1878.

NEW ZEALAND.

PUBLIC WORKS STATEMENT,

BY THE MINISTER FOR PUBLIC WORKS, THE HON. JAMES MACANDREW,
TUESDAY, 27TH AUGUST, 1878.

SIR,—

In submitting the Annual Public Works Statement I shall endeavour to do so in as few words and as clearly as I can. The task is new to me, and I am sure the House will extend to me its indulgence.

It will, I think, be more satisfactory, and will make the subject clearer, if, instead of embodying fully in my Statement the materials with which I have been furnished by the officers of the various departments, I append, as usual, the departmental reports themselves. With this view I shall confine my Statement to a bare outline of results for the year, and to an exposition of the Public Works proposals of the Government as respects the future. In this way, honorable members will be spared having to listen to a lengthy Statement from me, and they will be enabled, at leisure, to acquire a perfect knowledge of what has been doing during the year.

Before proceeding further, it may, perhaps, be expected that reference should be made to the recent changes which have been effected in the Public Works Department.

It will be remembered that last session the working of our Railway System was very fully inquired into by a Select Committee of this House. One of the most important conclusions arrived at was, that the construction of railways is one thing, and the working of them is another, and that the two things ought to be placed under distinct management. Accordingly the Government has given practical effect to this opinion, with, I am glad to say, so far as it has gone, good results, both as regards efficiency and economy.

The new system has involved of course, to some extent, a complete re-organization of the Public Works Department, and it must necessarily take some time before the machinery can be got to work smoothly in its new groove. I am persuaded, however, that the change will be found to be a step in the right direction.

The management of Working Railways in each island has been placed under a Commissioner, who, in matters of detail, has been invested with large discretionary power, and who is directly responsible to the Government through the Minister for Public Works; this change, when it gets fairly under way, will, I believe, result in numerous improvements in the practical working and organization of our railway system.

The Committee further suggested that the experiment of leasing the railways might be tried in the case of one of the Auckland lines. This is a matter, however, which involves very grave consideration; and, so far as the Government has been able to arrive at any conclusion on the subject, we do not yet see our way to taking any action in this direction. No doubt much may be said both for and against leasing the State railways. It seems premature, however, to entertain the question until such time as the system is more completely developed, or, at

all events, until it is seen how the recent change in the administration is likely to turn out. In the meantime, the balance of consideration would seem to be much in favour of the State retaining the management of its Railways in its own hands, although I am not prepared to say that the time may not arrive when it may be otherwise.

Among other points to which the Committee of last session directed its attention was that of affording greater facilities for the purchase of railway tickets than exist at present. I may say that with this view arrangements are now being made whereby, at the chief centres of population, tickets may be purchased otherwise than at Railway Stations.

Although during the past financial year there are one or two small lines which have not paid working expenses, yet upon the whole the returns will no doubt be regarded as satisfactory.

WORKING RAILWAYS, MIDDLE ISLAND.

In the Middle Island considerable lengths of line have been opened during the past year. At the close of the preceding year there were 647 miles of railway open for public traffic, and on 30th June last 741 miles were opened, being an increase of 94 miles The gross revenue on Middle Island Railways during the year amounted to £467,316, and the expenditure to £321,970; leaving a net balance available for the payment of interest of £145,346, as against £118,040 for the previous year.

The working expenses of the whole of the Middle Island Railways have averaged 68·89 of the receipts.

The total expenditure on the Construction of Railways in the Middle Island, including the Estimated Provincial Expenditure and the outlay on Harbour Works at Greymouth is, in round numbers, about £5,469,000, so that the profits show 2·65 per cent. on the whole outlay. This may be regarded as a not unfavourable result, seeing that some of the lines included in the above outlay have only been opened recently, and others are still unfinished.

The total number of passengers carried during the year was 1,159,147.

The working expenses on the Dunedin Section are considerably higher than during the previous year. This is mainly attributable to the heavy expenditure which has been found necessary in the renewal of rails and sleepers.

It will be seen from the Departmental Reports that £36 per mile of railway has been expended during the past year in new rails and fastenings on the Dunedin Section.

The working expenses on the Christchurch Section have been considerably reduced. The Commissioner's report shows a decrease of upwards of 6 per cent. on the gross revenue, being equal to a sum of £17,500, an amount which would have been considerably larger but for the introduction of a new tariff and mode of charge during the year.

For example, the rate during the year 1876–77 between Christchurch and Lyttelton for coal was 5s. 6d. per ton, and on timber 1s. 4d. per 100 feet. These rates have been reduced to 3s. 6d., and 10d. respectively, leaving a difference in favour of the earnings of 1876–77, as against 1877–78, of 2s. a ton on coal, and 6d. per 100 feet on timber, which on the quantity conveyed represents upwards of £6,700.

In comparing the result of the management for the two years, it is only fair to observe that, had the old rates been maintained, the sum named would have appeared at the credit of the past year.

It is held by some that provision should be made for wear and tear, and renewing the lines, by means of a sinking fund. I am disposed to think, however, that the system at present adopted—viz., that of renewing the lines as required and charging the cost directly against working expenses, is the best—it is certainly the simplest as regards accounts. It is not as though the whole of the lines had to be renewed at one and the same time—the work of renewal really commences from the date of opening the line for traffic.

It may be interesting to observe that the earnings per mile per annum on the three main Sections of Railways opened for traffic in the Middle Island are—

	£	s.	d.	
Christchurch Section	764	10	7	per mile per annum.
Dunedin Section	1,071	19	5	„ „
Invercargill Section	331	3	1	„ „

WORKING RAILWAYS, NORTH ISLAND.

In the North Island there were 311 miles of Railway open for public traffic on 30th June last, being 99 miles in excess of the number open on the same date of the previous year. The gross revenue for the year amounted to £102,581 18s. 4d., and the expenditure to £83,925 2s. 7d., leaving a net balance available for the payment of interest of £18,656 15s. 9d., as against £13,565 12s. 8d. for the preceding year.

The working expenses of the whole of the North Island Railways have averaged 81·81 per cent. of the receipts.

The total expenditure on Railways in the North Island up to date is, in round numbers, about £2,478,000, showing a profit on the whole outlay of 15s. per cent. A saving of some £8,000 a year has been effected in the working expenses of North Island Railways since they have been placed under separate management.

The total number of passengers carried during the year was 313,728.

The Reports of the Commissioners of Railways for each Island so fully explain the position, and afford such ample information of affairs, that I shall not further weary the House on this part of the subject.

RAILWAYS UNDER CONSTRUCTION—NORTH ISLAND.

So much for the Working Railways. I shall now turn to the other department of Public Works, namely—that of Railway Construction. You will, no doubt, be glad to learn that a considerable saving will be effected in the Head Office staff of this department, although the full extent of such saving will not appear until the expiration of the twelve months' notice of termination of engagement to which officers are entitled; the estimates will then show a reduction of some £3,000 a-year on departmental salaries. I am not without hope that a still further reduction may be effected without impairing the efficiency of the public service. This will, of course, depend upon the extent to which we may be enabled hereafter to carry on railway construction.

The position of Engineer-in-Chief for the colony it has been found expedient to dispense with, chiefly on the ground that it is physically impossible for one man to exercise any very minute personal control over the public works in both islands. It has, therefore, been deemed conducive to the public interest to appoint an Engineer in Charge in each of the two Islands, both of whom are, as in the case of the Commissioners of Railways, directly responsible to and under the control of the Government, through the Minister. By this means, the professional head of the department, primarily responsible, will be enabled to exercise a much closer personal supervision and control over Public Works than heretofore; and so far as my experience of the change enables me to judge, I am of opinion that the new arrangement is likely to work well, and be beneficial to the service. The departmental expenditure has not been increased, but has been diminished by the change.

It has been alleged that the changes by which the construction of Public Works, and the working of Railways in each Island, has been placed under distinct heads, is the forerunner of some deep and sinister design on the part of some person or persons, and that it is studiously intended to lead up to the political separation of the two Islands. I need scarcely say that such surmise is absolutely without foundation; one of those changes, at least, has been the result of careful inquiry by a Committee of this House, and, in so far as I am concerned, both have been made solely and simply with a view to more efficient and economical administration, altogether irrespective of the political opinions which I have long held, and which I still hold, as to what would have been the best and most suitable

form of Government for New Zealand. I would even go further, and say that, in my opinion, it would have been well for the colony to have had two Ministers for Public Works, one for each Island—both being members of the Cabinet, with seats in and responsible to this House. I venture to think that, had such been the case, there would have been much more to show for our money than there now is.

I shall now allude to the expenditure which must be incurred in respect of the completion of the portions of railways already authorized in the North Island,—

	Total Miles.	£
Kawakawa	6	27,000
Kaipara–Puniu	141½	247,000
Napier–Manawatu ...	70½	121,000
Wellington–Woodville ...	66	271,000
Waitara–Patea	33½	75,000
Patea–Manawatu ...	108	217,000
Total ...	425½	£958,000

of this amount, £321,625 are liabilities already incurred; and the difference, £636,375, is the amount required to finish the lines, which, when completed, will give 425½ miles open for traffic in the North Island.

RAILWAYS UNDER CONSTRUCTION—MIDDLE ISLAND.

The expenditure necessary to complete the Middle Island Railways already authorized is as follows:—

	Miles.	£
Nelson–Foxhill ...	23	39,000
Picton–Blenheim ...	18½	27,000
Brunner–Greymouth ...	8	112,000
Westport–Ngakawau ...	19¾	40,000
Amberley–Waitaki ...	315¾	303,000
Waitaki–Bluff ...	361	366,000
Winton–Kingston ...	68	25,000
Western Railways ...	44½	103,000
Waipahi to Tapanui ...	15½	72,000
Total ...	874	£1,087,000

Of this amount, £398,430 is for liabilities already incurred, and the balance of £688,570 is the amount required to finish the lines, which, when completed, will give 874 miles open for traffic in the Middle Island.

It will thus be seen that the sums required to complete and to place in proper working order the lines in both Islands, are, in the North Island, £958,000; and in the Middle Island, £1,087,000; making together £2,045,000, an amount which will go far to absorb the recent loan. It is proposed, however, to expend only £1,176,500 during the ensuing year.

THE FUTURE.

I will now proceed to indicate our proposals for the future.

NORTH ISLAND RAILWAYS.

We propose to fill up the gaps in the North Island system as follows:—

Wellington to Foxton *viâ* Waikanae	61 miles.
Waitotara River to Upper Patea Crossing	51 „
Te Awamutu (Waikato) to Inglewood (Taranaki)	125 „

This will complete an unbroken line from Wellington to Auckland of 476 miles.

Masterton to Woodville	50 miles.
Woodville to Papatu	40 „

Thus establishing unbroken railway communication from Wellington to Napier by a line of 220 miles.

Waikato to the Thames	30 miles.
Branch Line to Hamilton	2¼ „
Helensville to Kaukapakapa River	2½ „

Except as regards the line from Waikato to the Thames, there are no actual survey results upon which to estimate the cost of these works; and the

figures I am about to quote are based upon the ascertained mileage cost of the railways that have been constructed in different parts of the colony. Upon this basis, the following estimates of cost are arrived at:—

	£
Wellington to Foxton	440,000
Waitotara River to Upper Patea Crossing	357,000
Te Awamutu to Inglewood	1,115,000
Masterton to Papatu *vid* Woodville	630,000
Waikato to the Thames	168,000
Branch Line to Hamilton	10,000
Helensville to Kaukapakapa River	25,000
Wangarei to Kamo (7½ miles)	30,000
Total	£2,775,000

If we add to this the amount required to complete lines already authorized, namely, £958,000, we shall have a total of £3,733,000 for North Island Railways.

The construction of the line through the Waikato country, estimated, as I have said, to cost £1,115,000, will, it is hoped, be fully warranted by the acquisition of considerable areas of land suitable for settlement. I understand that the line will run through some of the finest land in New Zealand; and, from what has passed between the Hon. the Premier, the Hon. the Native Minister, and the Natives concerned, there is good reason to hope that the acquisition of the necessary land will be successfully negotiated. If those Natives have a just conception of the vast revenue which will accrue to them after parting with sufficient land whereby to construct this railway, they will not hesitate for a moment to enter heartily into a transaction which is bound to increase the value of the land which will be left to them very many fold. Moreover, they may earn a large amount of money by devoting their labour to the construction of the line, and there is good reason to believe that large numbers of them will gladly accept the useful employment which the construction of this line will afford.

The construction of the Wellington–Foxton line will, to some extent, be contingent upon the acquisition of land from the Native owners. In addition to an area of 300,000 acres of Maori land, 180,000 acres of which have been under negotiation for some time, the line will render available for settlement 100,000 acres now in the hands of the Crown; and there can be no doubt that, taken together, these lands will ultimately realise an amount which will go far towards covering the cost of the proposed railway. I know there may be considerable difference of opinion amongst honorable members with regard to this line; but I think that, apart from any advantages it may of itself yield, by enabling the country between Wellington and Foxton to be beneficially occupied, it is extremely desirable that it should be made, as part of the main trunk line which is to connect Wellington with Auckland. If the two great centres, Wellington and Auckland, are to be efficiently connected by railway, this Wellington to Foxton portion must be constructed at some time. I believe it to be well that we should accept the conclusion that that connection has to be made: and if so, I think the Parliament and the people will agree with me, that the sooner it is done the better it will be for the country. It will be seen from one of the Appendices to this Statement, that during the recess the question of the best route from Wellington to Foxton has occupied the attention of the Public Works Department; and of this, honorable gentlemen may rest assured, that, assuming the Government should be enabled to undertake the work, it will not be commenced until there has been a further, and a most thorough, investigation as to the best route to be adopted. It will thus be seen that our proposals embrace one main line of communication on the West Coast from Wellington to Auckland and the Thames, and another on the East Coast, Wellington to Napier. To make the system complete, it remains but to establish a connection between these two main lines by means of a short link of 12 miles between Bunnythorpe and Woodville. This would place Napier, and nearly all the East Coast country, in communication, not merely with Wellington, but also with Manawatu, Wanganui, New Plymouth, and Auckland. The probable cost of this link would be £119,000, and there can be little doubt that sooner or later this work will be undertaken.

As regards the North of Auckland it will be seen by these proposals that if the Kaukapakapa Station can be advantageously selected, railway communication for a distance of 40 miles will connect that city with the great Kaipara estuary, at a point accessible to vessels of ordinary tonnage. The short line from Wangarei to Kamo, opening up, as it will do, the important mineral and agricultural resources of that district, will come in as a portion of the Main North Line, which will, when completed, connect Auckland with the Bay of Islands.

MIDDLE ISLAND RAILWAYS.

Now, as to the Middle Island. The works we propose for the future are—

	Miles.	£
Otago Central—Dunedin to Albert Town, Lake Wanaka, ...	160	1,100,000
Amberley to Brunnerton, ...	110	950,000
Greymouth to Hokitika, ...	26	220,000
Canterbury–Interior Main Line—Oxford to Temuka, ...	85	380,000
South Ashburton to Ashburton Forks, ...	20	55,000
Albury Extension, ...	20	110,000
Tapanui Extension to Heriot Burn, ...	10	40,000
Fortrose to Edendale, ...	26	110,000
Otautau to Nightcaps, ...	16	75,000
Clutha to Catlin's River, ...	18	95,000
Waimea to Switzers, ...	15	70,000
Lumsden to Mararoa, ...	35	180,000
Shag Valley Branch Line, ...	9	35,000
Tapanui to Heriot Burn, ...	10½	40,000
Waireka Branch to Livingston, ...	16	105,000
Making a total length of proposed Railways for the Middle Island of ...	576½ miles, at a total cost of	£3,565,000

Adding to this an amount of £1,087,000, which is the estimated cost of completing and putting into working order the lines already authorized and opened for traffic in the Middle Island, we shall have a total of £4,652,000 for that Island.

As regards the Otago Central, honorable members will recollect that this House last session, both by resolution and by Act, affirmed that 100 miles of this line through Strath-Taieri to Clyde should be proceeded with; and the House also passed a resolution, in compliance with which 396,000 acres of Crown lands have been reserved from sale, with the view of devoting the proceeds, when they are sold, to the construction of this portion of line. It is now proposed to extend the line from Clyde to Lake Wanaka, a distance of 60 miles, for some 50 miles of which the country is as level as a bowling-green; the whole of it being in the hands of the Crown and available for settlement. My belief is, that no other of the lines now proposed will promote settlement and increase the productive power of the colony to the same extent as the Otago Central; and I venture to predict that many years will not pass without this line being extended to Hokitika *viâ* the Haast Pass. The length of that extension from Albert Town, the now-contemplated termination of the line, is only 190 miles; and the highest point of the range to be crossed is only 1,700 feet, as against 3,000 feet in the next line we propose to undertake,—that namely, from Amberley to Brunnerton, a distance of 110 miles.

Although it does not appear that this Amberley–Brunnerton line, in proportion to its length and cost of construction, will open up a very large extent of country suitable for settlement, yet the area of such land that will be opened up is by no means inconsiderable, and the proceeds of its sale will go far towards defraying the cost of the work. There can be no room for doubt that the traffic between the East and the West Coasts will, by this line, be developed enormously. It is estimated that, even now, were the line at work, there would be at the least 1,000 tons of coal alone brought across weekly; and if, as I believe, this coal, which is quite equal to the best Newcastle, can be put into ships' holds at Lyttelton for somewhere about £1 a ton, it is difficult to place any other limit than that of the carrying capacity of the line, upon the traffic that would be developed. There is also an almost unlimited quantity of timber, which would find its way to market by this railway. Honourable members will gather from the Engineer's report, that much careful exploration will be required before the exact route can be determined.

From Brunnerton to Greymouth, as members are aware, there is now a railway in operation, and we propose to continue it to Hokitika, a distance of 26 miles.

In accordance with a resolution of this House last Session, a reserve of land was made in the Aorere Valley in the Nelson District with a view of the proceeds being applied to railway construction. A flying survey of proposed line is now being completed. The Government is, however, of opinion that, before any expenditure in this direction is incurred, it is desirable that the river should be bridged, and the district rendered accessible by road, for which purpose £4,700 has been placed on the Estimates.

It will be recollected that last Session the House, on the motion of the honorable member for Akaroa, Mr. Montgomery, directed that surveys should be made, and estimates prepared, for a number of branch railways, as feeders to the main line. Those plans have been made, and the estimates are ready; but it has been suggested that the general interests of settlement would be better served, and the resources of Canterbury be developed to a much greater extent, if, instead of those branches, we obtained authority to construct an Interior Main Line, of about 85 miles in length, by means of which a very large area of available country would be opened up and made productive. The Engineer, in his report on this subject, says:—

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

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

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

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

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

I agree with this view, and now submit proposals for the Interior Main Line—Oxford to Temuka—accordingly. The South Ashburton to Ashburton Forks and the Albury Extension Lines will facilitate the beneficial occupation of upwards of 200,000 acres of land, which must add largely to the exports of Canterbury, and to the revenue of the main line; of this land 30,000 acres are in the hands of the Crown.

Some honorable members may be disposed to think that, having regard to the length of the railways which Canterbury already possesses, she is allowed an undue share in our proposals: but slight reflection will show that such an objection cannot be fairly sustained. When we consider the large amount which the coffers of the colony have derived from the Land Revenue of Canterbury, and the amount which, it is hoped, will for some time to come continue to be derived from the same source, I maintain that the district is entitled to even more than is now proposed. We are, in fact, only intending to confer upon the people of Canterbury benefits derivable from applying to a colonial purpose their own money—only proposing to expend a portion of Land Revenue for the benefit of those upon the land from which that revenue has been derived, by devoting it to purposes to which not only is it legitimately applicable, but for which it ought always to have been

held sacred. The same remarks will apply to the other railways, which are to depend for their construction upon the proceeds of the sale of lands to be rendered valuable by them.

A very important line in Canterbury, which is not included in the present proposals, is the Akaroa and Lake Ellesmere Line. The Government hope that the Trust—whose powers will be prolonged and extended by the Bill which has recently passed this branch of the Legislature—may find means whereby this work may be proceeded with. If, however, it should be found that the Trust is unable to do so, the Government will, at a future time, be disposed to deal with the matter specially, with a view to this most important undertaking being pushed forward.

As regards the branch line, Waipahi to Heriot Burn, it will be recollected that last Session the House decided that this branch should be constructed as far as Tapanui. It voted no money for the work, but resolved that it should be paid for out of land to be set aside for the purpose. I am pleased to say that this branch is now under way, and that no money will be required until after completion; the terms of the contract being that payment is to be made in cash, in three equal instalments, at two, four, and six months after the line is completed. The amount is £61,500, and the time for completion twenty-two months from date of contract, so that we shall have two years and upwards in which to realize upon the 40,000 acres of land reserved. The probability is that this land, owing to the construction of the railway, will realize from £2 to £3, and upwards, an acre, and will thus yield double the amount of the contract. I may add that there were five tenders for the work on the above terms, and the one accepted, being the lowest, was £2,000 under the Engineer's estimate. This fact is worth any number of arguments to show how we might, to a great extent, construct our railways without increasing the amount of our public debt, or adding to the annual burden in respect thereof. It is now proposed to extend the line 10 miles further; by so doing the growth of cereals will be very largely increased, and one of the most productive districts in the colony fully developed.

I have heard it objected that now, when the Land Fund has been colonialized, it is unfair to the colony as a whole to alienate large portions of its landed estate for local purposes. To me, such an objection seems—if I may be permitted so to say—simply absurd. We are not alienating landed estate: we are changing the form of parts of it, and thereby greatly increasing the value of the whole. If portions of land go, so far as the colony is concerned, the railways constructed out of the proceeds remain; and if we manage our affairs wisely, we shall derive a much larger income from those railways than we ever did, or ever could, derive from those portions of land.

We do not propose to deal exceptionally with the proceeds of land set apart for the construction of railways. Those proceeds will be dealt with as ordinary revenue; while from the enhanced value of the lands to be affected by the lines so constructed, we may fairly assume it as a fact that the ordinary revenue will year by year be greatly increased.

SUMMARY OF PROPOSALS—AIDS TO THE PUBLIC WORKS FUND.

Summing up the proposals I have had the honor to submit, they will be found to involve an expenditure for railways in the North Island of £3,733,000, and in the Middle Island of £4,652,000; altogether, £8,385,000. As I have already observed, the estimates under which these figures have been arrived at are to a certain extent approximate. My belief is that they are more over the mark than under, and that, with judicious and careful administration—unless circumstances alter very much within the next few years—it will be found that a much less sum will suffice. We propose that the expenditure shall be extended over five years, which, in my opinion, is the shortest period within which we could carry out works to this extent, unless we are prepared for the importation of labour to a greater extent than can be readily absorbed in the permanent settlement of the country. Our object will be so to regulate the administration of the waste lands of the Crown, as to afford every inducement and facility to men who labour in the construction of railways to invest their earnings in land. By laying off allotments for sale along the various lines as they progress,

I am disposed to think that much may be done in this direction, and that a fair proportion of the money expended on Public Works may find its way back to the Treasury.

Out of the loan authorized last session, there remained, on 30th June, available for public works, about £2,000,000. If we add to the Public Works Fund from ordinary revenue, during the next five years, say, £3,500,000, the amount just stated as available will be increased to £5,500,000; and there will remain about £3,000,000 to be raised by further loans, in order to meet the estimated cost of the whole of our proposals.

It may, perhaps, be asked, is not £3,500,000 too large a sum to expect to be spared from revenue? Is the revenue likely to be in a position to meet such a demand? In order that honorable members may be enabled to form an opinion as to this, I shall enumerate the different areas of Crown lands, the value of which will be specially affected by the proposed railways, and the sale of which may be said to be contingent upon those lines being constructed.

In the Middle Island, the *Otago Central to Albert Town* will pass almost entirely through Crown land, and open up the most valuable public estate in the colony: it will affect an area of 2,250,000 acres, all in the hands of the Crown.

Amberley to Brunnerton will pass through nearly 300,000 acres of freehold, and render available 400,000 acres of Crown land.

Greymouth to Hokitika will affect 85,000 acres of forest land belonging to the Crown.

Canterbury Subsidiary Main Line will pass chiefly through freehold land, but as it cuts across all the valleys at the base of the hill country, its construction will be of considerable value to the settlement of those valleys, and render more accessible an area of Crown land of 560,000 acres.

South Ashburton to Ashburton Forks, and Albury Extension, will enhance the value of 30,000 acres.

Fortrose to Edendale.—A preliminary survey of this line has been made, in terms of a resolution of the House last session, and land has been reserved for its construction in accordance with the same resolution. It will promote the profitable occupation of 120,000 acres of land, 40,000 of which are in the hands of the Crown.

Otautau to Nightcaps.—This is an extension of the inland line from Riverton. It will render available a very valuable coal field, and promote the cultivation of over 50,000 acres of fine agricultural land, 10,000 of which is in the hands of the Crown.

Clutha to Catlin's River is the commencement of a line which passes through a district containing 60,000 acres of fine agricultural freehold land. It will lead to the occupation of a territory which contains 60,000 acres of Crown land, chiefly forest.

Waimea to Switzer's opens up 200,000 acres of fertile land, much of which is ready for the plough, and all in the hands of the Crown.

Lumsden to Mararoa opens up 200,000 acres of Crown land of the finest quality, a great portion of which will, I believe, be occupied and cultivated very shortly after it is rendered accessible by rail.

Shag Valley Branch is a line which was intended to have been made by the Provincial Government of Otago. Surveys and working plans were prepared, and public tenders applied for and received, when abolition intervened. It commands a rich agricultural and pastoral district of 45,000 acres, of which 10,000 acres belong to the Crown, and will be one of the best paying feeders to the main line between Dunedin and Oamaru. It will, moreover, greatly facilitate access to the important gold-mining and rapidly-increasing agricultural districts of Macrae's and Hyde.

It will thus be seen that an area of nearly 4,000,000 acres of Crown land in the Middle Island will be affected by the proposed lines. Much of this land if accessible by rail, and in the market now, would realize £5 an acre and upwards. Probably we shall not be beyond the mark in estimating that it will realize to the State, at a moderate computation, little short of the whole estimated cost of the railways—viz., £4,650,000—now proposed to be made in the Middle Island.

As regards Crown lands in the North Island, I have first of all to direct the attention of honorable members to the fact that about 120,000 acres of the best land on the West Coast, portion of the confiscated territory, is now being surveyed for sale. I do not wish to raise the expectations of honorable members unduly, but I believe that I am warranted in reckoning that from this quarter alone (irrespective of the large area of land already acquired and under negotiation in the same locality) we may expect to receive a net revenue of three-quarters of a million sterling. In addition to these are very large areas of land in the Thames and Piako Districts, which will at once acquire a greatly increased value from the prospect of railway communication being likely to be opened between Grahamstown and Waikato. Other large blocks of land in the Bay of Plenty, Poverty Bay, and Wellington Districts, will shortly be available, and we shall have the gratification of beholding the North Island, for the first time for many years, yielding a substantial land revenue. For more particular information as to area, locality, and probable value of our North Island land estate, I would refer honorable members to the usual statement on Native lands, which will be shortly made by my colleague the Native Minister.

In reference to such of those lands as are situated upon the West Coast of this Island, forming part of our confiscated territory, I have a proposal to make to the House, which, while it may appear to be a considerable modification, if not a reversal of the financial arrangements of last session, is really a means of giving a practical effect to those arrangements. These lands have been acquired at an expense of blood and treasure, which, in our opinion, justify exceptional treatment in appropriating the proceeds. In addition to the 25 per cent. payable to the New Plymouth Harbour Board, the county in which they are situate, in accordance with the legislation of last session, would receive 20 per cent. of the amount realized from the sale, while the colony, which had already paid so heavily for the land, would be called upon to provide the means of constructing the main line of railway. We propose, then, to apply 15 per cent. of the 20 per cent. otherwise payable to the county, to the construction of the railway through the district. As the land will shortly be in the market, there will be a considerable sum at no distant date specially available for this work, which can be commenced immediately. The county will in this way receive the whole of the 20 per cent., while the colony will be assisted in a work which will contribute so materially to enhance the value of property in the district, and to increase the financial resources of the county.

Assuming these proposals to be approved by the Legislature, it becomes an important question, What is to be our procedure with regard to the works not already sanctioned? The House will, of course, recognize the impossibility of coming to any conclusion on such a matter which can be satisfactory to all. Each district in the colony believes that its claim to be provided with railways, at the cost of the State, ranks at least as high as the claim of any other district; and none, probably, will admit that any such claim ought to be met before its own. This, in truth, is a great difficulty, which the House, by its past legislation, has brought upon itself. That difficulty commenced from the moment when the Legislature repealed that cardinal condition of the Public Works policy that in the event of the proceeds of any railway failing to meet interest and sinking fund on the cost of its construction, property in the district should be rated to make up the deficiency. The difficulty is one which, I confess, I cannot solve. As things stand, the Government are desirous to distribute to the best advantage whatever funds may be available for the construction of Public Works, and to do this as fairly as possible under the circumstances, we shall endeavour to carry on as nearly as may be simultaneously the various works that may be authorized, and to apportion the expenditure each year in such directions as shall seem most likely to promote the speedy settlement and beneficial occupation of the waste lands of the country. Much of the difficulty of the situation arises from the fact that here in New Zealand we are expected to do, in a few years, what it has hitherto taken centuries elsewhere to accomplish. A few hundred thousands of people are bent upon doing in a lifetime that, which in the past has been the work of millions of men during generations. If New Zealand goes onward as she is now doing until she reaches her first centenary, it is hard to decide which will then be the "Greater," which the "Lesser," Britain. It is the remarkable progress we

have made which renders us so impatient with regard to our future progress, and this impatience is for us an evil, against the possible effects of which we must jealously guard.

I need scarcely say that there are lines of railway in each island, besides those embodied in my proposals, the importance of which are fully recognized by the Government, and which we should have been glad to have included. The present proposals involve an expenditure of £1,677,000 a year, until the lines mentioned are completed; and if we can come to an arrangement as between ourselves—an honourable understanding, which ought to be held as binding as the laws of the Medes and Persians—that, upon the completion of those lines, a similar amount shall continue to be expended on productive railways only, it is a mere question of time when all the land throughout the colony which it is required to occupy and render available by means of railway communication, shall be so rendered available. By the time that the railways now proposed are complete, we shall, no doubt, find that many branch lines will be undertaken by private enterprise. There are at present throughout the colony nearly 100 miles which are being taken in hand under the provisions of the District Railways Act of last session, and it is believed that by slightly amending that Act, advantage will be taken of its provisions to a much larger extent, and the Government will thereby be relieved of constructing many lines which, sooner or later, must otherwise devolve upon it. I look upon this as one of the most gratifying features in the future railway policy of New Zealand.

LOCAL WORKS.

I must now solicit the earnest attention of honorable members to a question which may virtually affect the whole scope of the future policy of the colony, and which, in my belief, may largely influence the functions and the character of this House—I refer to the question of Roads and Bridges. Although the gradual extension of the railway system is diminishing the extent to which money must needs be expended in such works, as compared with what was unavoidable in the past, there are still many districts in which such works will continue to be for years to come essential. I need not remind you, that one of the great advantages which was to be secured by the recent political changes was, that the name of a road or a bridge was never more to be heard in this House as connected with any askings for money. Such, we were asked to believe, was to be one of the first results of the Abolition of the Provinces. As it is, however, unless the House is prepared to make a decided stand, it is to be feared that roads, bridges, and culverts will become subjects of the most anxious and excited discussions to be heard within these walls. What, then, is to be our policy with respect to these works? My colleagues and myself are clearly of opinion that they ought to be wholly devolved upon local bodies, by whom the requisite funds must be found. One thing seems to me to be beyond doubt or question: The Colony must undertake all such works, or must refuse to undertake any. Any other course must be brimful of injustice. Last session we passed various votes for roads and bridges, with the understanding that the amounts were to be provided out of loan. Those votes will, I apprehend, have to be made good in any case. Many of them are now in course of expenditure; and we propose to renew all the unexpended portions by putting them upon this year's Estimates. This will, in round numbers, mean the appropriation of about £102,000 for local works in the North Island, and about £166,000 for similar works in the Middle Island. Thereafter we propose to finally close the account, and to confine Public Works operations entirely to railway construction. I admit that if we are sustained in this course, it will be productive of hardship to those portions of the colony which were not fortunate enough to participate in the scramble for roads and bridges last year. It seems to me, however, as I have said that, in fairness, we have no middle course open. If we are to construct arterial roads and bridges, we must take charge of all such works, and subsidies in aid of them, which are now paid to local bodies, must cease. It is manifestly unreasonable to expect that the colony can go on paying, as it did last year, nearly three-quarters of a million to local bodies, if it has to perform the functions which devolve upon such bodies besides.

One way out of the difficulty, perhaps, would be to increase the borrowing powers of local bodies. To this, however, many objections may be urged. Some people are of opinion that the colony should raise the money, and leave the local bodies to expend it; but here, again, we should trample under foot a fundamental principle on which the new order of things was so recently based—namely, That no money shall be raised by the colony the expenditure of which is not to be placed directly under the control of this House. For my own part, I have never believed that that principle ought to be rigidly and unreasoningly observed; but it was one of the cardinal points of Abolitionism, and I presume it will be adhered to by the present Parliament.

Altogether, I confess that this is one of the most difficult problems which we are now called upon to solve, and there can, in my opinion, be only one out of two fair solutions—either the colony should close its bowels of compassion in respect of every application for roads and bridges, however exceptional may be the claim (and they are all exceptional in the opinion of the claimant), or it should distribute its gifts to all upon some equitable basis. As it is, unless we go into the money market, there will be nothing to distribute over and above the subsidies already fixed. There remains, therefore, only the one solution, of every locality relying upon itself. I need scarcely say that, under all the circumstances of the case, we have been reluctantly compelled to turn a deaf ear to numerous and pressing applications for local works throughout the colony. I omitted to observe that the two amounts above referred to are irrespective of a sum of £225,000 which is required to meet provincial liabilities, and £35,000 for roads in Native districts.

It will be recollected that last Session a Bill was introduced, intituled "The Settlements Works Advances Bill," the object of which was to enable the Government to open up lands for settlement before they were put up for sale. In many localities Crown lands are comparatively inaccessible, and unless they are, to some extent, opened up by roads, they are likely to remain unoccupied or be sold below their value to speculators. This Bill, however, did not become law, as the Government did not specify the precise localities in which the proposed expenditure was to be applied. We intend to ask a vote of £58,590 for this object, full particulars of the proposed expenditure of which will appear in the Public Works Estimates. It is estimated that this amount will, at an average of 2s. 10d. per acre, enable upwards of 414,000 acres, in various districts throughout the colony, to be brought into the market, under conditions which will largely enhance its value.

It will be seen from the Public Works Estimates that a considerable sum of money is required for expenditure on various public buildings throughout the colony. Among those to which I may specially refer is the Lunatic Asylum at Dunedin, which is too small for the number of inmates, and which it is proposed to remove to a more suitable locality, being an extensive reserve of 900 acres of Government land, the cultivation of which on the part of the patients will, it is hoped, render the institution self-supporting, thereby relieving the State of a large annual burden which must otherwise continue to devolve upon it. It is proposed in the new establishment to make suitable provision for the cure of inebriates; to enable which class of patients to be dealt with, some special legislation will be necessary.

It is also intended to erect upon the same reserve adequate separate buildings for the Otago Reformatory and Industrial School for boys and girls. The cost of this latter will be more than recouped by selling the property upon which the school at present stands.

While on this subject it may not be deemed out of place to notice, that the hulk in Wellington Harbour belonging to the Public Works Department, being no longer required, we propose to have her fitted up as a Training School and Reformatory, into which boys convicted of criminal offences may be drafted from all parts of the colony, instead of their being associated with hardened criminals in the common gaols, or mixed with those whose only crime is that they have been left destitute and neglected.

CONCLUSION.

Much as the Public Works and Immigration Policy has conduced to the prosperity of New Zealand, there can be no question that if it is followed up as is now proposed, the future results will very largely exceed those of the past. We know the extent to which railways have helped us to increase our settled population, our agriculture, and our trade; and we know that for some of those railways we have paid very dearly, not alone in money. But our experience, whatever it has cost us, should at least have taught us in what directions, and in what manner, we can best spend the money hereafter available for such undertakings. Not only ought we resolutely to resolve that we will never again sanction the commencement of a railway as to which we have not at least reasonable evidence that it will pay; but we should equally resolve that, as one point of our experience, 10s. shall be made to represent as much work as 20s. have—unfortunately in too many cases—represented heretofore. We now see clearly many things after which we could only blindly grope when we began to construct our railways; we have many appliances that were then wholly wanting; and we have in our midst responsible and capable contractors, for whom, at the outset, we had to go far afield. In addition, the prices of materials are greatly reduced—indeed upon rails alone, the reduction is so great that, could we afford at once to purchase all we shall want for our contemplated lines, we should save probably £600,000, as compared with prices we have as a rule had to pay. Advantage has been, to a limited extent, taken of the low state of the market by ordering 10,000 tons of steel rails at £5 14s., delivered at Cardiff. In expressing these opinions I desire to disclaim casting any reflection upon those who have hitherto had the professional overcharge of our public works; if there have been blunders they have been chiefly incidental to circumstances, and to the nature of things—in my belief they have been more political than professional.

I do not think that I need occupy the time of the House further.

Appended to the Statement are tables showing:—

1.—Summary of Liabilities and Expenditure to 30th June, 1878.
2.—Statement showing the Total Liabilities and Expenditure on Railways out of Immigration and Public Works Loan to 30th June, 1878.
3.—Statement showing the Expenditure on Railways to 30th June, 1878—Classified.
4.—Statement showing the Liabilities on Railways to 30th June, 1878—Classified.
5.—Statement showing the Liabilities on Roads and Water-races to 30th June, 1878.
6.—Statement showing Liabilities and Expenditure on Roads, North Island, to 30th June. 1878.
7.—Statement showing Liabilities and Expenditure on Roads, Middle Island, to 30th June, 1878.
8.—Statement showing Liabilities, and Expenditure out of Consolidated Fund, for Repairs and Maintenance of Roads in Native Districts to 30th June, 1878.
9.—Summary of Liabilities and Expenditure on Roads in Colony to 30th June, 1878.
10.—Statement showing Liabilities and Expenditure for Prospecting and Developing Coal Mines.
11.—Statement showing Amount of Subsidies Authorized, Paid, and Refunded, and Payments of Interest on Sums Advanced for Water-races.
12.—Statement showing Liabilities and Expenditure for Waterworks on Gold Fields to June, 1878.
13.—Return showing Amount Expended for Telegraph Purposes for Year ended 30th June, 1878.
14.—Return showing Liabilities and Expenditure for Telegraph Purposes to 30th June, 1878.
15.—Statement showing Liabilities and Expenditure on Public Buildings to 30th June, 1878.
16.—Statement showing Liabilities and Expenditure on Lighthouses to 30th June, 1878.
17.—Statement showing Liabilities and Expenditure on Miscellaneous Public Works to 30th June, 1878.
18.—Statement of Rolling-stock and Plant.

There are likewise reports from the Engineers in charge of Public Works, and the Commissioners of Railways, in both Islands; annual report on public buildings; report of Chief Inspector of Machinery; report on lighthouse works; report on coal exploration and inspection of mines; reports on trial of native coal on locomotives—all of which embody much valuable information, and will no doubt be found both useful and instructive.

I conclude, Sir, by once more commending to the approval of honorable members the proposals I have had the honor to submit. I have had pleasure, too, in submitting them, for in my belief they are calculated to meet the requirements of settlement over a great portion of each Island. To give effect to them, will, I am convinced, be to increase enormously the productive power of the colony, and

to do that the constantly growing tendency of which must be to lighten the public burdens. Under these proposals, our industrial population ought to be at least doubled during the next few years; and the great proportion of the incomers ought to be, and may be, so located, that, while labouring lovingly to subdue the earth until that which is barren yields its kindly and natural fruits, they may labour stubbornly, because they are creating homes for their children, and proudly, because their names figure on no man's rent-roll. It is in such a spirit that most of us have struggled to create a great nation in this favoured land. Such was the spirit in which we strove through the day of small things; and now, when our vision is clearer as to what we may do and become, and when our grasp is firmer upon all that we undertake, I confess that I am jealous to have some share with those of whom it shall hereafter be said, that they had influence in promoting the prosperity and the greatness of New Zealand.

INDEX TO TABLES.

TABLE N . 1.

SUMMARY showing the TOTAL EXPENDITURE and LIABILITIES on PUBLIC WORKS out of IMMIGRATION and PUBLIC WORKS LOAN to 30th June, 1878.

Number of Table containing Details.	——	Expenditure to 30th June, 1877.	Expenditure during Year ended 30th June, 1878.	Total Expenditure to 30th June, 1878.	Liabilities on Authorities, Contracts, &c., 30th June, 1878.	Total Expenditure and Liabilities.	——
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
2 and 3	Railways	*6,129,920 8 5	713,578 17 2	6,843,499 5 7	720,055 19 9	7,563,555 5 4	Railways.
9	Roads	669,571 4 7	34,299 7 8	703,870 12 3	33,619 12 2	737,490 4 5	Roads.
11 of 1877	Payments made to Road Boards ...	225,000 0 0	...	225,000 0 0	...	225,000 0 0	Payments made to Road Boards.
10	Coal Exploration and Mine Development	10,260 8 8	574 19 4	10,835 8 0	52 15 3	10,888 3 3	Coal Exploration and Mine Development.
12	Water Supply on Gold Fields	355,063 8 10	39,645 17 7	394,709 6 5	15,306 18 1	410,016 4 6	Water Supply on Gold Fields.
11 of 1877	Aiding Works on Thames Gold Field ...	50,000 0 0	...	50,000 0 0	...	50,000 0 0	Aiding Works on Thames Gold Field.
14	Telegraphs	266,469 17 8	33,182 2 10	299,652 0 6	8,032 18 9	307,684 19 3	Telegraphs.
15	Public Buildings	178,467 18 4	105,167 13 3	283,635 11 7	22,525 0 0	306,160 11 7	Public Buildings.
16	Lighthouses	53,362 7 4	18,310 16 2	71,673 3 6	3,000 0 0	74,673 3 6	Lighthouses.
17	Miscellaneous Public Works	...	47,324 5 3	47,324 5 3	115,175 14 7	162,499 19 10	Miscellaneous Public Works.
	Departmental	99,101 18 4	17,914 13 1	117,016 11 5	...	117,016 11 5	
	TOTAL	8,037,217 12 2	1,009,998 12 4	9,047,216 4 6	917,768 18 7	9,964,985 3 1	TOTAL.

*This amount does not include the expenditure on railways of the late Provinces of Canterbury and Otago, which were valued at £731,759 and £372,522 respectively, and were not paid for out of Immigration and Public Works Loan, but were taken in reduction of the provincial debts.

TABLE No. 2.

STATEMENT showing the TOTAL EXPENDITURE and LIABILITIES on RAILWAYS out of IMMIGRATION and PUBLIC WORKS LOAN to 30th June, 1878, and reconciling same with Tables M and N, Financial Statement.

LINES OF RAILWAY.	Expenditure to 30th June, 1877, as per Table No. 3.	EXPENDITURE DURING 1877-78, AS PER TABLE M OF FINANCIAL STATEMENT, 1878.			Total Expenditure to 30th June, 1878, as per Table 3.	Liabilities on Authorities, Contracts, &c., 30th June, 1878, as per Table No. 4.	Total Expenditure and Liabilities.	LINES OF RAILWAY.
		On Votes 68 to 82 for Railways.	On Vote 83 for Surveys.	On Vote 84 for Additional Rolling-stock, Stations, Land, &c.				
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
NORTH ISLAND (as per particulars below)	2,199,465 9 1	277,765 9 9	866 1 2	...	2,478,097 0 0	321,625 18 10	2,799,722 18 10	NORTH ISLAND (as per particulars below).
MIDDLE ISLAND (as per particulars below)	3,930,169 0 11	423,842 16 8	9,654 7 5	900 7 3	4,364,566 12 3	398,430 0 11	4,762,996 13 2	MIDDLE ISLAND (as per particulars below).
MISCELLANEOUS SURVEYS ...	...	...	*470 17 11	...	470 17 11	...	470 17 11	MISCELLANEOUS SURVEYS.
UNAPPORTIONABLE	285 18 5	...	...	78 17 0	364 15 5	...	364 15 5	UNAPPORTIONABLE.
Total	6,129,920 8 5	701,608 6 5	*10,991 6 6	979 4 3	6,843,499 5 7	720,055 19 9	7,563,555 5 4	Total.
NORTH ISLAND.								NORTH ISLAND.
Kawakawa	26,460 5 7	143 13 9	...	...	26,603 19 4	848 14 7	27,452 13 11	Kawakawa.
Kaipara-Puniu	805,774 2 11	71,192 11 6	...	...	876,966 14 5	77,808 2 9	954,774 17 2	Kaipara-Puniu.
Napier-Manawatu	327,149 2 2	28,239 17 3	...	...	355,388 19 5	31,745 14 11	387,134 14 4	Napier-Manawatu.
Wellington-Masterton	464,778 0 7	73,314 19 8	...	...	538,093 0 3	114,710 16 0	652,803 16 3	Wellington-Masterton.
Waitara-Patea...	111,961 10 1	25,073 13 9	...	...	137,035 3 10	13,967 10 8	151,002 14 6	Waitara-Patea.
Patea-Manawatu	458,552 4 1	79,800 13 10	...	...	538,352 17 11	82,166 10 8	620,519 8 7	Patea-Manawatu.
PRELIMINARY SURVEYS.								PRELIMINARY SURVEYS.
Thames-Waikato	509 1 1	...	642 14 6	...	1,151 15 7	101 15 11	1,253 11 6	Thames-Waikato.
Mercer-Cambridge	528 17 3	...	...	...	528 17 3	...	528 17 3	Mercer-Cambridge.
Cambridge-Taupo	346 4 1	...	...	...	346 4 1	...	346 4 1	Cambridge-Taupo.
Masterton-Woodville	205 14 3	...	...	...	205 14 3	...	205 14 3	Masterton-Woodville.
Hutt-Waikanae	...	...	223 6 8	...	223 6 8	276 13 4	500 0 0	Hutt-Waikanae.
Tokano-Napier	20 16 0	...	...	...	20 16 0	...	20 16 0	Tokano-Napier.
Waipukurau-Gorge	3,179 11 0	...	...	...	3,179 11 0	...	3,179 11 0	Waipukurau-Gorge.
TOTAL, NORTH ISLAND ...	2,199,465 9 1	277,765 9 9	866 1 2	...	2,478,097 0 0	321,625 18 10	2,799,722 18 10	TOTAL, NORTH ISLAND.

* Including a sum of £109 15s. 11d. charged as unauthorized expenditure in Treasury Table N, Financial Statement, 1878.

TABLE No. 2—*continued.*

STATEMENT showing the TOTAL EXPENDITURE and LIABILITIES, &c.—*continued.*

LINES OF RAILWAY.	Expenditure to 30th June, 1877, as per Table No. 3.	EXPENDITURE DURING 1877-78, AS PER TABLE M OF FINANCIAL STATEMENT, 1878.			Total Expenditure to 30th June, 1878, as per Table 3.	Liabilities on Authorities, Contracts, &c., 30th June, 1878, as per Table No. 4.	Total Expenditure and Liabilities.	LINES OF RAILWAY.
		On Votes 68 to 82 for Railways.	On Vote 83 for Surveys.	On Vote 84 for Additional Rolling-stock, Stations, Land, &c.				
MIDDLE ISLAND.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	MIDDLE ISLAND.
Nelson–Foxhill	117,600 12 0	366 11 7	...	...	117,967 3 7	9,350 12 11	127,317 16 6	Nelson–Foxhill.
Picton–Blenheim	158,004 4 9	1,332 16 0	...	...	159,337 0 9	3,485 13 5	162,822 14 2	Picton–Blenheim.
Brunner–Greymouth	139,519 0 7	23,728 18 1	...	...	163,247 18 8	17,096 3 8	180,344 2 4	Brunner–Greymouth.
Westport–Ngakawau	157,791 2 10	28,644 5 4	...	...	186,435 8 2	15,691 4 11	202,126 13 1	Westport–Ngakawau.
Amberley–Waitaki (with branches)	1,275,962 10 6	102,968 18 10	...	*Cr.* 99 12 9	1,378,831 16 7	158,046 12 7	1,536,878 9 2	Amberley–Waitaki (with branches).
Waitaki–Bluff (with branches) ...	1,861,681 6 6	228,364 8 11	...	1,000 0 0	2,091,045 15 5	160,097 11 1	2,251,143 6 6	Waitaki–Bluff (with branches).
Winton–Kingston	203,607 5 5	25,173 5 1	...	...	228,780 10 6	8,123 15 9	236,904 6 3	Winton–Kingston.
Western Railways	...	13,263 12 10	...	...	13,263 12 10	23,684 7 9	36,948 0 7	Western Railways.
PRELIMINARY SURVEYS—								PRELIMINARY SURVEYS—
Foxhill–Brunner	2,872 19 1	...	...	...	2,872 19 1	...	2,872 19 1	Foxhill–Brunner.
Foxhill Southwards	454 11 8	...	...	...	454 11 8	...	454 11 8	Foxhill Southwards.
Greymouth–Christchurch ...	798 0 9	...	...	...	798 0 9	...	798 0 9	Greymouth–Christchurch.
Greymouth–Hokitika	2,727 19 4	...	6 6 3	...	2,734 5 7	37 7 9	2,771 13 4	Greymouth–Hokitika.
Hokitika–Christchurch ...	34 16 8	...	...	...	34 16 8	...	34 16 8	Hokitika–Christchurch.
Hokitika–Malvern	468 0 3	...	...	...	468 0 3	...	468 0 3	Hokitika–Malvern.
Hokitika Office	1,200 0 0	...	...	...	1,200 0 0	...	1,200 0 0	Hokitika Office.
Greymouth–Amberley ...	4,032 18 1	...	4,795 4 8	...	8,828 2 9	817 3 5	9,645 6 2	Greymouth–Amberley.
Amberley–Hurunui	...	...	151 16 8	...	151 16 8	55 17 4	207 14 0	Amberley–Hurunui.
Hurunui–Blenheim	522 2 5	...	204 10 6	...	726 12 11	...	726 12 11	Hurunui–Blenheim.
Ashburton–Mount Somers and Alford Forest	...	...	172 7 7	...	172 7 7	80 0 0	252 7 7	Ashburton–Mount Somers and Alford Forest.
Waimate–Hekataramea ...	...	...	109 0 0	...	109 0 0	...	109 0 0	Waimate–Hekataramea.
Duntroon–Hekataramea ...	...	...	...	...	...	1,050 0 0	1,050 0 0	Duntroon–Hekataramea.
Waimate Extension Survey ...	...	...	...	...	...	90 0 0	90 0 0	Waimate Extension Survey.
Orari–Hilton *viâ* Geraldine ...	...	...	124 16 0	...	124 16 0	...	124 16 0	Orari–Hilton *viâ* Geraldine.
White Cliffs–Rakaia Gorge ...	...	...	52 19 6	...	52 19 6	...	52 19 6	White Cliffs–Rakaia Gorge.
Albury–Fairlie Creek	...	...	105 10 6	...	105 10 6	...	105 10 6	Albury–Fairlie Creek.
Oamaru–Waiareka	493 6 9	...	...	...	493 6 9	...	493 6 9	Oamaru–Waiareka.
Waiareka–Livingston	...	...	8 2 6	...	8 2 6	...	8 2 6	Waiareka–Livingston.
Dunedin–Moeraki	2,175 2 4	...	...	...	2,175 2 4	...	2,175 2 4	Dunedin–Moeraki.
Clutha–Mataura	115 9 6	...	...	...	115 9 6	...	115 9 6	Clutha–Mataura.
Taieri *viâ* Strath Taieri–Clyde ...	...	...	2,684 3 8	...	2,684 3 8	178 12 0	2,862 15 8	Taieri *viâ* Strath Taieri–Clyde.
Taieri River *viâ* Brighton ...	...	...	3 0 0	...	3 0 0	...	3 0 0	Taieri River *viâ* Brighton.
Green Island Extension ...	...	...	7 11 0	...	7 11 0	11 12 0	19 3 0	Green Island Extension.
Clutha River Survey	...	...	0 18 6	...	0 18 6	...	0 18 6	Clutha River Survey.
Waipahi–Cromwell	100 0 0	...	...	...	100 0 0	...	100 0 0	Waipahi–Cromwell.
Waipahi–Tapanui	...	...	442 5 7	...	442 5 7	26 3 4	468 8 11	Waipahi–Tapanui.
Riverton–Orepuki	...	...	251 8 7	...	251 8 7	27 15 5	279 4 0	Riverton–Orepuki.
Gore–Elbow	...	...	454 12 0	...	454 12 0	369 1 6	823 13 6	Gore–Elbow.
Otautau, Waiau, and Nightcaps	...	...	39 13 11	...	39 13 11	110 6 1	150 0 0	Otautau, Waiau, and Nightcaps.
Lyttelton Station Ground ...	...	...	40 0 0	...	40 0 0	...	40 0 0	Lyttelton Station Ground.
Incidental	7 11 6	...	...	...	7 11 6	...	7 11 6	Incidental.
TOTAL, MIDDLE ISLAND ...	3,930,169 0 11	423,842 16 8	9,654 7 5	900 7 3	4,364,566 12 3	398,430 0 11	4,762,996 13 2	TOTAL, MIDDLE ISLAND.

TABLE No. 3.

STATEMENT showing the EXPENDITURE on RAILWAYS out of IMMIGRATION and PUBLIC WORKS LOAN to 30th JUNE, 1878.—CLASSIFIED.

LINES OF RAILWAY.	LAND. Costs.	LAND. Expenses.	SURVEYS: PRELIMINARY AND WORKING.	CONSTRUCTION. Grading.	CONSTRUCTION. Bridges and Culverts.	CONSTRUCTION. Fencing.	CONSTRUCTION. Permanent Way New Zealand.	CONSTRUCTION. Permanent Way, England.	ROLLING STOCK. New Zealand.	ROLLING STOCK. England.	WORKSHOPS, STATIONS, AND WHARVES.	ENGINEERING AND OFFICE.	INCIDENTAL.	TOTAL NET EXPENDITURE TO 30 JUNE, 1877.	TOTAL NET EXPENDITURE DURING YEAR 1877-78.	TOTAL NET EXPENDITURE TO 30 JUNE, 1878.	LINES OF RAILWAY.
NORTH ISLAND.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	NORTH ISLAND.
Kawakawa	...	...	553 9 1	3,022 12 0	2,281 10 11	...	3,184 18 0	10,640 2 2	903 13 11	3,672 13 1	893 16 1	1,416 12 6	34 11 7	26,460 5 7	143 13 9	26,603 19 4	Kawakawa.
Kaipara—Puniu	27,512 16 2	2,786 2 8	11,388 8 4	208,573 12 3	94,143 6 9	11,449 6 2	125,157 13 5	151,138 1 4	27,598 13 5	78,218 2 5	95,740 9 1	37,920 6 8	5,339 15 9	805,774 2 11	71,192 11 6	876,966 14 5	Kaipara—Puniu.
Napier—Manawatu ...	3,043 5 0	452 2 11	8,562 15 3	63,119 14 5	58,801 0 10	10,849 9 4	61,582 8 4	72,803 3 9	6,390 16 6	27,438 16 3	28,497 3 1	13,173 19 2	674 4 7	327,149 2 2	28,239 17 3	355,388 19 5	Napier—Manawatu.
Wellington—Masterton ...	18,823 6 11	1,345 3 3	11,069 10 2	195,170 10 1	66,017 18 7	10,467 12 9	40,484 0 2	77,581 14 8	5,799 19 4	45,390 2 5	44,851 9 11	20,470 4 1	621 7 11	464,778 0 7	73,314 19 8	538,093 0 3	Wellington—Masterton.
Waitara—Patea	7,611 16 10	747 10 8	3,251 3 4	28,317 3 3	21,221 10 6	3,392 18 2	24,980 2 7	24,087 6 11	1,735 12 5	5,792 18 8	10,558 4 0	5,064 13 6	274 3 0	111,961 10 1	25,073 13 9	137,035 3 10	Waitara—Patea.
Patea—Manawatu (with Foxton Branch)	21,945 2 5	1,473 13 3	14,790 7 2	114,030 19 7	87,055 11 3	21,087 17 7	60,684 2 10	128,581 4 2	10,782 16 11	30,255 19 4	24,309 3 0	21,858 15 10	1,497 4 7	458,552 4 1	79,800 13 10	538,352 17 11	Patea—Manawatu (with Foxton Branch).
PRELIMINARY SURVEYS—																	PRELIMINARY SURVEYS—
Thames—Waikato	...	...	1,151 15 7	...	...	...	...	...	...	...	...	...	...	509 1 1	642 14 6	1,151 15 7	Thames—Waikato.
Mercer—Cambridge ...	...	...	528 17 3	...	...	...	...	...	...	...	...	...	...	528 17 3	...	528 17 3	Mercer—Cambridge.
Cambridge—Taupo ...	...	...	346 4 1	...	...	...	...	...	...	...	...	...	...	346 4 1	...	346 4 1	Cambridge—Taupo.
Masterton—Woodville ...	...	...	205 14 3	...	...	...	...	...	...	...	...	...	...	205 14 3	...	205 14 3	Masterton—Woodville.
Hutt—Waikanae	...	...	223 6 8	...	...	...	...	...	...	...	...	...	...	...	223 6 8	223 6 8	Hutt—Waikanae.
Tokano—Napier	...	...	20 16 0	...	...	...	...	...	...	...	...	...	...	20 16 0	...	20 16 0	Tokano—Napier.
Waipukurau—Gorge ...	...	...	3,179 11 0	...	...	...	...	...	...	...	...	...	...	3,179 11 0	...	3,179 11 0	Waipukurau—Gorge.
Total Surveys, North Island, £5,656 4s. 10d.																	Total Surveys, North Island, £5,656 4s. 10d.
TOTAL, NORTH ISLAND ...	78,936 7 4	6,804 12 9	55,271 18 2	612,234 11 7	329,520 18 10	57,247 4 0	316,073 5 4	464,831 13 0	53,211 12 6	190,768 12 2	204,850 5 2	99,904 11 9	8,441 7 5	2,199,465 9 1	278,631 10 11	2,478,097 0 0	TOTAL, NORTH ISLAND.
MIDDLE ISLAND.																	MIDDLE ISLAND.
Nelson—Foxhill	14,846 10 4	1,126 5 8	2,066 2 4	18,146 2 0	14,312 12 2	6,911 13 0	16,433 14 8	22,170 10 6	1,744 14 8	7,591 14 3	9,017 16 6	3,395 1 3	204 6 3	117,600 12 0	366 11 7	117,967 3 7	Nelson—Foxhill.
Picton—Blenheim	8,140 19 10	1,186 17 10	2,005 7 3	52,311 1 7	28,746 10 5	923 5 8	17,136 13 10	22,192 6 6	2,572 4 2	8,806 7 5	10,625 2 6	4,498 0 1	192 3 8	158,004 4 9	1,332 16 0	159,337 0 9	Picton—Blenheim.
Greymouth—Brunner ...	5,879 19 0	1,114 17 6	1,689 18 7	51,012 2 2	29,285 18 7	597 8 0	10,505 1 7	10,898 16 10	3,551 3 3	14,396 3 0	25,750 17 9	8,095 9 10	470 2 7	139,519 0 7	23,728 18 1	163,247 18 8	Greymouth—Brunner.
Westport—Ngakawau ...	3,173 15 3	3,128 4 9	4,857 8 10	50,780 15 8	13,568 7 9	117 0 0	21,678 8 2	27,446 12 6	2,661 11 8	19,228 5 10	32,407 18 8	6,908 9 0	478 10 1	157,791 2 10	28,644 5 4	186,435 8 2	Westport—Ngakawau.
Amberley—Waitaki (with Branch Lines and Waitaki Bridge)	43,004 9 0	6,063 1 11	11,058 2 6	102,385 5 5	246,497 9 8 76,099 18 4	41,031 16 11	227,688 19 8	278,172 8 1	32,794 15 5	131,746 1 4	143,370 3 4	35,571 7 6	3,347 17 6	1,275,962 10 6	102,869 6 1	1,378,831 16 7	Amberley—Waitaki (with Branch Lines and Waitaki Bridge).
Waitaki—Bluff (and Branches)	62,345 6 5	10,563 0 1	21,750 8 6	679,614 16 7	222,016 18 10	57,412 15 2	256,605 8 10	289,580 6 3	27,501 5 10	161,718 5 1	227,162 16 11	68,378 18 5	6,395 8 6	1,861,681 6 6	229,364 8 11	2,091,045 15 5	Waitaki—Bluff (and Branches).
Winton—Kingston ...	894 0 0	190 12 2	2,811 19 6	41,748 15 2	9,085 9 11	2,762 6 3	52,218 13 1	73,701 7 0	3,743 13 1	25,903 0 8	7,391 3 5	8,194 10 8	729 19 7	203,607 5 5	25,173 5 1	228,780 10 6	Winton—Kingston.
Western Railways ...	1,593 0 5	466 11 6	...	3,832 7 3	1,437 14 0	1,263 16 5	985 1 2	167 0 11	238 0 2	1,706 15 9	99 15 6	1,429 15 2	43 14 7	...	13,263 12 10	13,263 12 10	Western Railways.
PRELIMINARY SURVEYS—																	PRELIMINARY SURVEYS—
Foxhill—Brunner	...	...	2,872 19 1	...	...	...	...	...	...	...	...	...	...	2,872 19 1	...	2,872 19 1	Foxhill—Brunner.
Foxhill—Southwards ...	...	...	454 11 8	...	...	...	...	...	...	...	...	...	...	454 11 8	...	454 11 8	Foxhill—Southwards.
Greymouth—Christchurch ...	...	...	798 0 9	...	...	...	...	...	...	...	...	...	...	798 0 9	...	798 0 9	Greymouth—Christchurch.
Greymouth—Hokitika ...	...	...	2,734 5 7	...	...	...	...	...	...	...	...	...	...	2,727 19 4	6 6 3	2,734 5 7	Greymouth—Hokitika.
Hokitika—Christchurch ...	...	...	34 16 8	...	...	...	...	...	...	...	...	...	...	34 16 8	...	34 16 8	Hokitika—Christchurch.
Hokitika—Malvern ...	...	...	468 0 3	...	...	...	...	...	...	...	...	...	...	468 0 3	...	468 0 3	Hokitika—Malvern.
Hokitika Office	...	...	1,200 0 0	...	...	...	...	...	...	...	...	...	...	1,200 0 0	...	1,200 0 0	Hokitika Office.
Greymouth—Amberley ...	...	...	8,828 2 9	...	...	...	...	...	...	...	...	...	...	4,032 18 1	4,795 4 8	8,828 2 9	Greymouth—Amberley.
Amberley—Hurunui ...	...	...	151 16 8	...	...	...	...	...	...	...	...	...	...	...	151 16 8	151 16 8	Amberley—Hurunui.
Hurunui—Blenheim ...	...	...	726 12 11	...	...	...	...	...	...	...	...	...	...	522 2 5	204 10 6	726 12 11	Hurunui—Blenheim.
Ashburton—Mount Somers and Alford Forest	...	...	172 7 7	...	...	...	...	...	...	...	...	...	...	...	172 7 7	172 7 7	Ashburton—Mount Somers and Alford Forest.
Waimate—Hekateramea ...	...	...	109 0 0	...	...	...	...	...	...	...	...	...	...	...	109 0 0	109 0 0	Waimate—Hekateramea.
Orari *viâ* Geraldine—Hilton	...	...	124 16 0	...	...	...	...	...	...	...	...	...	...	...	124 16 0	124 16 0	Orari *viâ* Geraldine—Hilton.
White Cliffs—Rakaia Gorge...	...	...	52 19 6	...	...	...	...	...	...	...	...	...	...	...	52 19 6	52 19 6	White Cliffs—Rakaia Gorge.
Albury—Fairlie Creek ...	...	...	105 10 6	...	...	...	...	...	...	...	...	...	...	...	105 10 6	105 10 6	Albury—Fairlie Creek.
Oamaru—Waiareka ...	...	...	493 6 9	...	...	...	...	...	...	...	...	...	...	493 6 9	...	493 6 9	Oamaru—Waiareka.
Waiareka—Livingston ...	...	...	8 2 6	...	...	...	...	...	...	...	...	...	...	...	8 2 6	8 2 6	Waiareka—Livingston.
Dunedin—Moeraki ...	...	...	2,175 2 4	...	...	...	...	...	...	...	...	...	...	2,175 2 4	...	2,175 2 4	Dunedin—Moeraki.
Clutha—Mataura	...	...	115 9 6	...	...	...	...	...	...	...	...	...	...	115 9 6	...	115 9 6	Clutha—Mataura.
Taieri *viâ* Strath Taieri—Clyde	...	...	2,684 3 8	...	...	...	...	...	...	...	...	...	...	...	2,684 3 8	2,684 3 8	Taieri *viâ* Strath Taieri—Clyde.
Taieri River *viâ* Brighton ...	...	...	3 0 0	...	...	...	...	...	...	...	...	...	...	...	3 0 0	3 0 0	Taieri River *viâ* Brighton.
Green Island Extension ...	...	...	7 11 0	...	...	...	...	...	...	...	...	...	...	...	7 11 0	7 11 0	Green Island Extension.
Clutha River Survey ...	...	...	0 18 6	...	...	...	...	...	...	...	...	...	...	...	0 18 6	0 18 6	Clutha River Survey.
Waipahi—Cromwell ...	...	...	100 0 0	...	...	...	...	...	...	...	...	...	...	100 0 0	...	100 0 0	Waipahi—Cromwell.
Waipahi—Tapanui ...	...	...	442 5 7	...	...	...	...	...	...	...	...	...	...	...	442 5 7	442 5 7	Waipahi—Tapanui.
Riverton—Orepuki ...	...	...	251 8 7	...	...	...	...	...	...	...	...	...	...	...	251 8 7	251 8 7	Riverton—Orepuki.
Gore—Elbow	...	...	454 12 0	...	...	...	...	...	...	...	...	...	...	...	454 12 0	454 12 0	Gore—Elbow.
Otautau, Waiau, and Nightcaps	...	...	39 13 11	...	...	...	...	...	...	...	...	...	...	...	39 13 11	39 13 11	Otautau, Waiau, and Nightcaps.
Lyttelton Station Ground ...	...	...	40 0 0	...	...	...	...	...	...	...	...	...	...	...	40 0 0	40 0 0	Lyttelton Station Ground.
Incidental	...	...	7 11 6	...	...	...	...	...	...	...	...	...	...	7 11 6	...	7 11 6	Incidental.
Total Surveys, Middle Island, £25,657 5s. 9d.																	Total Surveys, Middle Island, £25,657 5s. 9d.
TOTAL, MIDDLE ISLAND ...	139,878 0 3	23,839 11 5	71,896 13 3	999,831 5 10	641,050 19 8	111,020 1 5	603,252 1 0	724,329 8 7	74,212 8 3	371,096 13 4	455,825 14 7	136,471 11 11	11,862 2 9	3,930,169 0 11	434,397 11 4	4,364,566 12 3	TOTAL, MIDDLE ISLAND.
SUMMARY.																	SUMMARY.
NORTH ISLAND—																	NORTH ISLAND—
Railways	78,936 7 4	6,804 12 9	55,271 18 2	612,234 11 7	329,520 18 10	57,247 4 0	316,073 5 4	464,831 13 0	53,211 12 6	190,768 12 2	204,850 5 2	99,904 11 9	8,441 7 5	2,199,465 9 1	278,631 10 11	2,478,097 0 0	Railways.
MIDDLE ISLAND—																	MIDDLE ISLAND—
Railways	139,878 0 3	23,839 11 5	71,896 13 3	999,831 5 10	641,050 19 8	111,020 1 5	603,252 1 0	724,329 8 7	74,212 8 3	371,096 13 4	455,825 14 7	136,471 11 11	11,862 2 9	3,930,169 0 11	434,397 11 4	4,364,566 12 3	Railways.
MISCELLANEOUS SURVEYS ...	...	...	*470 17 11	...	...	...	...	...	...	...	...	...	...	...	470 17 11	470 17 11	* MISCELLANEOUS SURVEYS.
UNAPPORTIONABLE	...	...	...	...	...	...	...	...	...	...	364 15 5	...	...	285 18 5	78 17 0	364 15 5	UNAPPORTIONABLE.
TOTAL	218,814 7 7	30,644 4 2	127,639 9 4	1,612,065 17 5	970,571 18 6	168,267 5 5	919,325 6 4	1,189,161 1 7	127,424 0 9	561,865 5 6	661,040 15 2	236,376 3 8	20,303 10 2	6,129,920 8 5	713,578 17 2	6,843,499 5 7	TOTAL.

TABLE No. 4.

STATEMENT showing the LIABILITIES on RAILWAYS out of IMMIGRATION and PUBLIC WORKS LOAN to 30th June, 1878.—CLASSIFED.

LINES.	RAILWAYS UNDER CONSTRUCTION.			ADDITIONS TO WORKING RAILWAYS.			ROLLING STOCK.				MISCELLANEOUS PLANT.	Estimated Amount required to complete Permanent Way, at a Mileage Rate.	TOTAL LIABILITIES.	LINES.
	On Authorities.	On Contracts.	Total.	On Authorities.	On Contracts.	Total.	On Authorities.	On Colonial Contracts.	On English Contracts.	Total.	On English Contracts.			
NORTH ISLAND.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	NORTH ISLAND.
Kawakawa	800 0 0	...	800 0 0	...	...	...	48 14 7	...	...	48 14 7	...	...	848 14 7	Kawakawa.
Kaipara-Puniu	12,459 15 5	47,562 4 10	60,022 0 3	3,144 14 4	...	3,144 14 4	2,933 2 0	...	8,436 14 10	11,369 16 10	...	3,271 11 4	77,808 2 9	Kaipara-Puniu.
Napier-Manawatu	1,898 17 11	15,361 14 2	17,260 12 1	390 9 2	...	390 9 2	11 17 5	...	3,482 0 2	3,493 17 7	239 2 0	10,361 14 1	31,745 14 11	Napier-Manawatu.
Wellington-Masterton ...	9,481 16 5	74,880 16 11	84,362 13 4	339 19 9	...	339 19 9	...	30 0 0	10,095 11 4	10,125 11 4	10,064 1 8	9,818 9 11	114,710 16 0	Wellington-Masterton.
Waitara-Patea	5,186 11 1	1,656 8 0	6,842 19 1	96 0 0	...	96 0 0	38 4 0	...	339 16 7	378 0 7	239 2 0	6,411 9 0	13,967 10 8	Waitara-Patea.
Patea-Manawatu	7,378 14 8	51,280 14 5	58,659 9 1	1,348 13 11	...	1,348 13 11	164 6 6	27 10 0	12,061 6 5	12,253 2 11	239 2 0	9,666 2 9	82,166 10 8	Patea-Manawatu.
Surveys	378 9 3	...	378 9 3	...	...	...	...	...	...	...	...	...	378 9 3	Surveys.
Total	37,584 4 9	190,741 18 4	228,326 3 1	5,319 17 2	...	5,319 17 2	3,196 4 6	57 10 0	34,415 9 4	37,669 3 10	10,781 7 8	39,529 7 1	321,625 18 10	Total.
MIDDLE ISLAND.														MIDDLE ISLAND.
Nelson-Foxhill	134 7 4	6,229 8 10	6,363 16 2	...	...	...	13 0 0	...	2,275 16 8	2,288 16 8	239 2 0	458 18 1	9,350 12 11	Nelson-Foxhill.
Picton-Blenheim	141 16 0	...	141 16 0	254 12 4	...	254 12 4	100 0 0	...	2,275 16 8	2,375 16 8	239 2 0	474 6 5	3,485 13 5	Picton-Blenheim.
Brunner-Greymouth ...	9,350 13 0	2,466 0 0	11,816 13 0	397 9 0	...	397 9 0	10 0 0	...	2,275 16 8	2,285 16 8	239 2 0	2,357 3 0	17,096 3 8	Brunner-Greymouth.
Westport-Ngakawau ...	6,047 13 10	6,563 5 9	12,610 19 7	185 2 3	...	185 2 3	1,105 9 10	...	...	1,105 9 10	239 2 0	1,550 11 3	15,691 4 11	Westport-Ngakawau.
Amberley-Waitaki	3,146 4 10	9,280 8 9	12,426 13 7	51,745 8 1	...	51,745 8 1	309 14 3	2,398 17 0	51,591 18 7	54,300 9 10	2,350 0 0	37,224 1 1	158,046 12 7	Amberley-Waitaki.
Waitaki-Bluff	25,218 2 0	52,603 4 11	77,821 6 11	12,370 11 8	...	12,370 11 8	605 13 1	16 10 0	55,532 13 3	56,154 16 4	6,175 0 0	7,575 16 2	160,097 11 1	Waitaki-Bluff.
Winton-Kingston	564 2 7	6,672 10 0	7,236 12 7	165 17 5	...	165 17 5	...	...	...	...	...	721 5 9	8,123 15 9	Winton-Kingston.
Western Railways	1,082 18 8	12,987 5 10	14,070 4 6	...	...	...	...	1,492 8 0	6,861 15 3	8,354 3 3	...	1,260 0 0	23,684 7 9	Western Railways.
Surveys	2,853 18 10	...	2,853 18 10	...	...	...	...	...	...	...	...	...	2,853 18 10	Surveys.
Total	48,539 17 1	96,802 4 1	145,342 1 2	65,119 0 9	...	65,119 0 9	2,143 17 2	3,907 15 0	120,813 17 1	126,865 9 3	9,481 8 0	51,622 1 9	398,430 0 11	Total.
SUMMARY.														SUMMARY.
NORTH ISLAND	37,584 4 9	190,741 18 4	228,326 3 1	5,319 17 2	...	5,319 17 2	3,196 4 6	57 10 0	34,415 9 4	37,669 3 10	10,781 7 8	39,529 7 1	321,625 18 10	NORTH ISLAND.
MIDDLE ISLAND	48,539 17 1	96,802 4 1	145,342 1 2	65,119 0 9	...	65,119 0 9	2,143 17 2	3,907 15 0	120,813 17 1	126,865 9 3	9,481 8 0	51,622 1 9	398,430 0 11	MIDDLE ISLAND.
TOTAL	86,124 1 10	287,544 2 5	373,668 4 3	70,438 17 11	...	70,438 17 11	5,340 1 8	3,965 5 0	155,229 6 5	164,534 13 1	20,262 15 8	91,151 8 10	720,055 19 9	TOTAL.

TABLE No. 5.

STATEMENT showing the LIABILITIES on ROADS and WATER-RACES, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

—	AUTHORITIES.	CONTRACTS.	GRANTS.	TOTAL.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Roads—				
North of Auckland	2,166 13 0	...	5,249 17 3	7,416 10 3
North Island	1,684 6 0	967 15 6	300 0 0	2,952 1 6
Native Districts	2,036 11 1	...	7,706 0 0	9,742 11 1
Nelson South-West Gold Fields ...	27 0 11	4,543 15 0	7,007 4 0	11,577 19 11
Westland	966 19 9	9,563 18 0	...	10,530 17 9
Hokitika-Christchurch	1,142 2 9	...	...	1,142 2 9
TOTAL	8,023 13 6	15,075 8 6	20,263 1 3	43,362 3 3
Water-races—				
New River...	...	...	377 12 0	377 12 0
Waimea	3,608 9 10	8,394 1 6	...	12,002 11 4
Mikonui	8 0 0	...	...	8 0 0
Nelson Creek	2,668 12 11	...	...	2,668 12 11
Mount Ida...	250 1 10	...	...	250 1 10
TOTAL	6,535 4 7	8,394 1 6	377 12 0	15,306 18 1

TABLE No. 6.

STATEMENT showing the EXPENDITURE and LIABILITIES on ROADS, NORTH ISLAND, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

LOCALITY.	EXPENDITURE.			Total Liabilities on Authorities and Contracts, 30 June, 1878.	Total Expenditure and Liabilities.
	1869–77.	1877–78.	Total.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
AUCKLAND PROVINCIAL DISTRICT.					
North of Auckland	18,107 10 6	13,291 4 7	31,398 15 1	7,416 10 3	38,815 5 4
Bay of Islands	33,113 16 9	37 10 0	33,151 6 9	...	33,151 6 9
Mangere Bridge	15,486 7 8	...	15,486 7 8	...	15,486 7 8
Thames	75 2 9	...	75 2 9	...	75 2 9
Waikato	16,583 18 7	...	16,583 18 7	1,150 0 0	19,733 18 7
Bay of Plenty	70,001 0 5	569 17 5	70,570 17 10	1,266 7 0	71,837 4 10
Poverty Bay	15,944 6 3	173 1 11	16,117 8 2	174 5 0	16,291 13 2
Taupo	9,273 4 5	...	9,273 4 5	...	9,273 4 5
TOTAL	160,477 16 10	780 9 4	161,258 6 2	2,590 12 0	163,848 18 2
HAWKE'S BAY PROVINCIAL DISTRICT.					
Napier	23,826 0 3	...	23,826 0 3	...	23,826 0 3
Seventy-Mile Bush	45,750 18 2	...	45,750 18 2	...	45,750 18 2
Wairoa	1,212 7 8	...	1,212 7 8	1 9 6	1,213 17 2
TOTAL	70,789 6 1	...	70,789 6 1	1 9 6	70,790 15 7
TARANAKI PROVINCIAL DISTRICT.					
New Plymouth—Inland	3,760 17 3	...	3,760 17 3	...	3,760 17 3
Hawera—Waitara	13,907 6 6	...	13,907 6 6	...	13,907 6 6
Wai-iti—Patea	58,566 6 9	...	58,566 6 9	300 0 0	58,866 6 9
TOTAL	76,234 10 6	...	76,234 10 6	300 0 0	76,534 10 6
WELLINGTON PROVINCIAL DISTRICT.					
Patea—Wanganui	36,246 5 4	...	36,246 5 4	...	36,246 5 4
Wanganui—Taupo	5,156 2 2	...	5,156 2 2	...	5,156 2 2
Manawatu	44,392 19 0	130 0 0	44,522 19 0	...	44,522 19 0
Opaki—Manawatu Gorge	57,717 19 8	285 7 9	58,003 7 5	60 0 0	58,063 7 5
Hutt—Lowry Bay	290 0 0	...	290 0 0	...	290 0 0
TOTAL	143,803 6 2	415 7 9	144,218 13 11	60 0 0	144,278 13 11
SUMMARY.					
AUCKLAND PROVINCIAL DISTRICT ...	178,585 7 4	*14,417 10 7	193,002 17 11	10,007 2 3	203,010 0 2
HAWKE'S BAY „ „ ...	70,789 6 1	...	70,789 6 1	1 9 6	70,790 15 7
TARANAKI „ „ ...	76,234 10 6	...	76,234 10 6	300 0 0	76,534 10 6
WELLINGTON „ „ ...	143,803 6 2	415 7 9	144,218 13 11	60 0 0	144,278 13 11
UNAPPORTIONABLE, TOOLS, ETC. ...	1,732 18 6	...	1,732 18 6	...	1,732 18 6
RECOVERIES	14 12 11	...	14 12 11	...	14 12 11
TOTAL	471,160 1 6	14,832 18 4	485,992 19 10	10,368 11 9	496,361 11 7

* Including £345 16s. 8d. charged as "Unauthorized," in Treasury Table N, Financial Statement, 1878.

TABLE No. 7.

STATEMENT showing the EXPENDITURE and LIABILITIES on ROADS, MIDDLE ISLAND, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

LINES OF ROAD.	EXPENDITURE. 1870-77.	EXPENDITURE. 1877-78.	EXPENDITURE. Total.	Total Liabilities on Authorities and Contracts, 30 June, 1878.	Total Expenditure and Liabilities.
NELSON SOUTH-WEST GOLD FIELDS.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Buller—Arnould	52,640 15 2	4,285 10 6	56,926 5 8	11,568 17 6	68,495 3 2
Main Road—Boatman's	844 10 0	...	844 10 0	...	844 10 0
Westport—Lyell	7,273 13 10	...	7,273 13 10	...	7,273 13 10
Ahaura—Amuri	6,208 9 9	2 4 1	6,210 13 10	9 2 5	6,219 16 3
Nile Bridge	1,115 16 4	...	1,115 16 4	...	1,115 16 4
Takaka Valley	1,679 2 9	320 17 3	2,000 0 0	...	2,000 0 0
Collingwood Quartz Range ...	436 6 10	70 14 3	507 1 1	...	507 1 1
TOTAL	70,198 14 8	4,679 6 1	74,878 0 9	11,577 19 11	86,456 0 8
WESTLAND PROVINCIAL DISTRICT.					
Greymouth—Arnould	5,058 1 5	...	5,058 1 5	...	5,058 1 5
Greymouth—Okarito	76,408 19 2	6,838 15 3	83,247 14 5	10,530 17 9	93,778 12 2
South Creek—Main Line	281 17 6	...	281 17 6	...	281 17 6
Junction Line	3,923 9 5	...	3,923 9 5	...	3,923 9 5
Greenstone—Lake Brunner ...	2,756 5 6	...	2,756 5 6	...	2,756 5 6
Marsden—Maori Creek	2,538 3 0	...	2,538 3 0	...	2,538 3 0
Marsden—Paroa	798 8 0	...	798 8 0	...	798 8 0
Stillwater—Maori Gully	1,869 2 0	...	1,869 2 0	...	1,869 2 0
Kanieri Forks—Kanieri Lakes ...	1,578 1 0	...	1,578 1 0	...	1,578 1 0
Hokitika—Blue Spur	2,520 3 5	...	2,520 3 5	...	2,520 3 5
Kanieri Bridge	489 15 0	...	489 15 0	...	489 15 0
Waimea Bridge	207 12 6	...	207 12 6	...	207 12 6
Westland, General	2,406 17 10	206 15 5	2,613 13 3	...	2,613 13 3
TOTAL	100,836 15 9	7,045 10 8	107,882 6 5	10,530 17 9	118,413 4 2
HOKITIKA—CHRISTCHURCH ...	27,375 12 8	7,741 12 7	35,117 5 3	1,142 2 9	36,259 8 0
SUMMARY.					
NELSON SOUTH-WEST GOLD FIELDS...	70,198 14 8	4,679 6 1	74,878 0 9	11,577 19 11	86,456 0 8
WESTLAND PROVINCIAL DISTRICT ...	100,836 15 9	7,045 10 8	107,882 6 5	10,530 17 9	118,413 4 2
HOKITIKA—CHRISTCHURCH ...	27,375 12 8	7,741 12 7	35,117 5 3	1,142 2 9	36,259 8 0
TOTAL	198,411 3 1	19,466 9 4	217,877 12 5	23,251 0 5	241,128 12 10

TABLE No. 8.

STATEMENT showing the EXPENDITURE and LIABILITIES for REPAIRS and MAINTENANCE of ROADS in NATIVE DISTRICTS, NORTH ISLAND, out of CONSOLIDATED FUND, 1st July, 1875, to 30th June, 1878.

Districts.	Expenditure to 30 June, 1877, out of Votes for 1875-77.	Expenditure, 1877-78.	Total Liabilities on Authorities and Contracts.	Total Expenditure and Liabilities to 30 June, 1878.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Expenditure—1st July, 1875, to 30th June, 1878:—				
Bay of Islands	89 0 0	...	...	
Waikato District	673 0 11	1,183 10 3	...	
Bay of Plenty District	4,003 6 3	2,673 13 2	...	
Poverty Bay District	1,539 4 1	359 14 5	...	
Napier District	1,224 4 5	1,139 19 6	...	
Taupo District	249 12 2	...	...	
Manawatu District	2,294 18 11	48 2 11	...	
Opaki Gorge	1,184 14 5	...	...	
Patea—Wai-iti District	2,994 2 1	310 16 0	...	
Wanganui District	833 7 6	4 19 8	...	
Mangere Bridge	63 0 9	...	...	
Wairoa	58 11 9	...	...	
Seventy-Mile Bush, Hawke's Bay	780 3 0	...	...	
	15,987 6 3	5,720 15 11		21,708 2 2
Liabilities on 30th June, 1878:—				
Waikato District	...	...	563 4 11	
Bay of Plenty District	...	...	8,801 4 7	
Poverty Bay District	...	...	124 13 7	
Napier District	...	...	144 14 2	
Wairoa District	...	...	64 5 11	
Manawatu District	...	...	7 7 3	
Wanganui District	...	...	6 4 4	
Patea—Wai-iti District	...	...	30 16 4	
				9,742 11 1
TOTAL	...	...	...	31,450 13 3

TABLE No. 9.

SUMMARY showing the EXPENDITURE and LIABILITIES on ROADS in COLONY, out of IMMIGRATION and PUBLIC WORKS LOAN, DEFENCE and OTHER PURPOSES LOAN, and CONSOLIDATED FUND, to 30th June, 1878.

	Expenditure.			Liabilities on Contracts and Authorities, 30th June, 1878.	Total Expenditure and Liabilities.
	To 30th June, 1877.	1877–78.	Total.		
OUT OF IMMIGRATION AND PUBLIC WORKS LOAN.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
North Island, as per Table No. 6 ...	471,160 1 6	14,832 18 4	485,992 19 10	10,368 11 9	496,361 11 7
Middle Island, as per Table No. 7 ...	198,411 3 1	19,466 9 4	217,877 12 5	23,251 0 5	241,128 12 10
TOTAL	669,571 4 7	34,299 7 8	703,870 12 3	33,619 12 2	737,490 4 5
OUT OF DEFENCE AND OTHER PURPOSES LOAN.					
Expenditure in Bay of Islands and North of Auckland Districts, as per Table No. 4 of Public Works Statement, 1876	3,727 2 2	...	3,727 2 2	...	3,727 2 2
OUT OF CONSOLIDATED FUND.					
Native Districts, as per Table No. 8 ...	15,987 6 3	5,720 15 11	21,708 2 2	9,742 11 1	31,450 13 3
TOTAL	19,714 8 5	5,720 15 11	25,435 4 4	9,742 11 1	35,177 15 5

TABLE No. 10.

STATEMENT showing the EXPENDITURE and LIABILITIES for PROSPECTING and DEVELOPING COAL MINES, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

PROVINCIAL DISTRICT.	Expenditure.			Liabilities.	Totals.
	Prospecting and Developing.		Totals.		
	1871–77.	1877–78.			
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Auckland	1,568 12 10	...	1,568 12 10	...	1,568 12 10
Nelson	7,441 0 8	82 1 2	7,523 1 10	...	7,523 1 10
Westland	662 4 3	76 19 6	739 3 9	...	739 3 9
Canterbury	245 8 2	83 3 7	328 11 9	...	328 11 9
Otago	320 19 9	285 2 10	606 2 7	...	606 2 7
General expenses	22 3 0	47 12 3	69 15 3	52 15 3	122 10 6
TOTAL	10,260 8 8	574 19 4	10,835 8 0	52 15 3	10,888 3 3

TABLE No. 11.

STATEMENT showing the AMOUNT of SUBSIDIES AUTHORIZED, PAID, and REFUNDED, together with PAYMENTS of INTEREST on SUMS ADVANCED, for WATER-RACES, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

	Total Subsidy Authorized to be Paid.	Payments on Account of such Subsidy.	Amounts not required now written off.	Balance Payable.	Payments of Interest on Advances.	Amount of Subsidy Refunded.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Hohonu	2,494 12 11	2,494 12 11	...	...	271 16 9	547 1 4
Hibernian	2,000 0 0	2,000 0 0	...	...	443 11 5	...
New River...	5,000 0 0	3,502 10 3	1,119 17 9	377 12 0	639 14 8	...
Kanieri	10,560 18 4	10,560 18 4	...	...	560 18 4	...
Arrow	612 10 0	612 10 0	...	...	139 8 6	...
Beaumont and Tuapeka ...	2,000 0 0	640 0 0	1,360 0 0	...	...	...
Carrick Range	9,223 11 5	9,223 11 5	...	...	338 19 2	...
Mount Pisgah	1,000 0 0	200 0 0	800 0 0	...	3 10 0	...
TOTAL ...	32,891 12 8	29,234 2 11	3,279 17 9	377 12 0	2,397 18 10	547 1 4

TABLE No. 12.

STATEMENT showing the EXPENDITURE and LIABILITIES for WATER-RACES on GOLD FIELDS, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

LOCALITY AND NAME OF COMPANY.	EXPENDITURE.					LIABILITIES.			TOTAL EXPENDITURE AND LIABILITIES.	LOCALITY AND NAME OF COMPANY.
	Survey and Construction, 1870–77.	Subsidies, 1870–77.	Survey and Construction, 1877–78.	Subsidies, 1877–78.	Totals.	Authorities and Contracts.	Subsidies.	Totals.		
NORTH ISLAND.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	NORTH ISLAND.
AUCKLAND PROVINCIAL DISTRICT:—										AUCKLAND PROVINCIAL DISTRICT:—
Thames	66,321 19 3	...	3,696 8 4	...	70,018 7 7	...	...	...	70,018 7 7	Thames.
MIDDLE ISLAND.										MIDDLE ISLAND.
WESTLAND PROVINCIAL DISTRICT:—										WESTLAND PROVINCIAL DISTRICT:—
Hohonu	3 7 0	1,955 12 1	...	...	1,958 19 1	...	...	...	1,958 19 1	Hohonu.
Hibernian	12 5 8	1,992 14 8	...	...	2,005 0 4	...	...	...	2,005 0 4	Hibernian.
New River	21 5 0	3,496 0 3	...	...	3,517 5 3	...	377 12 0	377 12 0	3,894 17 3	New River.
Waimea	117,960 11 3	...	10,866 18 6	...	128,827 9 9	12,002 11 4	...	12,002 11 4	140,830 1 1	Waimea.
Mikonui	1,726 5 5	...	3 0 0	...	1,729 5 5	8 0 0	...	8 0 0	1,737 5 5	Mikonui.
Kanieri	1 5 6	10,310 18 4	...	...	10,312 3 10	...	...	...	10,312 3 10	Kanieri.
NELSON PROVINCIAL DISTRICT:—										NELSON PROVINCIAL DISTRICT:—
Nelson Creek	66,186 9 0	...	21,153 5 6	...	87,339 14 6	2,668 12 11	...	2,668 12 11	90,008 7 5	Nelson Creek.
Napoleon Hill	257 16 7	...	...	...	257 16 7	...	...	...	257 16 7	Napoleon Hill.
Charleston, Four-Mile ...	116 0 0	...	...	...	116 0 0	...	...	...	116 0 0	Charleston, Four-Mile.
OTAGO PROVINCIAL DISTRICT:—										OTAGO PROVINCIAL DISTRICT:—
Mount Ida	58,846 14 2	...	2,319 9 6	...	61,166 3 8	250 1 10	...	250 1 10	61,416 5 6	Mount Ida.
Arrow	...	612 10 0	...	...	612 10 0	...	...	...	612 10 0	Arrow.
Beaumont and Tuapeka ...	...	640 0 0	...	...	640 0 0	...	...	...	640 0 0	Beaumont and Tuapeka.
Carrick Range	...	7,642 17 4	...	1,606 15 9	9,249 13 1	...	...	...	9,249 13 1	Carrick Range.
Waipori	11,263 1 0	...	...	...	11,263 1 0	...	...	...	11,263 1 0	Waipori.
Mount Pisgah	...	200 0 0	...	...	200 0 0	...	...	...	200 0 0	Mount Pisgah.
DEPARTMENTAL:—										DEPARTMENTAL:—
Salaries, Travelling, Advertising, &c.	5,495 16 4	...	...	...	5,495 16 4	...	...	...	5,495 16 4	Salaries, Travelling, Advertising, &c.
TOTAL	261,890 16 11	26,850 12 8	34,342 13 6	1,606 15 9	324,690 18 10	14,929 6 1	377 12 0	15,306 18 1	339,997 16 11	TOTAL.
SUMMARY.										SUMMARY.
NORTH ISLAND	66,321 19 3	...	3,696 8 4	...	70,018 7 7	...	...	...	70,018 7 7	NORTH ISLAND.
MIDDLE ISLAND	261,890 16 11	26,850 12 8	34,342 13 6	1,606 15 9	324,690 18 10	14,929 6 1	377 12 0	15,306 18 1	339,997 16 11	MIDDLE ISLAND.
TOTAL	328,212 16 2	26,850 12 8	38,039 1 10	1,606 15 9	394,709 6 5	14,929 6 1	377 12 0	15,306 18 1	410,016 4 6	TOTAL.

TABLE No. 13.

RETURN showing the AMOUNT EXPENDED for TELEGRAPH PURPOSES out of the IMMIGRATION and PUBLIC WORKS LOAN, from the 1st July, 1877, to the 30th June, 1878.

Number of Miles of Poles.	Number of Miles of Wire.	Locality.	Amount.
			£ s. d.
28	50	Reefton to Westport, additional expenditure	963 0 0
60	120	Blenheim to Tophouse	4,343 9 5
...	200	Third Wire, Nelson to Greymouth	2,891 14 0
...	...	Christchurch to Waitaki, reconstruction	729 2 4
...	...	Christchurch to Greymouth, reconstruction	453 8 10
37	37	Winton to Lowther, railway wire	958 0 4
...	140	Third Wire, Wellington to Wanganui	2,241 19 9
...	...	Wellington to Wainui, reconstruction	3,098 10 11
53	70	Kawakawa to Mongonui	3,194 15 10
19	19	Waipukurau to Kopua, railway wire	1,018 5 11
4	24	New Plymouth to Inglewood, including loop-line to Waitara, railway wire	510 7 5
			£20,402 14 9
		New Stations, expenditure on lines in course of construction, not yet brought to charge; also sundry material lying in stock	12,779 8 1
201	660	TOTAL	£33,182 2 10

TABLE No. 14.

STATEMENT showing the TOTAL EXPENDITURE and LIABILITIES for TELEGRAPH PURPOSES, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

Period.	Miles of		Expenditure and Liabilities.
	Poles.	Wire.	
			£ s. d.
To June, 1877	1,918	4,704	266,469 17 8
From 30th June, 1877, to 30th June, 1878	201	660	33,182 2 10
	2,119	5,364	£299,652 0 6
Liabilities	...	...	8,032 18 9
TOTAL	...	...	£307,684 19 3

TABLE No. 15.

STATEMENT showing the EXPENDITURE and LIABILITIES on PUBLIC BUILDINGS, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

	Expenditure to 30th June, 1877.	Expenditure, year ending 30th June, 1878.	Total Expenditure to 30th June, 1878.	Total Liabilities.	Total Expenditure and Liabilities, 30th June, 1878.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Judicial	15,156 12 8	6,309 1 9	21,465 14 5	1,500 0 0	22,965 14 5
Postal and Telegraphic ...	53,203 4 11	9,019 11 5	62,222 16 4	1,300 0 0	63,522 16 4
Customs	1,457 12 3	3 3 9	1,460 16 0	200 0 0	1,660 16 0
Offices for Public Departments	98,815 6 2	30,154 9 10	128,969 16 0	10,400 0 0	139,369 16 0
Lunatic Asylums	...	4,478 8 7	4,478 8 7	1,875 0 0	6,353 8 7
School Buildings	...	51,950 0 0	51,950 0 0	...	51,950 0 0
Hospitals	...	3,252 17 11	3,252 17 11	500 0 0	3,752 17 11
Miscellaneous	9,835 2 4	...	9,835 2 4	6,750 0 0	16,585 2 4
TOTAL	£178,467 18 4	105,167 13 3	283,635 11 7	22,525 0 0	306,160 11 7

TABLE No. 16.

STATEMENT showing the EXPENDITURE and LIABILITIES on LIGHTHOUSES, out of IMMIGRATION and PUBLIC WORKS LOAN, to 30th June, 1878.

——	Expenditure to 30th June, 1877.	Expenditure for Year ending 30th June, 1878.	Total Liabilities.	Total Expenditure and Liabilities on 30th June, 1878.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Expenditure on sundry Works prior to 30th June, 1877	53,362 7 4	...	...	53,362 7 4
Expenditure on following Works during 1877–78, viz.:—				
Brothers Lighthouse	...	340 6 0	...	340 6 0
Portland Island Lighthouse	...	1,704 10 9	...	1,704 10 9
Puysegur Point „	...	3,418 12 1	25 0 0	3,443 12 1
Moko Hinau „	...	43 10 0	...	43 10 0
Cape Maria Van Diemen Lighthouse ...	...	1,863 12 11	800 0 0	2,663 12 11
Centre Island „	...	1,905 19 7	100 0 0	2,005 19 7
Moeraki „	...	2,804 2 3	50 0 0	2,854 2 3
Akaroa „	...	2,510 15 2	75 0 0	2,585 15 2
Cape Saunders „	...	545 4 1	1,900 0 0	2,445 4 1
Timaru „	...	708 8 3	50 0 0	758 8 3
"Hinemoa," s.s.	...	7 9 3	...	7 9 3
"Stella," s.s.	...	2,458 5 10	...	2,458 5 10
TOTAL...	53,362 7 4	18,310 16 2	3,000 0 0	74,673 3 6

TABLE No. 17.

STATEMENT showing the EXPENDITURE and LIABILITIES on MISCELLANEOUS PUBLIC WORKS, out of IMMIGRATION and PUBLIC WORKS LOAN (Vote 102, 1877/78), 30th June, 1878.

No. of Item.	——	Appropriation.	Expenditure.	Liabilities.	Total Expenditure and Liabilities.
		£	£ s. d.	£ s. d.	£ s. d.
1	Road, Whangarei to Port Albert	3,000	...	...	...
2	Road, Raglan to Waikato	2,000	500 0 0	1,500 0 0	2,000 0 0
3	Road, Thames to Ohinemuri	5,000	3,500 0 0	1,500 0 0	5,000 0 0
4	Road, Tauranga to Opotiki	1,500	...	...	...
5	Road, Taupo to Tauranga	1,500	...	...	...
6	Road, Gisborne to East Cape	1,000	...	...	...
7	Road, Ormond to Opotiki	1,000	...	...	...
8	Road, Gisborne to Wairoa	1,000	...	...	...
9	Waipaoa River Bridge and Approaches	3,700	2,438 7 8	1,291 5 0	3,729 12 8
10	Draining Patutahi Block	800	31 19 5	618 0 7	650 0 0
11	Bridge over Ahuriri Harbour	10,000	13 10 0	...	13 10 0
12	Road, Napier to Taupo	1,500	...	...	...
13	Road, Wairoa to Waikaremoana	1,500	...	...	...
14	Road, Wainui to Waipukurau	2,000	...	2,000 0 0	2,000 0 0
15	Road, Wainui to Inland Settlement	500	...	500 0 0	500 0 0
16	Mountain Road, Taranaki	3,000	1,893 1 7	1,174 17 5	3,067 19 0
17	Main Road, Stony River to Waitotara	3,000	...	...	...
18	Road, Seventy-Mile Bush, Opaki to Kopua, including Manawatu Gorge Road	5,000	32 0 0	4,500 0 0	4,532 0 0
19	Ruamahunga Bridge, Opaki Road	6,000	...	...	...
20	Road, Rangitumau	1,000	...	500 0 0	500 0 0
21	Road, Mungaroa to Waikanae	3,500	500 0 0	1,250 0 0	1,750 0 0
22	Road, Rangitikei to Murimotu or Inland Patea ...	1,000	...	1,000 0 0	1,000 0 0
23	Road, Taueru	1,000	...	500 0 0	500 0 0
24	Road in Manchester Block	900	...	900 0 0	900 0 0
25	Road, Foxton to Otaki (inland)	3,000	...	3,000 0 0	3,000 0 0
26	Road, Masterton to Castlepoint	3,000	1,500 0 0	...	1,500 0 0
27	Bridge over Ahaura	5,000	...	7,983 0 0	7,983 0 0
28	Nelson Creek Bridge	1,500	...	...	...
29	Road, Westport to Lyell, including Bridge over Ohika River	4,000	2,000 0 0	2,000 0 0	4,000 0 0
30	Road, Nelson to Westport and Greymouth	10,000	2,562 12 6	5,933 0 0	8,495 12 6
31	Road, Motupiko to the Lyell, by the Hope	1,400	...	1,400 0 0	1,400 0 0
32	Road, Oronoko to Stanley Brook	1,000	300 0 0	500 0 0	800 0 0
33	Road, Aorere Valley	2,000	...	2,000 0 0	2,000 0 0
34	Road, Takaka to Motueka, over Mount Arthur Range ...	1,200	...	1,200 0 0	1,200 0 0
35	Bridge over Wairoa in Waimea District	5,000	100 1 9	...	100 1 9
	Carried forward	97,500	15,371 12 11	41,250 3 0	56,621 15 11

TABLE NO. 17—*continued.*

STATEMENT showing the EXPENDITURE and LIABILITIES on MISCELLANEOUS PUBLIC WORKS, out of IMMIGRATION and PUBLIC WORKS LOAN (Vote 102, 1877/78), 30th June, 1878—*continued.*

No. of Item.	——	Appropriation.	Expenditure.	Liabilities.	Total Expenditure and Liabilities.
		£	£ s. d.	£ s. d.	£ s. d.
	Brought forward	97,500	15,371 12 11	41,250 3 0	56,621 15 11
36	Road, Nelson to Havelock, including Bridge over Wakamarina	1,500	300 0 0	...	300 0 0
37	Bridge over Clarence River	5,000	...	5,000 0 0	5,000 0 0
38	Bridge over Arnold	1,500	1,500 0 0	...	1,500 0 0
39	Hokitika Harbour improvement	15,000	...	...	...
40	Bridge over Teremakau, at Kumara...	9,000	5 17 0	7,383 0 0	7,388 17 0
41	Bridge over Hokitika, at Kanieri	8,000	32 10 0	6,804 4 8	6,836 14 8
42	Road by Coast from Hokitika to Haast Pass	3,000	...	3,000 0 0	3,000 0 0
43	Purchase of Beaumont Bridge	5,000	...	...	...
44	Purchase of Bridge over Clutha, at Clyde	5,000	5,000 0 0	...	5,000 0 0
45	Purchase of Victoria Bridge over Kawarau	4,200	4,000 0 0	...	4,000 0 0
46	Kawarau Bridge at Junction, Arrow River	8,000	...	...	...
47	Bridge over Oreti, at Elbow	6,000	...	6,000 0 0	6,000 0 0
48	Portobello Road	500	0 6 0	...	0 6 0
49	Jetty at Toitoi	1,000	...	1,000 0 0	1,000 0 0
50	Road, Toitoi, inland	1,000	...	1,000 0 0	1,000 0 0
51	Road, Wyndham to Toitois	1,500	...	1,500 0 0	1,500 0 0
52	Road, Gore to Switzer's	4,000	...	4,000 0 0	4,000 0 0
53	Road, Lawrence to Roxburgh	5,000	5,000 0 0	...	5,000 0 0
54	Road, Roxburgh to Clyde	2,500	2,500 0 0	...	2,500 0 0
55	Protective Works, Dipton	500	...	500 0 0	500 0 0
56	Removal of Rocks, Catlin's River	1,000	...	...	...
57	Compensation to A. Stitt, Buller Road Contract ...	800	620 0 0	...	620 0 0
58	Jetty at Port Levy	250	...	250 0 0	250 0 0
59	Road, Waipori to Lawrence, *viâ* Bungtown	400	...	400 0 0	400 0 0
60	Road Construction, FitzGerald to Dalhousie	500	...	500 0 0	500 0 0
61	Duthie's to Tuapeka Mouth, *viâ* Tuapeka River ...	500	...	500 0 0	500 0 0
62	Main Road, Otago, Palmerston to Houndburn ...	2,500	2,500 0 0	...	2,500 0 0
63	Jetty on Clutha River, at Balclutha	250	250 0 0	...	250 0 0
64	Manuherikia Bridge, St. Bathans	500	250 0 0	250 0 0	500 0 0
65	Maerewhenua Railway Bridge	5,000	...	5,000 0 0	5,000 0 0
66	Road from Pukekohe Railway Station to Waiuku ...	3,000	...	3,000 0 0	3,000 0 0
67	Road from Pukekohe Railway Station, through East Pukekohe District, to Bombay	1,000	...	1,000 0 0	1,000 0 0
68	Wharf at Pollok, Manukau Harbour	150	...	150 0 0	150 0 0
69	Road from Papakura Railway Station to Wairoa, improvement of...	1,000	...	1,000 0 0	1,000 0 0
70	Main Road near Longford, Buller Valley, completion ...	2,000	...	2,000 0 0	2,000 0 0
71	Main Road, Glenomaru to Catlin's River	1,000	750 0 0	250 0 0	1,000 0 0
72	Road, Parau to Port Levy...	500	...	500 0 0	500 0 0
73	Road, Port Levy to Pigeon Bay	500	...	500 0 0	500 0 0
74	Road, Karere, Manawatu	300	...	...	...
75	Manawatu Bridge Approaches	200	74 4 5	125 15 7	200 0 0
76	Bridge over the Ruamahunga, at Hurinuiorangi ...	3,000	...	3,000 0 0	3,000 0 0
77	Continuation of Kimbolton Road through Sandon Block (Kiwitea)	1,000	250 0 0	750 0 0	1,000 0 0
78	Opening Mountain Road to Patea for coach traffic ...	4,000	1,805 13 10	2,194 6 2	4,000 0 0
	Coromandel Public Works,—				
79	Road to Tokatea Range	1,000	1,000 0 0	...	1,000 0 0
80	Road, Thames to Hastings	500	...	500 0 0	500 0 0
81	Road, Coromandel to Hastings	1.000	800 0 0	200 0 0	1,000 0 0
82	Road, Mackaytown to Waikato	1,000	500 0 0	...	500 0 0
83	Road, Nelson to Tophouse and Tarndale	1,400	202 3 3	...	202 3 3
84	Portage Road, Riverhead to Kaipara	250	...	...	...
85	Clearing Snags, Waikato	100	96 10 1	53 9 11	150 0 0
86	Pukekaroro Bridge (destroyed by flood)	60	60 0 0	...	60 0 0
87	Orawaiti Bridge (destroyed by flood)	2,000	210 18 3	91 1 9	302 0 0
88	Contribution towards Bridge over Waikato River at the Narrows	300	...	300 0 0	300 0 0
89	Road, Mangoturoto to Waikiekie	500	...	500 0 0	500 0 0
90	Opening Road at Ruatangata	150	137 0 0	13 0 0	150 0 0
91	Wharf at Whangarei Heads	600	...	600 0 0	600 0 0
92	Road at Maungakaramea	500	250 0 0	250 0 0	500 0 0
93	Tramway at Kamo	2,000	85 1 0	...	85 1 0
94	Matakana Wharf	500	...	...	...
95	Main Road, Maburangi to Whangarei	2,000	...	400 0 0	400 0 0
96	Bridge over Waikato at Hamilton, contribution ...	3,000	...	3,000 0 0	3,000 0 0
97	Public Works, Feilding Settlement, contribution under agreement	10,000	...	10,000 0 0	10,000 0 0
98	Erection of Jetty and Shed at Catlin's River... ...	500	...	...	...
99	Removal of rock, &c., at Martin's Bay Harbour ...	200	5 0 0	...	5 0 0
100	Completion of Road from Maori Kaika to Taiaroa Head Lighthouse	500	54 8 0	45 12 0	100 0 0
101	Bridge over Buller River on Main Road from Nelson to Reefton	4,000	...	...	...
102	Trunk Roads, County of Wanganui	1,500	1,084 18 6	415 1 6	1,500 0 0
103	Wanganui and Taupo Road	500	...	...	...
	Bannockburn Bridge } unauthorized {	...	2,500 0 0	...	2,500 0 0
	T. Mackay's salary } unauthorized {	...	128 2 0	...	128 2 0
	TOTAL	247,910	47,324 5 3	115,175 14 7	162,499 19 10

TABLE No. 18.

ROLLING-STOCK AND PLANT.

Statement showing the Rolling-stock Ordered to 30th June, 1878.

—	Locomotives.																			Carriages.									Brakes.			Trucks.							Wagons, etc.			
		Fairlies.						Bogies.												1st Class.			Composite.			2nd Class.															
	Fell.	23 tons. 9-in. cyl. 8 wheels.	24 tons. 9-in. cyl. 8 wheels.	23 tons. 10-in. cyl. 8 wheels.	25 tons. 10½-in. cyl. 8 wheels.	Single, 6 wheels coupled. Bogie.	American 12-in. cyl. 4 wheels, coupled.	17 tons. 10½-in. cyl. 4 wheels, coupled. Widmark's axle-box.	17 tons. 10½-in. cyl. 4 wheels, coupled.	12 tons. 9½-in. cyl. 4 wheels, coupled.	25 tons. 14-in. cyl. 6 wheels, coupled.	28 tons. 13-in. cyl. 6 wheels, coupled.	17 tons. 10½-in. cyl. 6 wheels, coupled.	12 tons. 8-in. cyl. 6 wheels, coupled.	12 tons. 9½-in. cyl. 4 wheels, coupled.	10 tons. 8½-in. cyl. 4 wheels, coupled.	10 tons. 8-in. cyl. 4 wheels, coupled.	8 tons. 8-in. cyl. 4 wheels, coupled.	6-in. cylinder. 4 wheels, coupled. Vert. boiler.	6 wheels.	4 wheels.	4-wheel Saloon.	6 wheels.	4 wheels.	4-wheel Cross-seated.	6 wheels.	4 wheels.	4-wheel Saloon.	Fell.	Passenger.	Goods.	Platform, Coal.	Carriage.	Timber.	Cattle.	Sheep.	Meat.	Horse Boxes.	Covered Goods.	High-side.	Low-side.	Iron Hopper, Mineral.
Total ...	4	1	1	6	2	18	8	10	4	16	10	4	54	2	16	1	2	17	1	37	14	7	82	42	20	102	56	6	2	37	67	31	2	160	91	78	2	46	348	1689	1153	382

Statement showing the Rolling-stock Received to 30th June, 1878.

Kawakawa Section ...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	31	...	2	...	...	...	...	1	3	...	...
Kaipara „ ...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	1	1	...	1	2	...	2	3	...	...	...	2	...	...	12	2	8	...	...	8	21	15	...
Auckland „ ...	...	1	...	...	...	...	...	4	...	...	...	...	9	...	...	...	...	...	...	5	3	...	7	10	...	8	8	...	...	5	9	...	...	28	10	4	...	10	28	88	48	50
Napier „ ...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	3	...	...	...	...	1	1	...	5	2	...	5	5	...	...	2	4	...	...	...	2	4	...	2	3	64	38	...
Wellington „ ...	4	...	...	1	...	...	...	4	...	2	...	...	...	...	2	...	...	...	...	1	1	...	2	8	...	2	4	...	2	2	4	...	...	12	4	4	2	4	15	28	21	...
Foxton „ ...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	2	...	...	...	...	3	2	...	2	7	...	...	...	3	...	...	8	2	4	...	2	12	25	18	...
Wanganui „ ...	...	...	...	1	...	...	...	1	...	...	...	...	2	...	...	...	...	...	...	1	1	...	1	2	...	4	2	...	...	1	2	...	...	10	2	4	...	3	13	17	15	...
New Plymouth „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	5	...	...	2	...	...	...	...	...	...	...	...	4	4	6	...
Greymouth „ ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	1	...	...	...	...	...	2	...	...	2	...	...	...	2	...	...	...	...	...	...	...	...	7	8	62
Westport ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	1	...	...	...	...	...	2	...	...	...	2	...	...	...	...	...	...	...	...	15	...	88
Nelson ...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	2	...	1	2	...	...	2	...	...	...	2	...	...	4	2	2	...	...	...	10	10	...
Picton ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	1	...	2	...	...	1	1	...	...	2	...	...	...	6	1	2	...	...	3	6	20	...
Christchurch „ ...	...	...	...	...	...	...	2	1	4	1	6	2	9	2	1	1	...	12	1	13	1	...	28	10	...	40	10	...	...	8	20	...	2	20	31	2	...	12	178	616	306	50
Dunedin „ ...	...	...	1	3	2	...	...	...	...	...	...	...	12	...	1	...	1	...	...	8	...	7	18	...	20	17	...	6	...	6	6	...	...	20	16	20	...	7	24	163	111	112
Invercargill „ ...	...	...	...	...	...	...	...	...	...	...	...	2	10	...	1	...	...	...	...	7	2	...	14	...	...	21	4	...	...	9	2	...	...	32	15	20	...	2	59	22	137	20
Total ...	4	1	1	6	2	...	2	10	4	7	6	4	49	2	16	1	2	17	1	37	14	7	82	42	20	102	56	6	2	37	59	31	2	154	87	74	2	42	348	1089	753	382

TABLE No. 18—*continued.*

SCHEDULE OF VARIOUS CLASSES OF PERMANENT-WAY MATERIAL.

ORDERS.

Lines.	Order. Memo.	Order. Date.	Miles.	Weight per yard.	Rails.	Fang Bolts.	Spikes.	Sole Plates.	Steel Joints.	Fish Plates.	Bolts and Nuts.	Chairs.	Wood Keys.	Points and Crossings.
					Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	No.	Sets.
Manawatu Tramway ...	27/71	Sept. 2/71	3	25 lb.	121	...	4	...	...	...	...	...	...	2
Canterbury Branch Lines	11/72	Jan. 20/72	20	30 lb.	944	...	29	...	34	...	...	...	...	10
Ditto	78/72	June 8/72	92	„	4,340	...	132	...	155	...	...	...	...	30
Ditto	63/75	Aug. 31/75	...	„	...	...	...	...	20	...	...	...	...	...
Picton–Blenheim ...	24/72	Jan. 23/72	12	„	566	...	17	...	20	...	...	...	...	...
			124	...	5,850	...	178	...	229	...	...	...	...	40
Addington–Rangiora ...	...	Mar. 2/71	6	70 lb.	767	...	28	...	...	39	...	274	28,581	...
Ditto ...	...	...	13	„	1,438	...	48	...	3	54	14	431	70,269	30
			19	...	2,205	...	76	...	3	93	14	705	98,850	30
Rangiora–Kowai ...	138/73	Jan. 18/73	14	56 lb.	1,252	26	18	...	...	48	13	...	...	10
Selwyn–Rakaia ...	9/71	Mar. 15/71	13	„	1,144	58	28	74	...	54	...	...	...	...
Auckland	...	...	6½	„	1,372	and fastenings		...	...	...	...	...	...	41
Kawakawa ...	...	...	3	„	268	„	„	...	...	...	...	...	...	...
			36½	...	...	...	...	...	...	...	...	...	...	51
To be Delivered at—														
Wellington ...	59/74	Sept. 26/74	89	52 lb.	7,500	92	128	...	...	244	69	...	...	...
Ditto ...	61/74	Sept. 30/74	...	„	...	...	...	...	...	...	...	...	...	80
Ditto ...	27/76	June 1/76	5	„	410	...	7	...	...	15	4	...	...	...
Ditto ...	32/76	June 29/76	...	„	...	...	10	...	...	...	...	...	...	80
Ditto ...	44/76	Aug. 25/76	1†	„	82	...	...	...	...	...	...	...	...	...
Ditto ...	64/76	Oct. 20/76	29½	„	2,419	29	40	...	...	90	24	...	...	...
* Ditto ...	68/77	July 28/77	7†	„	574	7	11	...	...	20	6	...	...	...
* Ditto ...	81/77	Sept. 21/77	15†	„	1,230	...	15	...	...	...	...	...	...	...
* Ditto ...	93/77	Oct. 19/77	...	„	...	15	39	...	...	42	12	...	...	...
*Napier ...	68/77	July 28/77	8†	„	656	8	13	...	...	22	6	...	...	...
Auckland	27/76	June 1/76	6	„	492	...	8	...	...	17	5	...	...	...
Ditto ...	32/76	June 29/76	...	„	...	...	...	...	...	...	...	...	...	20
* Ditto ...	81/77	Sept. 21/77	5†	„	410	...	5	...	...	...	...	...	...	...
* Ditto ...	93/77	Oct. 19/77	...	...	...	5	8	...	...	14	4	...	...	...
*Lyttelton ...	81/77	Sept. 21/77	20†	„	1640	...	5	...	...	...	...	...	...	...
* Ditto ...	93/77	Oct. 19/77	...	„	...	20	32	...	...	56	16	...	...	...
Port Chalmers ...	59/74	Sept. 26/74	11	„	1,000	11	16	...	...	29¾	8½	...	...	...
Ditto ...	61/74	Sept. 30/74	...	„	...	...	...	...	...	...	...	...	...	50
Ditto ...	27/76	June 1/76	28½	„	2,337	...	39	...	...	86	23	...	...	...
Ditto ...	40/77	May 4/77	5	„	410	6	7	...	...	15	4	...	...	...
* Ditto ...	81/77	Sept. 21/77	10†	„	820	...	5	...	...	...	...	...	...	...
* Ditto ...	93/77	Oct. 19/77	...	„	...	10	16	...	...	28	8	...	...	...
The Bluff... ...	27/76	June 1/76	9	„	738	...	12	...	...	26	7	...	...	...
* Ditto ...	81/77	Sept. 21/77	...	...	...	...	20	...	...	...	...	...	...	...
* Ditto ...	93/77	Sept. 19/77	...	...	...	...	26	...	...	...	...	...	...	...
Wellington, colonial make	77/2121	May 14/77	...	...	...	...	...	...	...	...	...	...	...	10
Westport „	77/3644	Aug. 11/77	...	...	...	...	...	...	...	...	...	...	...	1
			249	...	20,718	203	462	...	...	704¾	196½	...	...	241
Wellington–Masterton (Summit Incline) ...	30/74	May 2/74	3†	70 lb.	596	and fastenings		...	...	...	...	...	...	...
*Takaka Road Board ...	72/77	Aug. 24/77	...	20 lb	220	...	6½	...	...	...	...	...	...	6
*To be delivered at Wellington	41/78	May 4/78	9†	53 lb.	750	14	14	...	...	42	7	...	...	...

ORDERS IN COURSE OF EXECUTION.

Lines.	Port of Delivery.	Order. Memo.	Order. Date.	Miles.	Weight per Yard.	Rails.	Fang Bolts.	Spikes.	Fish Plates.	Fish Bolts.	Steel Joints.	Points and Crossings.
					lbs.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Sets.
Auckland–Kaipara	Auckland ...	81/77	21/9/77	5†	52	410	...	5	...	...	...	...
„	„ ...	93/77	19/10/77	...	„	...	5	8	14	4	...	...
Napier–Manawatu	Napier ...	68/77	28/7/77	8†	52	656	8	13	22	6	...	...
Wellington–Masterton	Wellington ...	81/77	21/9/77	15†	52	1,230	...	15	...	...	...	...
„	„ ...	93/77	19/10/77	...	„	...	15	39	42	12	...	...
„	„ ...	41/78	4/5/78	9†	53	750	14	14	42	7	...	...
Waitara–Wanganui	„ ...	68/77	28/7/77	7†	52	574	7	11	20	6	...	...
Amberley–Waitaki	Lyttelton ...	81/77	21/9/77	20†	52	1,640	...	5	...	...	...	...
„	„ ...	93/77	19/10/77	...	„	...	20	32	56	16	...	...
Waitaki–Invercargill	Port Chalmers	81/77	21/9/77	10†	52	820	...	5	...	...	...	...
„	„ ...	93/77	19/10/77	...	„	...	10	16	28	8	...	...
Western Railways, Otago	The Bluff ...	81/77	21/9/77	...	52	...	...	20	...	...	...	...
„	„ ...	93/77	19/10/77	...	„	...	...	26	...	...	...	...
Takaka Road Board	Nelson ...	72/77	24/8/77	...	20	220	...	6½	...	...	...	6
Total Orders unexecuted, †52 lb. material				...	...	5,330	65	195	182	52	...	...
„ „ †53 lb. „				...	...	750	14	14	42	7	...	...
„ „ 20 lb. „				...	...	220	...	6½	...	...	...	6
„ „ †40 lb. „				...	...	To cost £6,450			...	...	...	...

* Orders not yet completed. † Steel.

Memo.—In addition to above, there is an order for 40-lb. steel rails and fastenings (9 and 42/78), to be shipped to Lyttelton for Ashburton County Council, in such quantities as will cost, including all expenses, £6,450.

No.—TABLE 18—*continued.*

SCHEDULE OF 40-lb. PERMANENT-WAY MATERIAL.

ORDERS.

Lines.	Order. Memo.	Order. Date.	Miles.	Rails.	Fang Bolts.	Spikes.	Sole Plates.	Top Clips.	Steel Joints.	Points and Crossings.
				Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Sets.
Auckland–Kaipara	27/76	June 1/76	24	1,509	...	38	...	...	56	...
Kaipara–Riverhead... ...	28/73	June 2/73	18	1,132	44	21	47	33	47	10
Auckland–Mercer	53/71	Nov. 25/71	10	629	25	12	26	19	26	...
Ditto	123/72	Oct. 25/72	25	1,572	61	30	65	46	65	...
Ditto	129/72	Nov. 23/72	...	...	...	...	...	...	...	25
Mercer–Newcastle	1/74	Jan. 10/74	25	1,572	61	30	65	46	65	20
Auckland–Puniu	64/76	Oct. 20/76	5	315	5	7	...	...	12	...
Waitara–New Plymouth ...	24/72	Jan. 23/72	10	629	25	12	26	19	26	...
Ditto ...	28/73	June 2/73	2	126	5	3	5	4	5	...
Waitara–Patea	27/76	June 1/76	10	629	...	16	...	...	23	...
Wellington–Masterton ...	53/71	Nov. 25/71	10	629	25	12	26	19	26	...
Ditto ...	24/72	Jan. 23/72	11	692	27	13	29	20	29	...
Ditto ...	129/72	Nov. 23/72	...	...	...	...	...	...	...	25
Napier–Waipukurau ...	24/72	Jan. 23/72	12	754	30	15	31	22	31	...
Ditto ...	28/73	June 2/73	35	2,200	85	42	91	65	91	20
Takapau Southward ...	64/76	Oct. 20/76	7	441	7	10	...	...	18	...
Manawatu–Wanganui ...	28/73	June 2/73	15	943	37	18	39	28	39	10
Ditto ...	1/74	Jan. 10/74	15	943	37	18	39	28	39	10
Westport–Mount Rochfort ...	1/74	Jan. 10/74	20	1,257	50	24	51	38	51	10
Brunner–Greymouth ...	53/71	Nov. 25/71	8	503	20	10	21	15	21	...
Ditto ...	64/76	Oct. 20/76	2	126	2	3	...	...	5	...
Nelson–Foxhill	138/73	Jan. 18/73	21	1,321	51	25	55	39	55	12
Ditto	27/76	June 1/76	1	63	...	2	...	...	3	...
Picton–Blenheim	27/76	June 1/76	0¾	47	...	1¼	...	...	2¼	...
Ditto	53/71	Nov. 25/71	12	754	30	15	31	22	31	...
Ditto	53/71	Nov. 25/71	3†	188	8	4	8	6	8	...
Ditto	28/73	June 2/73	8	503	20	9	22	15	22	10
Rakaia–Timaru	24/72	Jan. 23/72	15	943	37	18	39	28	39	...
Ditto	123/72	Oct. 25/72	30	1,886	74	36	78	56	78	...
Ditto	129/72	Nov. 23/72	...	...	...	...	...	...	...	25
Ditto	28/73	June 2/73	20	1,258	49	24	52	37	52	40
Waitaki–Moeraki	28/73	June 2/73	41	2,578	100	46	105	77	105	20
Moeraki–Dunedin	1/74	Jan. 10/74	25	1,572	62	30	65	46	65	20
Dunedin–Clutha	68/71	May 27/71	6	377	15	7	15	11	15	10
Ditto	26/71	Aug. 31/71	10	629	24	12	26	19	26	10
Ditto	53/71	Nov. 25/71	3†	88	8	4	8	6	8	...
Ditto	123/72	Oct. 25/72	25	1,572	62	30	65	46	65	...
Ditto	129/72	Nov. 23/72	...	...	...	...	...	...	...	25
Clutha–Mataura	1/74	Jan. 10/74	25	1,572	62	30	65	46	65	10
Tokomairiro–Lawrence	28/73	June 2/73	23	1,447	56	25	59	44	59	40
Invercargill–Mataura ...	53/71	Nov. 25/71	12	754	30	15	31	22	31	...
Ditto	28/73	June 2/73	28	1,741	68	33	73	52	72	...
Winton–Kingston	28/73	June 2/73	23	1,447	56	25	59	44	59	30
Ditto	1/74	Jan. 10/74	27	1,698	67	32	70	51	70	10
To be Delivered at—										
Auckland	59/74	Feb. 26/74	60	3,975	63	87	...		138	...
The Bluff	59/74	Feb. 26/74	62	4,025	64	89	...	...	142	...
Lyttelton	60/74	Sept. 28/74	45½	3,000	48	67	...	...	105	...
Auckland	61/74	Sept. 30/74	...	...	...	...	...	...	...	30
Wellington	61/74	Sept. 30/74	...	...	...	...	...	...	...	30
Lyttelton	61/74	Sept. 30/74	...	...	...	...	...	...	...	60
Port Chalmers	61/74	Sept. 30/74	...	...	...	...	...	...	...	30
The Bluff	61/74	Sept. 30/74	...	...	...	...	...	...	...	50
Auckland	12/76	Mar. 10/76	...	...	...	27	...	...	...	...
Lyttelton	12/76	Mar. 10/76	...	...	...	9½	...	...	...	...
Port Chalmers	12/76	Mar. 10/76	...	...	...	7	...	...	...	...
The Bluff	12/76	Mar. 10/76	...	...	...	16½	...	...	...	...
Auckland	32/76	June 29/76	...	...	...	...	...	...	...	75
Wellington	32/76	June 29/76	...	...	...	...	...	...	...	35
Ditto	44/76	Aug. 25/76	1†	63	...	...	...	...	...	...
Ditto	64/76	Oct. 20/76	5	315	5	7	...	...	12	...
Colonial Made	...	...	...	...	...	...	...	...	...	343
Ditto	...	Aug. 1/76	...	...	...	...	...	...	...	51
Ditto (Western Railways)	77/2121	May 14/77	...	...	...	...	...	...	...	40
The Bluff ditto ...	58/77	June 30/77	...	...	...	25	...	...	...	...
Wellington (Rai Valley Tramway)	51/77	May 31/77	5	315	5	8	...	...	12	...
*Lyttelton, for Ashburton County Council	54/78	July 19/78	...	...	...	...	...	...	...	...
The Bluff (Western Railways)	60/78	July 20/78	20†	...	...	...	...	...	...	...
	...	...	801¼	50,732	1,610	1,100¼	1,487	1,069	2,014¼	1,136

* Orders not yet completed. † Steel.

INDEX TO APPENDICES.

APPENDICES TO THE PUBLIC WORKS STATEMENT, 1878.

APPENDIX A.

AUDITED STATEMENT OF EXPENDITURE ON PUBLIC WORKS OUT OF THE IMMIGRATION AND PUBLIC WORKS LOAN, FOR THE YEAR 1877-78.

Prepared in compliance with Section 9 of "The Public Works Act, 1876."

The Hon. J. MACANDREW to the COMMISSIONERS of AUDIT, Wellington.

GENTLEMEN,— Public Works Office, Wellington, 30th July, 1878.

In compliance with the 9th section of "The Public Works Act, 1876," I enclose a statement of the expenditure during the preceding financial year upon all Government works authorized by Parliament under "The Immigration and Public Works Appropriation Act, 1876."

I have, &c.,
J. MACANDREW,
Minister for Public Works.

The Commissioners of Audit, Wellington.

STATEMENT of EXPENDITURE on PUBLIC WORKS for the YEAR 1877-78, out of IMMIGRATION and PUBLIC WORKS LOAN, prepared in compliance with Section 9 of "The Public Works Act, 1876."

CLASS.	SUMMARY.	Net Expenditure.
		£ s. d.
III.	RAILWAYS	713,578 17 2
IV.	ROADS	34,299 7 8
VI.	WATERWORKS ON GOLD FIELDS	39,645 17 7
VII.	COAL MINES	574 19 4
VIII.	TELEGRAPH EXTENSION	33,182 2 10
IX.	PUBLIC BUILDINGS	105,167 13 3
X.	LIGHTHOUSES	18,310 16 2
XI.	MISCELLANEOUS PUBLIC WORKS	47,324 5 3
	TOTAL NET EXPENDITURE ON WORKS, IMMIGRATION AND PUBLIC WORKS LOAN	£992,083 19 3

Examined and found correct.

CHARLES KNIGHT,
Commissioner of Audit.

W. A. THOMAS,
Accountant Public Works.

1st August, 1878.

Vote.	Particulars.	Appropriation.	Expended out of Appropriation.	Expended in Excess of Appropriation.	Total Net Expenditure.
	CLASS III.—RAILWAYS.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
69	Kawakawa	6,113 0 0	143 13 9	...	143 13 9
70	Kaipara-Puniu	142,830 0 0	71,192 11 6	...	71,192 11 6
71	Napier-Manawatu...	75,633 0 0	28,239 17 3	...	28,239 17 3
72	Wellington-Masterton	162,677 0 0	73,314 19 8	...	73,314 19 8
73	Waitara-Patea	50,000 0 0	25,073 13 9	...	25,073 13 9
74	Patea-Manawatu	141,956 0 0	79,800 13 10	...	79,800 13 10
75	Nelson-Foxhill	11,083 0 0	366 11 7	...	366 11 7
76	Picton-Blenheim	29,235 0 0	1,332 16 0	...	1,332 16 0
77	Brunner-Greymouth	35,006 0 0	23,728 18 1	...	23,728 18 1
78	Westport-Ngakawau	38,234 0 0	28,644 5 4	...	28,644 5 4
79	Amberley-Waitaki	182,754 0 0	102,968 18 10	...	102,968 18 10
80	Waitaki-Bluff	365,488 0 0	228,364 8 11	...	228,364 8 11
81	Winton-Kingston	39,296 0 0	25,173 5 1	...	25,173 5 1
82	Western Railways	37,587 0 0	13,263 12 10	...	13,263 12 10
83	Surveys of New Lines and Roads	10,000 0 0	10,000 0 0	881 10 7	10,881 10 7
	" " unauthorized	...	...	109 15 11	109 15 11
84	Additional Land, &c.	43,208 0 0	979 4 3	...	979 4 3
					£713,578 17 2

Vote.	Particulars.	Appropriation.	Expended out of Appropriation.	Expended in Excess of Appropriation.	Total.
	CLASS IV.—ROADS.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
85	North Island	32,071 0 8	14,487 1 8	...	14,487 1 8
	„ unauthorized	...	...	345 16 8	345 16 8
86	Nelson South-West Gold Fields	17,801 5 4	4,679 6 1	...	4,679 6 1
87	Westland	19,163 4 3	7,045 10 8	...	7,045 10 8
88	Hokitika–Christchurch	6,000 0 0	6,000 0 0	1,741 12 7	7,741 12 7
					£34,299 7 8
	CLASS VI.—WATERWORKS ON GOLD FIELDS.				
90	Water-races	90,907 6 2	39,645 17 7	...	£39,645 17 7
	CLASS VII.—COAL MINES.				
91	Coal Mines	1,000 0 0	574 19 4	...	£574 19 4
	CLASS VIII.—TELEGRAPH EXTENSION.				
92	Telegraph Extension	26,700 0 0	26,700 0 0	6,482 2 10	£33,182 2 10
	CLASS IX.—PUBLIC BUILDINGS.				
93	Judicial	33,142 0 0	6,309 1 9	...	6,309 1 9
94	Postal and Telegraph	11,315 0 0	9,019 11 5	...	9,019 11 5
95	Customs	1,150 0 0	3 3 9	...	3 3 9
96	Offices for Public Departments	37,475 0 0	30,154 9 10	...	30,154 9 10
97	Lunatic Asylums	41,800 0 0	4,478 8 7	...	4,478 8 7
98	School Buildings	50,000 0 0	50,000 0 0	1,950 0 0	51,950 0 0
99	Hospitals	6,000 0 0	3,252 17 11	...	3,252 17 11
100	Miscellaneous	6,645 0 0	...	...	...
					£105,167 13 3
	CLASS X.—LIGHTHOUSES.				
101	Lighthouses	33,800 0 0	18,310 16 2	...	£18,310 16 2
	CLASS XI.—MISCELLANEOUS PUBLIC WORKS.				
	Item,				
102	2. Road, Raglan to Waikato	2,000 0 0	500 0 0	...	500 0 0
	3. „ Thames to Ohinemuri	5,000 0 0	3,500 0 0	...	3,500 0 0
	9. Waipoa Bridge and Approaches... ...	3,700 0 0	2,438 7 8	...	2,438 7 8
	10. Draining Patutahi Block	800 0 0	31 19 5	...	31 19 5
	11. Bridge over Ahuriri Harbour	10,000 0 0	13 10 0	...	13 10 0
	16. Mountain Road, Taranaki	3,000 0 0	1,893 1 7	...	1,893 1 7
	18. Road, Seventy-Mile Bush, &c.	5,000 0 0	32 0 0	...	32 0 0
	21. „ Mungaroa to Waikanae	3,500 0 0	500 0 0	...	500 0 0
	26. „ Masterton to Castlepoint	3,000 0 0	1,500 0 0	...	1,500 0 0
	29. „ Westport to Lyell	4,000 0 0	2,000 0 0	...	2,000 0 0
	30. „ Nelson to Westport and Greymouth	10,000 0 0	2,562 12 6	...	2,562 12 6
	32. „ Oronoko to Stanley Brook ...	1,000 0 0	300 0 0	...	300 0 0
	35. Bridge over Wairoa in Waimea District ...	5,000 0 0	100 1 9	...	100 1 9
	36. Road, Nelson to Havelock	1,500 0 0	300 0 0	...	300 0 0
	38. Bridge over Arnould	1,500 0 0	1,500 0 0	...	1,500 0 0
	40. „ Teremakau at Kumara ...	9,000 0 0	5 17 0	...	5 17 0
	41. „ Hokitika at Kanieri ...	8,000 0 0	32 10 0	...	32 10 0
	44. Purchase of Bridge over Clutha ...	5,000 0 0	5,000 0 0	...	5,000 0 0
	45. „ Victoria Bridge over Kawarau	4,000 0 0	4,000 0 0	...	4,000 0 0
	48. Portobello Road	500 0 0	0 6 0	...	0 6 0
	53. Road, Lawrence at Roxburgh	5,000 0 0	5,000 0 0	...	5,000 0 0
	54. „ Roxburgh at Clyde	2,500 0 0	2,500 0 0	...	2,500 0 0
	57. Compensation to Stitt Brothers, Buller Road Contract	800 0 0	620 0 0	...	620 0 0
	62. Main Road, Otago, Palmerston to Houndburn	2,500 0 0	2,500 0 0	...	2,500 0 0
	63. Jetty on Clutha River at Balclutha ...	250 0 0	250 0 0	...	250 0 0
	64. Manuherika Bridge, St. Bathans ...	500 0 0	250 0 0	...	250 0 0
	71. Main Road, Glenomaru to Catlin's River ...	1,000 0 0	750 0 0	...	750 0 0
	75. Manawatu Bridge Approaches ...	200 0 0	74 4 5	...	74 4 5
	77. Kimbolton Road, Sandon Block ...	1,000 0 0	250 0 0	...	250 0 0
	78. Opening Mountain Road to Patea ...	4,000 0 0	1,805 13 10	...	1,805 13 10
	79. Road, Tokatea Range	1,000 0 0	1,000 0 0	...	1,000 0 0
	81. „ Coromandel to Hastings	1,000 0 0	800 0 0	...	800 0 0
	82. „ Mackaytown to Waikato ...	1,000 0 0	500 0 0	...	500 0 0
	83. „ Nelson to Tophouse and Tarndale ...	1,400 0 0	202 3 3	...	202 3 3
	85. Clearing snags, Waikato	100 0 0	96 10 1	...	96 10 1
	86. Pukekaroro Bridge	60 0 0	60 0 0	...	60 0 0
	87. Orawaiti Bridge	2,000 0 0	210 18 3	...	210 18 3
	90. Opening Road at Ruatangata	150 0 0	137 0 0	...	137 0 0
	92. Road at Maungakaramea	500 0 0	250 0 0	...	250 0 0
	93. Tramway at Kamo	2,000 0 0	85 1 0	...	85 1 0
	99. Removal of rocks, &c., at Martin's Bay Harbour	200 0 0	5 0 0	...	5 0 0
	100. Completion Road, Maori Kaik to Tairoa Head Lighthouse	500 0 0	54 8 0	...	54 8 0
	102. Trunk Road, County Wanganui ...	1,500 0 0	1,084 18 6	...	1,084 18 6
	Bannockburn Bridge, unauthorized ...	...	...	2,500 0 0	2,500 0 0
	T. Mackay's salary, (*re* administration of Coal Fields), unauthorized	...	...	128 2 0	128 2 0
					£47,324 5 3

APPENDIX B.

ANNUAL REPORT ON RAILWAYS IN THE NORTH ISLAND BY THE ENGINEER IN CHARGE.

The Engineer in Charge, North Island, to the Hon. the Minister for Public Works.

Sir,— Public Works Office, Wellington, 30th June, 1878.

I have the honor to forward annual report on railway works executed during the last year:—

The total expenditure on railways in the North Island, up to 30th June, 1878, was, exclusive of preliminary surveys	£2,472,440
And the amount of contracts let, and other liabilities	321,247
Total of expenditure and liabilities	£2,793,687

The first table below shows the number of miles opened for traffic and now under construction in the North Island, with the expenditure and liabilities; and the second table (*see* end of report) consists of a list of the railways, and all the contracts, completed or in progress, with the times of completion, &c. The total number of miles opened for traffic during the year is 99 miles 38 chains:—

Name of Railway.	Expended to 30th June, 1878.	Liabilities on 30th June, 1878.	Total Length authorized.	Open for Traffic.
North Island.	£ s. d.	£ s. d.	M. ch.	M. ch.
Kawakawa	26,603 19 4	848 14 7	8 19	2 68
Kaipara-Puniu	876,966 14 5	77,808 2 9	143 71	111 77
Napier-Manawatu	355,388 19 5	31,745 14 11	102 24	64 1
Wellington-Masterton	538,093 0 3	114,710 16 0	66 12	27 7
Waitara-Patea	137,035 3 10	13,967 10 8	33 33	19 73
Patea-Manawatu	538,352 17 11	82,166 10 8	107 78	85 57
Total	2,472,440 15 2	321,247 9 7	461 77	311 43

NORTH ISLAND.

Kawakawa Railway.

During the year the only work of construction which has been executed is the renewal of the breastwork at the present landing at the cranes. This has been done by the lessees, but has not yet been inspected for the purpose of making a valuation of the cost which will be defrayed by the Public Works Department. The flood openings, reported on last year as being necessary, have not yet been put in; the line has, however, been free from destructive floods during the year.

Kaipara-Puniu Railway.

Sections of Line Opened.—During the financial year three sections of the Waikato Railway have been opened for traffic—viz., Mercer to Newcastle, on 13th August; Newcastle to Hamilton, on 19th December, 1877; and Hamilton to Ohaupo, on 4th June, 1878: in all, 50 miles 62 chains.

Newmarket-Helensville (Helensville Contract).—So little progress was made by the contractor on this work that it was formally taken out of his hands, and the work was carried on by the department until near the end of April, when the timber breastwork in the river at Helensville showed such signs of weakness, by bulging forward for a length of about 1½ chains, that the filling in behind it was discontinued. It would appear that, from motives of economy, this work had been designed as a solid wharf with a timber facing; but it is now evident that a portion of the width of the wharf will have to be constructed of open timber framing and decking well braced and tied, as the mud forming the bed of the river is of such a depth and so soft as to be unable to carry a heavy filling of earth.

The timber work already in place will not be lost, but will form part of the amended design, which will shortly be put in hand.

Auckland Contract (9 miles 61 chains).—The works on this contract are rather backward, but, as there are nearly twelve months of contract time yet unexpired, there is every probability the work will be finished within contract time.

Waitakerei Contract (12 miles 65 chains), between end of Auckland Contract and Riverhead.—This work, which includes formation, permanent way, and buildings, was advertised for public tender. A change, however, in the direction of the line having been decided on—viz., a reversion to the line as first recommended by the Engineers—the advertisements have been withdrawn, but tenders will shortly be called for the work as amended.

Onehunga Wharf.—The contract time for this work expired on 2nd February, It would appear that the contract time as specified was very short, and much delay has been caused by a very unfavourable season. The contractor is apparently using every effort to complete the work.

Mercer–Newcastle (31 miles 2 chains).—The plate-laying contract was finished on 11th August, and this section opened on the 13th of same month. The works have stood very well, and the subsidence of the banks over the extensive swamps has been almost inappreciable.

Newcastle–Ohaupo.—This contract consists of two sections, Newcastle–Hamilton, Hamilton–Ohaupo. The first was opened about five weeks before contract time. The second should have been opened on the 1st April, but, a few days before that date, a portion of the swamp, 18 miles 32 chains to 18 miles 40 chains, subsided, and necessitated the removal of the rails, sleepers, and ballast over this portion.

The lightest materials obtainable, viz., those procured from the spongy surface of the swamp, were then selected and formed into an embankment of increased width and height stretching over the weakest spot; the rails, sleepers, and ballast were relaid; and the line thus again made good, and opened for public traffic on the 4th June. This subsidence occurred at a point from which two sets of drainage proceeded, one running north, the other running south, so that here the drains were shallowest and the ground necessarily softest.

The drains through this extensive swamp will require to be gradually deepened, and kept well and thoroughly free and clear of obstructions, to insure perfect drainage, as on this will depend the future maintenance of the railway.

Ohaupo–Te Awamutu (6 miles 20 chains).—This work is now under contract, the time for which will expire on the 18th September, 1879: it includes formation, permanent way, and buildings.

Surveys.—A survey of a proposed railway line has been made from the Waikato to the Thames, on which Mr. James Stewart reports to the following effect:—The full length of this line will be about 30 miles, commencing at or near the Hamilton Railway Station, crossing the Waikato a short distance below Hamilton Township, and terminating at a landing-place on the Thames River, at Aroha.

For the first three or four miles the line passes over good firm, dry land; at four miles the Waikato County Council's road is struck, and followed to the Swamp Company's road, at 4 miles 76 chains. This road, and a continuation of it, are followed to 13 miles 45 chains. From thence to 15 miles 60 chains, the line (with the exception of 15 chains where it skirts the base of a hill) passes through a level swamp of rather drier nature than the first part through which the above roads are run. A creek is crossed at 16 miles 70 chains, and the Piako River at 18 miles 60 chains. At 19 miles 10 chains the great Piako and Waitoa Plain is struck, and left again at 25 miles 35 chains: this plain is a good swamp, nearly all a clayey or sandy subsoil, and easily drained.

The Waitoa River is crossed between the 24th and 25th miles, the Waiharakeke between the 25th and 26th, and the Piranui at the 27th mile. A saddle is crossed at 25 miles 65 chains; thence the line passes over good country, rather swampy, but with good hard subsoil.

The Omahu landing on the Thames is at 30 miles 40 chains—that is, half a mile below the point where the straight part of the line would strike the river; but if the line is to be carried on to the Thames Township, Ohinemuri, Shortland, and Grahamstown, the crossing should be at 30 miles 15 chains, or thereabouts.

Stations will be required about 4½ miles, 9 miles, and 25 miles.

Summarizing the description of the line, it may be said that 9½ miles are already formed and ditched; about 14 miles require only ditching and forming, and the remainder very ordinary earthworks. All the bridges, with the exception of that over the Waikato, will be of very easy construction; but that over the Waikato will be very large and costly. The line will be tolerably straight from end to end, with no sharp curves, and with no very steep grades.

The total cost of the railway as above described may be estimated approximately at £178,000.

Napier–Manawatu Railway.

The line is now open for traffic from Napier and the Spit to Kopua, a distance of 64 miles 48 chains. The last section, Takapau to Kopua, 5 miles 60 chains, was opened for traffic on the 25th January last. A large amount of extra station accommodation has been provided along this line, and other necessary works, including about 22½ miles of fencing, and extensive stone protective works at a bend in the Ngaruroro River at 10 miles.

Papatu Section (64 miles 48 chains to 70 miles 5 chains).—On this the bush has been felled, and the line cleared; some earthwork is in progress up to 65 miles 24 chains, and the remainder is being staked out for the purpose of letting it in small contracts.

Papatu Bridge Contract.—This includes three large timber bridges, the sites of which are in the the above section. The contract time extends to 15th July, 1879.

Patea–Manawatu Railway.

The line between Foxton and Wanganui was finally opened throughout for traffic on the 20th May, 1878, a total distance of 86 miles 9 chains.

Foxton–Bunnythorpe (29 miles 50 chains).—Sundry additions to station accommodation have been made, and several new sidings have been laid down, with other improvements.

Increased wharf accommodation is very much needed at Foxton, and a contract has been let for an additional length of wharf. The question of very largely increased station accommodation is under consideration, and plans are being prepared with a view to the work being undertaken at an early date.

Bunnythorpe to Greatford Station (the latter place is about one mile N.E. of Rangitikei River), (18 miles 41·73 chains).—In this section the portion between Feilding and Halcombe, 7¾ miles, was opened for traffic on 22nd April, 1878; and another portion between Halcombe and Greatford, 5½ miles, was opened on 20th May, 1878, being the last link connecting Foxton and Wanganui.

Greatford Station to Wanganui (37 miles 4 chains).—In this section the portion included in the Wanganui Town branch contract, 2 miles 71 chains, was opened for traffic on 24th January, 1878; and the Marton contract, 13 miles 67 chains. was opened on 20th May, 1878.

Rangitikei Bridge.—This contract was completed on the 25th July, 1877. It consists of nine spans of 60 feet each, resting on piled piers, and is well and substantially quilt. The piers, which are of timber, have been protected against scour by depositing around them heavy concrete blocks: this has been done with complete success.

Surveys—Bunnythorpe towards Manawatu Gorge.—Four miles of this section have been pegged out on an approved line, beyond which 3¼ miles to the Gorge, and 4½ miles through it, are yet unfinished, as it is not yet decided on which side of the Manawatu River the line will be laid out.

North of Wanganui (Brunswick and Kai-iwi Contracts, together 9 miles 34 chains from Aramoho Junction).—The formation only of this length is finished, but tenders will shortly be called for the plate-laying and other works not yet completed.

Waitotara Contract (12 miles 71 chains, ending at a point a short distance north of the Waitotara River).—This work, which includes formation and plate-laying, has lately been let. The contract time will end December 5th, 1879.

Surveys.—The field-work for the land plans of the Kai-iwi and Waitotara sections is completed, and the plans are now in course of preparation. A trial line of the extension of the railway to Waverley (Wairoa) was begun on 1st June.

Waitara-Patea Railway.

Waitara-New Plymouth.—On this line the truss bridges have been painted, and about 100 chains of fencing erected. About 2¼ miles of the line are yet unfenced.

Waiongona Section.—This leaves the above line at Sentry-Hill Station, and is 8 miles 60 chains in length. The plate-laying and ballasting have been completed during the year, and the section was opened for traffic on the 30th November last to Inglewood.

Ngatoro Section (8 miles 60 chains to 13 miles 40 chains).—The formation on this section was completed on the 27th May. The masonry and timber culverts have also been completed by contract; and rails, with fittings and sleepers, are on the ground ready for plate-laying, which will now be proceeded with.

Waipuku Section (13 miles 40 chains to 18 miles 60 chains).—On this the bush has been felled 3 chains wide, and the central chain cleared of timber up to 15½ miles. Formation work also is complete up to 14 miles 40 chains.

The masonry and timber culverts have been let by contract, as have also the larger bridges. The works on the last-named sections have mostly been done on the petty-contract system, affording employment to about eighty men living in the vicinity of the line.

Stratford Section (18 miles 60 chains to 22 miles 20 chains, terminating at the first crossing of the Patea River).—The bush has been felled as far as the river, and the centre cleared to 20½ miles, also by petty contracts.

Surveys.—These are now complete up to 13 miles 40 chains.

Wellington-Masterton Railway.

The portion of this line between the Upper Hutt and Kaitoke Stations, 7 miles 38 chains, was opened for traffic on the 1st January, 1878.

Since then the works on the Mungaroa, Pakuratahi, and Summit contracts have been completed, including the lining of all the tunnels in which the nature of the materials demanded it.

The plate-laying on the Incline contract is now being proceeded with by day labour, under the supervision of the officers of the department: this differs from the ordinary plate-laying in having a central rail, and special engines are required to work on it. The Fell engines, imported for this purpose, have been employed on that portion of the line in transporting rails and other material from the summit, and so far their working has been a complete success. The work is being pushed on as rapidly as possible, and it is hoped that the line may be opened to Featherston about the middle of September.

Featherston Station Contract.—This is now being pushed on satisfactorily, although much time was lost during the first two months by the inefficient arrangements of the contractor.

Carterton Contract.—This extends from Featherston to Masterton, a distance of 20 miles 41 chains. The work was let on 6th April, 1878, and includes formation, plate-laying, and buildings. The contract time will expire on 22nd March, 1880. Very little work has yet been done.

Surveys.—The preliminary explorations and survey of the proposed Hutt-Waikanae Railway were begun early in the month of April, and have been carried on uninterruptedly since that time: the explorations have been made to include that portion of the line lying between Waikanae and Foxton. Owing to the wetness and cold of the season, the work has been specially disagreeable, and has been carried on under much disadvantage. Special reports on these surveys are attached to this report, as well as an approximate estimate of the cost of constructing a railway as far as Foxton.

A map of the North Island, showing the extensions made in the railway system during the year, is also attached.

I have, &c.,
J. Blackett,
Engineer in Charge, North Island.

The Hon. the Minister for Public Works.

Enclosure 1 in Appendix B.

NEW ZEALAND RAILWAYS—NORTH ISLAND

TABLE of LENGTHS of GOVERNMENT LINES CONSTRUCTED and SURVEYED up to 30th June, 1878.

Appropriation.	Name of Line.	Mileage.	Sub-division.	Main Line.	Sidings.	Total.	State of Line.										
							Surveyed.	Under Formation	Under Plate-laying	Opened.							
										Date.	To June, 1872.	1872–73.	1873–74.	1874–75.	1875–76.	1876–77.	1877–78.	Total.
		M. chs. lks.		M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.		M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.
Kawakawa ...	Kawakawa ...	8 19 0	Kawakawa No. 1 ...	2 68 0	0 30 0	3 18 0	...	...	...	22 Feb., 1877	...	...	...	...	...	2 68 0	...	2 68 0
			,, No. 2 ...	3 11 0	...	3 11 0	3 11 0	...	...	...	...	...	...	...	...	...	...	...
			,, No. 3 ...	2 20 0	0 30 0	2 50 0	2 20 0	Prelim.	...	...	...	...	...	...	...	...	...	...
Kaipara–Puniu ...	Kaipara–Auckland...	38 62 0	Helensville Terminus	0 43 0	0 70 0	1 33 0	...	...	0 43 0	...	...	...	...	...	...	...	...	...
			Kaipara–Riverhead	15 68 0	0 65 12	16 53 12	...	...	...	29 Oct., 1875	...	...	...	...	15 68 0	...	...	15 68 0
			Riverhead ...	12 50 0	0 60 0	13 30 0	12 50 0	...	...	...	...	...	...	...	...	...	...	...
			Auckland ...	9 61 0	1 28 0	11 9 0	...	...	9 61 0	...	...	...	...	...	...	...	...	...
	Onehunga Branch ...	2 73 0	Onehunga Branch ...	2 53 0	1 32 26	4 5 26	...	...	...	24 Dec., 1873	...	...	2 53 0	...	...	...	...	2 53 0
			,, Wharf ...	0 20 0	0 20 0	0 40 0	...	...	0 20 0	...	...	...	...	...	...	...	...	...
	Waikato ...	102 16 0	Auckland–Mercer ...	42 54 0	5 51 54	48 25 54	...	...	...	20 May, 1875	...	...	...	42 54 0	...	...	...	42 54 0
			Mercer–Newcastle ...	31 2 0	3 50 0	34 52 0	...	...	...	13 Aug., 1877	...	...	...	...	...	...	31 2 0	31 2 0
			Newcastle–Hamilton	10 33 0	0 60 0	11 13 0	...	...	...	19 Dec., 1877	...	...	...	...	...	...	10 33 0	10 33 0
			Hamilton–Ohaupo ...	9 27 0	...	9 27 0	...	...	...	4 June, 1878	...	...	...	...	...	...	9 27 0	9 27 0
			Ohaupo–Te Awamutu	6 20 0	0 60 0	7 0 0	...	...	6 20 0	...	...	...	...	...	...	...	...	...
			Te Awamutu South	2 40 0	...	2 40 0	2 40 0	Prelim.	...	...	...	...	...	...	...	...	...	...
	Waikato–Thames ...	30 44 0	Waikato–Thames ...	30 44 0	...	30 44 0	30 44 0	...	...	...	...	...	...	...	...	...	...	...
Napier–Manawatu ...	Napier–Manawatu ...	102 24 0	Spit	2 0 0	4 0 0	62 21 0	...	...	...	25 Nov., 1874	...	...	...	2 0 0	...	...	...	2 0 0
			Napier–Pakipaki (pt.)	12 0 0						12 Oct., 1874	...	...	...	12 0 0	...	...	...	12 0 0
			,, ,,	4 13 0						1 Jan., 1875	...	...	...	4 13 0	...	...	...	4 13 0
			Pakipaki (part) ...	10 10 0						17 Feb., 1876	...	...	...	...	10 10 0	...	...	10 10 0
			,, ,, ...	3 26 0						28 Aug., 1876	...	...	...	...	...	3 26 0	...	3 26 0
			Waipawa ...	8 70 0						28 Aug., 1876	...	...	...	...	...	8 70 0	...	8 70 0
			Waipukurau ...	4 63 0						1 Sept., 1876	...	...	...	...	...	4 63 0	...	4 63 0
			Takapau ...	12 79 0						12 Mar., 1877	...	...	...	...	...	12 79 0	...	12 79 0
			Kopua ...	5 60 0	0 35 0	6 15 0	...	...	...	25 Jan., 1878	...	...	...	...	...	...	5 60 0	5 60 0
			Papatu ...	6 28 0	0 20 0	6 48 0	...	6 28 0	...	...	...	...	...	...	...	...	...	...
			Papatu–Gorge ...	31 75 0	...	31 75 0	31 75 0	Prelim.	...	...	...	...	...	...	...	...	...	...
Waitara–Patea ...	Waitara–New Plymouth	11 13 0	Waitara–New Plymouth	11 13 0	...	11 13 0	...	...	...	14 Oct., 1875	...	...	...	...	11 13 0	...	...	11 13 0
	Waitara–Patea ...	22 20 0	Waiongona ...	8 60 0	0 24 0	9 4 0	...	...	...	30 Nov., 1877	...	...	...	...	...	...	8 60 0	8 60 0
			Ngatoro ...	4 60 0	...	4 60 0	...	4 60 0	...	...	...	...	...	...	...	...	...	...
			Waipuku ...	4 13 0	...	4 13 0	...	4 13 0	...	...	...	...	...	...	...	...	...	...
			To Patea (1st crossing)	4 47 0	...	4 47 0	4 47 0	...	...	...	...	...	...	...	...	...	...	...
Patea–Manawatu ...	Patea–Wanganui ...	22 21 0	Waitotara ...	12 70 0	0 65 0	13 55 0	...	...	12 70 0	...	...	...	...	...	...	...	...	...
			Kai Iwi ...	1 0 0	...	1 0 0	...	1 0 0	...	...	...	...	...	...	...	...	...	...
			Brunswick ...	8 31 0	0 59 0	9 1 0	...	8 31 0	...	...	...	...	...	...	...	...	...	...
	Wanganui–Manawatu	85 57 0	Wanganui Town Branch	2 71 50	0 38 0	3 29 50	...	...	...	21 Jan., 1878	...	...	...	...	...	...	2 71 50	2 71 50
			Wanganui Bridge ...	0 14 50	...	0 14 50	...	...	...	17 May, 1877	...	...	...	...	...	0 14 50	...	0 14 50
			Wanganui ...	10 0 0	0 67 0	10 67 0	...	...	...	17 May, 1877	...	...	...	...	...	10 0 0	...	10 0 0
			Wangaehu ...	10 18 0	0 60 0	10 78 0	...	...	...	17 May, 1877	...	...	...	...	...	10 18 0	...	10 18 0
			Marton (part) ...	9 10 0	0 40 0	14 23 0	...	...	...	4 Feb., 1878	...	...	...	...	...	...	9 10 0	9 10 0
			,, ,, ...	4 53 0						20 May, 1878	...	...	...	...	...	...	4 53 0	4 53 0
			Halcombe (part) ...	6 27 0	0 70 0	10 69 0	...	...	...	20 May, 1878	...	...	...	...	...	...	6 27 0	6 27 0
			,, ,, ...	3 52 0						22 April, 1878	...	...	...	...	...	...	3 52 0	3 52 0
			Oroua ...	5 1 0	1 0 0	10 1 0	...	...	...	20 Oct., 1876	...	...	...	...	...	5 1 0	...	5 1 0
			Junction ...	4 0 0						20 Oct., 1876	...	...	...	...	...	4 0 0	...	4 0 0
			Palmerston ...	4 72 0	0 30 0	5 22 0	...	...	...	20 Oct., 1876	...	...	...	...	...	4 72 0	...	4 72 0
			Foxton Tramway ...	24 58 0	...	24 58 0	...	...	...	27 April, 1876	...	...	...	...	24 58 0	...	...	24 58 0
Wellington–Woodville	Wellington–Woodville	71 67 0	Thorndon Reclamat'n	0 52 0	...	0 52 0	...	0 52 0	...	...	...	...	...	...	...	...	...	...
			Wellington ...	8 9 0	1 51 75	20 60 75	...	...	...	14 April, 1874	...	...	8 9 0	...	...	...	...	8 9 0
			Hutt ...	5 75 0						15 Dec., 1875	...	...	...	...	5 75 0	...	...	5 75 0
			River (part) ...	2 5 0						15 Dec., 1875	...	...	...	...	2 5 0	...	...	2 5 0
			,, ,, ...	3 0 0						1 Feb., 1876	...	...	...	...	3 0 0	...	...	3 0 0
			Mungaroa (part) ...	0 35 0	0 20 0	8 18 0	...	...	...	1 Feb., 1876	...	...	...	...	0 35 0	...	...	0 35 0
			,, ,, ...	7 43 0						1 Jan., 1878	...	...	...	...	...	...	7 43 0	7 43 0
			Pakuratahi ...	6 50 0	...	6 50 0	...	...	6 50 0	...	...	...	...	...	...	...	...	...
			Summit ...	1 12 0	0 20 0	1 32 0	...	...	1 12 0	...	...	...	...	...	...	...	...	...
			Incline ...	8 78 0	0 40 0	9 38 0	...	...	8 78 0	...	...	...	...	...	...	...	...	...
			Featherston Station	1 12 0	0 20 0	1 32 0	...	1 12 0	...	...	...	...	...	...	...	...	...	...
			Carterton ...	20 41 0	1 40 0	22 1 0	...	...	20 41 0	...	...	...	...	...	...	...	...	...
			Masterton to Ruamahanga	5 55 0	...	5 55 0	5 55 0	Prelim.	...	...	...	...	...	...	...	...	...	...
Totals ...	...	498 16 0	...	498 16 0	32 47 67	530 63 67	93 22 0	26 36 0	66 75 0	...	...	...	10 62 0	60 67 0	73 24 0	67 11 50	99 38 50	311 43 0

Enclosure 2 in Appendix B.

REPORT No. 1 ON THE HUTT-WAIKANAE SECTION OF THE WELLINGTON-MANAWATU RAILWAY.

Mr. KNORPP to the ENGINEER-IN-CHIEF.

SIR,— Wellington, 17th May, 1878.

I have the honor to report that, according to directions of the Hon. the Minister for Public Works, I have examined two of the proposed routes, designated below as No. 1 and No. 3, from the Wellington and Masterton Railway to Waikanae. The line which has been called No. 2 is not of such a character as to be worth reporting on.

Both these routes traverse very broken country, of which, at present, only parts have been surveyed, so that distance can only be estimated approximately. The levels could be taken by aneroid only, and may therefore require corrections hereafter.

No. 1 *Line.*

No. 1 line will start from the Upper Hutt Station and run over average country to above the place where the Hutt-Waikanae Road will cross the Hutt River: here a bridge of at least three 80-ft. spans, probably on cylinders, will be required. From this point it will have to follow generally the course of the Akatarawa Stream for a length of about nine miles, and then that of one of its tributaries for about three miles, until it arrives at the saddle dividing the Hutt from the Waikanae drainage. This saddle is 1,560 feet above sea-level. Of this height about 300 feet may be overcome by a curved tunnel about 30 chains long, leaving the summit of this line at 1,260 feet above the sea, or about 120 feet higher than the Rimutaka Tunnel, which is 29½ chains long. The country from the Hutt River to the saddle is of a very difficult nature for a railway, being a succession of precipitous spurs and deep gullies with only a few flats of small extent, and exceeds in roughness the country of the Mungaroa and Pakuratahi contracts. A ruling grade of 1 in 40 can be obtained through this part, but further extensive investigation of the ground alone can determine what ruling grade should be adopted. From the saddle to the foot of the hills at Waikanae the country nearly equals that of the Hutt side in roughness, and from a few readings at points through which the line must pass it is probable that a ruling grade of 1 in 40 cannot be obtained on this side, and that a much steeper grade will have to be adopted.

Assuming the length of this line to be 25 miles from the Upper Hutt Station to the Waikanae banks, which, with the numerous windings of the necessary contours, is probably a somewhat low estimate, I consider that its construction will cost not less than £250,000, exclusive of land and stations (at the present prices of labour and materials), unless specially steep grades are adopted, for which the country appears to offer special facilities.

No. 3 *Line.*

No. 3 line starts at the end of the 12th mile of the Wellington and Masterton Railway, and winds up a gully behind Mr. Hayward's house to a saddle 531 feet above the sea, where a short cutting of a maximum depth of 35 feet can with advantage be made. This length, estimated to be four miles, will contain some heavy cuttings and banks. From this saddle to the Pahautanui Small Farm Settlement, a distance of about three miles, some heavy earthwork will have to be provided for: it is expected that a ruling grade of 1 in 40 can be obtained on both sides of this saddle. At the head of the Pahautanui small farms two alternative routes exist. The one runs down to and follows the main road until the valley behind Mr. Abbott's homestead at Horokiwi opens out. The other continues in a straighter course across Mr. Mulhern's land through some very rough country to the same point. The lower line is estimated to be about three miles longer than the upper line, but the grading would be very light, although probably 100 feet in height would be lost in adopting it. The above valley leads to the Wainui saddle, which is 860 feet* above sea level: 132 feet of this height may be overcome by a tunnel about 18 chains long; the country from the valley to the saddle will necessitate some heavy grading, with a ruling grade of 1 in 40. From the Wainui saddle to the foot of the hills (about three miles from Paikakariki Hotel) the country greatly resembles the "Incline" contract of the Wellington and Masterton Railway, and will occasion some heavy grading, with a few short tunnels. It is, however, expected that a ruling grade of 1 in 40 can be obtained.

From the foot of the hills the line would pass to the Waikanae through the valley between the main range and the sand-hills of the sea-coast, which appears to present no expensive feature.

It is estimated that the total length of No. 3 line, from end of 12th mile on the Wellington and Masterton Railway *viâ* the Pahautanui main road to the junction with No. 1 line, is 29 miles, and that its cost exclusive of land and stations will be about the same as that of No. 1, £250,000. It appears, therefore, that,—

1. The estimated cost of No. 1 and No. 3 are the same;
2. The estimated length of new line to be constructed is 25 miles and 29 miles respectively;
3. The estimated length of haulage from Waikanae to end of 12th mile is 32 miles along No. 1, and 29 miles along No. 3 line;
4. The estimated height to which load has to be lifted from the 12th mile is 1,179 feet along No. 1, and 1,137 feet along No. 3 line:

leaving thus a balance of 3 miles in length and 42 feet in height in favour of No. 3 line if the main road route at Pahautanui is adopted, and 6 miles in length and 142 feet in height if the straighter line near the Pahautanui Small Farm Settlement is adopted.

The trial surveys now being run will give further detail information; but, before any final decision is come to, I would recommend that further exploration be made between the Waikanae and the Otaki, as a lower saddle may possibly exist there between the east and west sides of the Tararua Range.

I have, &c.,

C. B. KNORPP,

The Engineer-in-Chief. Superintending Engineer.

* Since ascertained by level to be 881 feet.

Enclosure 3 in Appendix B.

REPORT ON THE WAIKANAE-MANAWATU SECTION OF THE WELLINGTON-MANAWATU RAILWAY.

Mr. KNORPP to the ENGINEER in CHARGE, NORTH ISLAND.

SIR,— Wellington, 29th July, 1878.

I have the honor to report that I have examined the country between the Waikanae and Manawatu Rivers, with a view to determine a route for a proposed railway. The annexed plan shows its approximate course. Foxton is the nearest place where to connect it with the Patea–Manawatu Railway; a route *viâ* Fitzherbert and Palmerston North has also been examined, and is shown on the plan. From the Waikanae its length would be about 32 miles to Foxton Wharf, and 47½ miles to Palmerston Station. For 25 miles this line would traverse easy country, at first at the foot of, and then on the low undulating terrace which stretches from near Waikanae to the Township of Fitzherbert, between the foot of the first low range of the Tararua Hills and the lakes and swamps of the sea-coast and the Manawatu River: nowhere would it rise more than 100 feet above sea level, and easy grades and curves can be obtained, with light formation. The Waikanae, Otaki, and Ohau are the principal rivers to be crossed—by four, seven, and three 60-feet spans respectively; they have shingle beds, with well-defined banks, and carry large quantities of timber in floods: piles, with heavy shoes, will drive well in all. There are also about a dozen smaller streams, which will not entail any expensive work. With the exception of the few old clearings shown, the whole country is covered with light bush; good totara grows near the sites of the Otaki and Ohau Bridges. Gravel for ballast occurs between the Waikanae and Otaki, at the Werowhanga clearing, and at the Wereroa clearing behind Horowhenua Lake.

At the 23rd mile the line branches off towards Foxton, and enters, at the 25th mile, the swamps of the Manawatu, whence heavy works of embankment and bridging will be required to get over the flooded country and the Manawatu River, for which large spans on cylinders, with a swing-bridge for navigation, will have to be provided. The river protection and reclamation will have to be continued from the wharf to the ferry.

From the 23rd mile the route to Palmerston continues on the terrace, which becomes rather more broken, especially between the 26th and 38th miles, over the Koputeroa, Te Maire, and Tokomaru streams, which may be crossed by 40-feet spans, until at the 42nd mile it reaches the east corner of Fitzherbert clearing, and then turns through the Kairanga Native Reserve, over the Kohuterawa stream (40-feet spans) to the Manawatu River, which it crosses about 2½ miles below the road bridge, and thence to Palmerston Station. Nowhere on the Palmerston route would the line rise higher than about 200 feet above sea level, and easy grades and curves can be obtained without much work. On the last portion the earthwork will be heavier, and the bridging lighter, than on the first 25 miles. The crossing of the Manawatu and the flooded country on this line will be less expensive, as 80-feet spans will be sufficient, and navigation will not have to be specially provided for.

An approximate estimate shows that the railway from Waikanae to Foxton cannot be made under £190,000, and that from Waikanae to Palmerston under £220,000, exclusive of land and stations.

In connection with these lines it may be of interest to point out that if the comparatively easy private railways, from Carnarvon to Sandon and from Sandon to Rangitawa, are made, the distance by rail between Foxton and Wanganui will be shortened by 19 miles.

I have, &c.,

C. B. KNORPP,

John Blackett, Esq., Engineer in Charge, North Island. Superintending Engineer.

PLAN OF THE

WAIKANAE TO MANAWATU
RAILWAY

To accompany Mr. Knorpp's
Report of 29th July 1878,

Scale of Miles.

10 0 10 20

REFERENCE

Shews lines of exploration Waikanae - Manawatu ——————
" " " " No. 1 Hutt - Waikanae - - - -
" " " " No. 3 " " + + ++

APPENDIX C.

ANNUAL REPORT ON ROADS IN THE NORTH ISLAND, BY THE ENGINEER IN CHARGE.

The Engineer in Charge, North Island, to the Hon. the Minister for Public Works.

Sir,— Public Works Office, Wellington, 30th June, 1878.

I have the honor to forward annual report on roadwork executed during last year under "The Public Works Act, 1876," up to the 31st May.

The report this year will necessarily be very brief, as most of the roads have been handed over to the several counties in which they are located, and the new works executed by the Government are of limited extent.

ROADS NORTH OF AUCKLAND.

The District Engineer reports that no work has been executed by him in this district during the year. The expenditure voted by Parliament has been mainly under the control of the counties interested.

WORKS SOUTH OF AUCKLAND.

Great South Road.—Within the last three months this road has been maintained. The bridges were found to be more or less out of repair, and in many places the surface of the road badly worn.

The bridges have all been repaired, excepting that at Drury, the wings of which need attending to. This work will, however, soon be completed. The Maungatawhiri Bridge was much decayed, and has been repaired at a cost of £33.

All the bluestone road-metal used has been procured from Mount Eden Gaol, and is of good quality. Portions of the road, on which bluestone road-metal had never been used, have been repaired with scoria gravel.

Approximate expenditure to end of May, about £302.

Mangere Bridge.—Previous reports as to the destruction of some of the piles of this bridge by the *teredo* have been confirmed, and there is no doubt that provision should be made to renew the piles of the piers.

Experiments have shown that heart-of-totara piles in the same waters are not affected by the worm, and may be used with safety. The cost of renewing the piles, tarring all the woodwork, and painting the ironwork, will be about £1,800.

Tamaki Bridge.—A report was made on the state of this structure in February, 1877, and certain repairs to the flooring were made at a cost of £25. The lessee has again drawn attention to the state of the floor, which it is evident must be renewed, and also other necessary repairs executed, the cost of which will probably amount to £1,500.

Cambridge–Taupo Road.—This line of road lies between Cambridge and the main line of road between Tauranga and Taupo, which it joins about four miles north of Atiamuri Bridge. The work on it has been executed by a party of the Armed Constabulary Force, working since June last under the supervision of the Public Works Department. The working party has been reduced in number, but there are still about thirty-five at work.

When the Public Works Department took charge, the Pairere Bridge, 30 feet long, was half-built, the timber used being rimu. The bridge is now finished. Large box-culverts on piles are placed where necessary, and the soft sandstone of the district is being used for dry stone culverts. All other bridges and culverts now being built are of kauri or totara.

The length of road formed, 15 feet wide, fit for the haulage of timber, is 12 miles, but no part has been metalled. Originally the formation was only 10 feet wide, but about 7 miles have been widened as above after being very much destroyed by floods.

About one-half of the timber for the Waipa Bridge, situated about eighteen miles from Cambridge, has been delivered. The rest is being hauled, and the piling-engine is on the ground.

Endeavours have been made to procure timber from the Natives there, and also to employ them in hauling kauri timber from Cambridge, but without success, as intertribal quarrels interfere and prevent the execution of any agreements.

BAY OF PLENTY.

Tauranga–Taupo Road.—The portion of this road lying between Tauranga and Oropi, 12 miles, after having been put in good order, was handed over to the county. The remainder of the road has been maintained under an efficient overseer: it is generally in good or fair order throughout, but demands constant attention and re-forming, as it is not a metalled road.

The overseer calculates that the ordinary traffic on this road of heavy waggons and drays has increased, since May, 1877, five times, and that of coaches, buggies, and saddle-horses nearly ten times.

The bridges in the Mangarewa Forest were built of rimu, and are decaying. Two of them at least will require to be renewed shortly, when this is done more durable wood will be used.

Rotorua–Tarawera Road (about 10 miles).—The rocks which obstructed this road near Wairoa have been blasted away, the pieces broken and used as metal on the worst portions. It is now in good order for traffic.

Maketu–Rotorua Road.—Ordinary bridge and other repairs have kept this road safe for traffic, but the portion between Ohinemutu and Taheke demands attention and considerable improvements to meet the increased requirements of tourists and others: these will probably cost £200.

Opotiki–Ohiwa Road: Waioeka Bridges.—These were damaged by a flood in November, 1875, and during the last year 230 feet of the larger bridge have been taken to pieces and rebuilt. The repair of the smaller bridge is now in hand: it has been found necessary to lengthen it 52 feet, owing to the washing away of the river-bank; it will now be 120 feet in all. A considerable amount of earthwork has been executed in making the approaches, &c.

Whakatane–Te Teko Road.—240 chains of embankment have been made through the swamp containing 33,520 cubic yards of earthwork; also 60 chains of road formation. The timber for the bridges and culverts is now being carted from the Ohiu bush on the Te Teko and Galatea Road. The work is being done under a Native contract.

Tauranga–East Cape.—About 12 miles of this road have been maintained by Native contractors. A schoolhouse has been built at Torere, and a Courthouse at Maketu; and the schoolhouses at Maketu, Whakatane, Omaramufu, and Te Kaha have been repaired and painted under the superintendence of the Public Works overseer.

Napier–Taupo; Taupo–Atiamuri.

This portion of the main line of road is, in the same way as the northern portion, placed under the charge of a competent overseer, who attends to all necessary repairs and improvements.

Kaiwhaka–Runanga (45 miles).—This has been maintained in a fairly efficient state of repair by a party of Armed Constabulary, numbering about twenty, and other skilled labour has been employed in the special work of repairing and reconstructing certain culverts and bridges.

Runanga–Atiamuri (57 miles).—The necessary repairs on this have been executed by parties of Armed Constabulary from the Opepe and Taupo Constabulary posts, and the road is in generally fair order.

Taupo to Hot Springs (1¾ miles).—A new road, lately opened for traffic, and in good order. A return road forming a circular drive is being made, and is just about completed. The work has been done by the Armed Constabulary.

EAST COAST.

Kopua–Norsewood.—This is intended to connect the Kopua Railway Station with the main trunk road at the settlement of Norsewood. About 3 miles 74 chains have been surveyed and cleared, and, of this, 1 mile 33 chains have been formed and metalled. The work done includes one bridge over the Manawatu River, consisting of centre span of 50 feet and two side spans of 18 feet each, besides five box-culverts.

Waipaoa Cart Bridge.—This structure, the contract for which was described in last year's report as having been let, is now very near completion. A new road has been opened to the site by the local authorities, who, when the bridge is finished, will make the necessary approaches. On a recent visit to the place I found that it would be necessary to protect one bank of the river against the action of heavy floods: plans for this work are now being prepared.

MANAWATU DISTRICT.

Manawatu Gorge Road (viz., from the ferry at the crossing at the Manawatu, below the Gorge, to the bridge in the Gorge, about 4½ miles, of which 3¼ miles lie in Manawatu County, and 1¼ miles in the Wairarapa West County).—This road has been well maintained, and the culverts and bridges are in good order throughout.

The cost of repairs on the above portions of road will amount respectively to about £185 and £123 annually.

Manawatu Gorge Bridge.—This structure has been painted during the last year at a cost of £278 10s., and is now in good condition.

WORKS, FOR WHICH PROVINCIAL APPROPRIATIONS HAD BEEN MADE, TAKEN OVER AND CARRIED OUT BY GENERAL GOVERNMENT.

Opaki–Manawatu.—All the metalling contracts, described as being in progress last year, are now finished.

Ferries have been established under Native ferrymen at Manawatu Upper Crossing, and at the Mangatainoko, which so far have been conducted in a satisfactory manner.

Mauriceville Road (2 miles 73·83 chains).—The whole of the formation on this road will, it is expected, be completed in about a fortnight or three weeks; and a contract has been let for three bridges, which are however not yet completed.

Rangitumau Road.—All the bush-felling contracts have been completed, and the road has been handed over to the Masterton Highway Board.

Mangapakeha Road.—All the contracts reported as being in hand last year have been completed, and the road is in the hands of the Wairarapa East County.

Roads North of Feilding.—The whole of the contracts for bush-felling on these lines of road, amounting to 775 chains, have been completed, and the balance of the vote has been expended under the supervision of the Manawatu County Council.

Bunnythorpe Road.—The bush has been felled upon the main cross-road from the railway line to Tainui River, and the formation has been completed from the Rangitikei Road to the Bunnythorpe Railway Station—a distance of 309 chains of formation and 289 chains of bush-felling.

Manawatu Bridge and Approaches, near Palmerston North.—The contract work of the bridge is completed, but the approaches are still in hand, and include 46 chains of earthwork.

Moutoa Swamp: Roads and Drains.—365 chains of main drains have been completed, and 100 chains are now in hand.

Upokongaro to Mangawhero.—15 miles of roads have been laid off on this line.

Rangitikei Bridge (Contracts No. 1 and No. 2).—This work is now completed, and ready for final inspection.

Lower Tauherenikau Bridge.—This work has been completed, and the formation of the approaches is being undertaken by the Featherston Highway Board.

Main Road, Wairarapa West County.—This road (more particularly the Rimutaka hill and valley section) is becoming very much cut up with the large traffic, and will require close attention during the winter. The Forty-Mile Bush section has been much improved, and is in good order.

Masterton–Opaki Road.—Above 2½ miles of this have been formed and metalled during the past year; there remains a distance of about 2 miles yet to be finished, but the funds available last year were insufficient to complete it.

Reclaimed Land, Wellington.—The whole of the timber breastwork is completed, and of the earthwork there yet remain about 3½ acres to be filled in. There has been delay in laying down the permanent drains, owing to the actual position of the street lines not being determined. The fencing intended to be erected at the head of the quarry will shortly be undertaken.

I have, &c.,
JOHN BLACKETT,
Engineer in Charge, North Island.

The Hon. the Minister for Public Works.

APPENDIX D.

ANNUAL REPORT ON MIDDLE ISLAND WORKS BY THE ENGINEER IN CHARGE.

The ENGINEER in CHARGE, Middle Island, to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Public Works Office, Dunedin, 1st July, 1878.

I have the honor to submit the following report on the various works completed and in progress in the Middle Island during the past financial year.

In order to facilitate reference I purpose adhering generally to the arrangement of the subject and method of giving information adopted in former reports.

RAILWAYS.

The following table shows the lengths of railways authorized and open, together with the expenditure and liabilities, to and on the 30th June, 1878, inclusive of the lines taken over from the Provincial Governments of Canterbury and Otago:—

Name of Railway.	Total Length authorized.	Open for Traffic.	Expenditure to 30th June, 1878.	Liabilities on 30th June, 1878.
MIDDLE ISLAND.	M. ch.	M. ch.	£ s. d.	£ s. d.
Nelson–Foxhill	20 11	19 10	117,967 3 7	9,350 12 11
Picton–Blenheim	18 32	17 10	159,337 0 9	3,485 13 5
Brunner–Greymouth	7 50	7 50	163,247 18 8	17,096 3 8
Westport–Ngakawau	19 63	18 70	186,435 8 2	15,691 4 11
Amberley–Waitaki, with Branches,—				
General Government Lines	255 28	255 28	1,378,831 16 7	158,046 12 7
Provincial „ „	54 37	54 37	731,759 0 0	...
Waitaki–Bluff, with Branches,—				
General Government Lines	254 71	225 36	2,091,045 15 5	160,097 11 1
Provincial „ „	106 12	75 41	312,225 0 0	...
Provincial Government Lines finished and opened by General Government	...	8 79	...	...
Winton–Kingston	68 35	59 27	228,780 10 6	8,123 15 9
Western Railways—General Government Lines	37 20		13,263 12 10	23,684 7 9
„ Provincial „ „			60,297 0 0	...
	842 39	741 68	5,443,190 6 6	395,576 2 1

The rate at which the several railways in the Middle Island have been completed during each financial year is as follows, details being given in Table A hereto appended:—

—	Miles of Railway Opened during Financial Year.							Total.
	Up to 30th June, 1872.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	
Middle Island ...	58 51	22 42	11 11	127 43	243 64	184 04	94 13	741 68

Nelson–Foxhill Railway.

A contract for the extension of this line from its present terminus to the Port, a distance of about a mile, was entered into last month, and the contractor is making a commencement with the works. It is intended to be finished in nine months. This practically is the only constructive work executed or undertaken on the railway during the past year.

Westport–Ngakawau Railway.

General.—The total length of this line as surveyed from Westport to the Ngakawau River is 19 miles 35 chains, of which 18 miles 70 chains is open. There is also a branch of 1 mile 15 chains commencing at 6¼ miles from Westport, and extending to the Fairdown Stone Quarry, whence materials for the harbour works are procured. Ten miles of the main line to Waimangaroa was opened in August, 1876, and the remaining 8 miles 70 chains on the 22nd September, 1877. The branch line has been opened since August, 1876. The Westport–Ngakawau Railway terminates at a point 45 chains south of the Ngakawau River, but it is not proposed to extend it either in that direction or eastward along the river-bank till the development of the adjacent coal mines warrants the expenditure.

Westport Station.—The most important work that has been in progress on the Westport–Ngakawau Railway last year is the Westport Station contract now almost finished, amounting with extras to about £36,000. In addition to the ordinary station buildings and appliances, this contract includes river-protective works, wharves, and coal staiths, calculated to accommodate a large mineral and general traffic. The works, which are of the most complete description, have been faithfully carried out by the contractor.

Buller Stop-bank.—Connected with the Westport–Ngakawau Railway, but scarcely chargeable to it, is an extensive work that demands careful consideration—viz., the Buller Stop-bank. Within the last few years the river has shown a tendency to leave its course near the head of the Orawaiti Valley, and follow that valley, possibly to the sea. Such a result would be utter destruction to the whole adjoining district, and a serious loss to the colony at large. The Town of Westport would be cut off from the country to the north of it, and possibly swept away altogether; the railway would be broken through, and the harbour, which is perhaps the best that commands the western coal fields, would be completely destroyed. The encroachment of the river was at first thought to be unimportant, and an ordinary earthen embankment was erected to resist it; but this gave way in a large flood, and the whole question assumed the important aspect I have just mentioned. The estimates provide a considerable sum for the work, but, beyond taking steps to prevent further damage, it is not proposed to expend much of it till Sir John Coode's final report on the Buller River is received.

Picton–Blenheim Railway.

There has been no new work on this line during the past year, but the contract survey of the extension into Blenheim, a distance of 1¼ miles, has been made, and the drawings are in progress, it being intended to call for tenders as soon as they are ready. The Opawa Bridge on the extension is to be made for both road and railway traffic.

Greymouth–Brunnerton Railway.

General.—This railway, opened in April, 1876, was originally regarded as a coal line only: consequently little or no provision was made for passenger and general traffic. Latterly, however, these have increased to a considerable extent, so it was necessary to provide additional station accommodation, which has been done during the past year. Still, the railway is in this respect far from complete. The development of the coal trade, which has already acquired considerable proportions, will necessitate the construction of a new station at Greymouth, together with coal staiths similar to those at Westport, or other appliances for loading vessels. Surveys have been ordered for those works, and it is proposed that their erection should proceed simultaneously with the harbour works.

Harbour Works at Greymouth.—These works, which are probably the most important now in progress on the West Coast, consist chiefly of training walls on each side of the Grey River, opposite and below the town of Greymouth.

They are intended to confine the river into one channel, by which means it is calculated that a certain depth of water will at all times be maintained in the channel itself and on the bar at the mouth of the river. Like all works dependent on the action of running water in open channels, there must necessarily be a slight uncertainty as to the precise effect of these walls. It is therefore satisfactory to know that Mr. Moriarty and Sir John Coode have practically indorsed the original plans. The alterations they suggested are comparatively unimportant, and are apparently due to the altered conditions of the case since the works were designed.

The total expenditure on the Greymouth works since May, 1877, has been about £18,000, distributed as follows:—

Cobden Wall	£3,500
Johnston Street Wall	9,500
Lagoon Wall	5,000
Total	£18,000

The contract for the walls on the southern side of the river was not making satisfactory progress; so the work was taken out of the contractor's hands in October last, and has since been carried on by the department. The extent of the work contemplated under the contract is now finished, but it is proposed to continue the wall in the manner lately adopted till Sir John Coode's complete report on the whole scheme is received, after which contracts will be let.

A small dredge for the Greymouth Harbour is now in course of construction in Dunedin; it is expected to be finished in about two months.

Amberley–Waitaki Railway, with Branches.

Main Line.—The principal construction works done during the year are the alteration of the gauge from Amberley to Lyttelton, and the re-modelling and extending of the Christchurch and Lyttelton Stations.

Eyreton Branch Extension.—This line, which connects the Kaiapoi–Eyreton and Rangiora–Oxford branches, is six miles in length, and the works are very light. It was opened in February.

Opawa Branch.—A large portion of this line was so seriously injured by a flood shortly after its opening in the beginning of 1877 that a reconstruction became necessary. The works were finished, and the branch reopened for its entire length, in August.

New Works.—The new works most urgently required on the Canterbury railways are new workshops, which are proposed to be erected at Addington, and additional station accommodation almost everywhere. The Timaru Station in particular wants to be remodelled and extended, the traffic, having completely outgrown its capabilities.

It would be advisable to proceed with the extension of the railway northwards from Amberley but a short section only can be proceeded with till the route beyond is finally determined.

Another work of considerable importance to the railway system is the extension of the Malvern branch to the coal mines, a distance of six miles. It should be proceeded with at once. Mr. Conyers informs me that the use of the Malvern coal instead of Newcastle in the locomotives on the Canterbury railways will save £3,000 per annum, at which rate the cost of the extension will be recouped in about four years.

Waitaki–Invercargill Railway and Branches.

General.—At the end of last financial year the lengths not commenced and under construction consisted of—

	Miles.
Moeraki Junction to Glendermid	46¼
Waipahi to Clutha	31¾
	78

Of this distance the following sections have since been opened:— ...

Waipahi to Clinton, 1st November, 1877	9¾	
Glendermid to Blueskin, 20th December, 1877	10	
Clutha River to Balclutha, 22nd January, 1878	1½	
Blueskin to Waikouaiti, 7th May, 1878	14½	
Moeraki Junction to Palmerston, 22nd May, 1878	12¾	
		48½
Leaving a balance unopened of		29½ Miles.

Of this balance, 9 miles is between Waikouaiti and Palmerston, and 20½ miles between Balclutha and Clinton. These are the only two links wanting to complete the railway from Amberley to the Bluff. It was confidently expected that the line between Dunedin and Christchurch, and at least 10 miles of the gap between Balclutha and Clinton, would have been completed by the beginning of this month, but an unprecedented continuance of bad weather retarded the works by at least six weeks. I hope, however, to see through communication established between Dunedin and Christchurch by the end of August, and between Amberley and the Bluff early in summer.

As a considerable agitation has taken place throughout Otago, and more particularly in Dunedin, with reference to the time occupied in the construction of the main line, I may explain that no undue delay has taken place since the works were authorized. The Clinton–Clutha Section, 20½ miles in length, was only begun in September, 1877, so, if completed in October next, the rate of progress will have been upwards of 1½ miles per month. Considering the magnitude of the works, this is by no means too little. With reference to the Dunedin and Moeraki Section the rate of progress has been considerably above the average in other countries, and I do not know any line in New Zealand that can bear comparison with it in this respect. For instance, the Dunedin and Clutha Railway was authorized in the session of 1870; the works were begun in March, 1871; and the line was opened in September, 1875, having thus taken 4½ years to make. The Dunedin and Moeraki line was authorized in the session of 1873; the works were begun in March, 1874; and the whole line will be opened at the very latest in September next. It will thus have taken exactly the same time as the Clutha one, although the works are about twice as heavy, and the difficulties of location and construction in the same proportion. This will be seen by the following statement giving the approximate quantities of the principal works on the two lines:—

		Clutha Railway.	Moeraki Railway.
Location in bush country ...	Miles.	Nil	20
Earthwork	cubic yards	800,000	1,500,000
Tunnelling	lineal yards	4,356	5,676
Masonry	cubic yards	5,000	23,000

Waitaki to Moeraki, with Branches.—It is proposed to extend the Awamoko branch across the Mairewhenua River, a distance of about a mile. A vote was taken for the bridge last year, but the work is not yet done. The contract drawings are, however, in hand.

As recommended by Mr. Carruthers in the last annual report, it will soon be necessary to relay the Waiareka branch with heavy rails: those on it now are only 28 lb. per yard, which is altogether too light for the heavy traffic and steep gradients.

The Oamaru Station has been found too small for the traffic; it will require considerable additions immediately.

Kartigi Contract.—The time for the completion of this contract expired on the 5th January, but the works are not yet finished. As already stated, the 12¾ miles between Moeraki Junction and Palmerston were opened on the 22nd May, and the remaining 5 miles are expected to be finished during August, but the final completion of the contract works will take a month or two longer. Although pressed hard by the department, the contractors for this section have not pushed on the works as fast as might have been done.

Waikouaiti Section.—This section, which is 9½ miles in length, was originally reserved from contract with the view of providing labour for the "unemployed" in Dunedin, and, with the exception of the bridges, all the works have been carried out on this basis. The section is now practically complete: the 5½ miles from its commencement to Waikouaiti were opened on the 7th May, and the remainder will be opened, along with that of the Kartigi contract, in a few weeks. With the exception of a few mechanics, and other men at odd jobs that could not be measured, the whole of the Waikouaiti Section was done by piece-work. Great pressure was brought to bear on the department by a number of the "unemployed" to pay "by the day," and they offered to work for less wages than the other method was calculated to bring them, but we were satisfied that day-work would never pay the Government, so declined to agree to it. The result has quite borne out our anticipations, and the experiment has been otherwise a success. The section has been constructed cheaper than any in Otago that has paid the contractor; the men who were willing and able to work got employment at fair wages, and an effectual answer was given to those who clamoured loudly for work which they did not wish to get.

A careful account has been kept of the expenditure on the Waikouaiti Section. The exact cost of some of the minor works cannot be determined till the accounts are finally squared up; but the following, which are the prices paid for the principal items, will show that the works have been done very cheaply: Fencing, 33s. per chain; earthwork, including plant, 1s. 1d. per cubic yard; masonry, 31s. per cubic yard; plate-laying, 1s. 6d. per lineal yard; ballasting, 3s. per cubic yard.

Maori Kaika at Waikouaiti to Glendermid.—This, which is the heaviest section of the Main Trunk Railway through the Island, was let in four contracts. Most of them were considerably behind time, but this is the only fault we had to find with the contractors; the works throughout have been executed in a very satisfactory manner. The most important work on this section is the Deborah Bay Tunnel, nearly seven-eighths of a mile in length, four-fifths of it being lined with masonry and brickwork in cement mortar. It was at one time supposed that the whole tunnel would require lining, but, the unlined portion having now stood for about three years, we may reasonably conclude that there is little chance of its giving way at least for some years to come.

Port Chalmers to Clutha, with Branches.—With the exception of buildings connected with the workshops at Dunedin and minor station-buildings on other parts of the lines, there have been no constructive works of importance done during the year.

The principal works required for the proper completion of this section are increased station accommodation at Port Chalmers and Dunedin. It was proposed to erect a new station and extend the Bowen Pier at Port Chalmers two years ago, but neither of these works has yet been done. It will be necessary to increase the station and wharfage room at once, otherwise there will be a complete block in the traffic in the busy season. The Dunedin Station, as it stands, was expected to meet the requirements of the place for many years to come, but the traffic has increased so rapidly that even now it is scarcely large enough, and when the lines are connected and in full working order, north and south, it will be altogether too small. As the new station will take about two years to complete, it is advisable to make a commencement without delay.

Clutha to Mataura.—The Clutha Bridge and the Balclutha contract, extending from the river to the Balclutha Township, were opened for traffic in January. The bridge, which is the largest structure of its kind in the Island, has seven main spans of 120 feet each, with a stone arch of 30-feet span over a district road at the north end. The piers are of iron cylinders 7 feet in diameter, and the superstructure is a timber and iron truss-girder, of the usual type. The whole of the work connected with the Clutha Bridge has been carried out in a very satisfactory manner. The Balclutha contract consisted of 1¼ miles of formation with station works at Balclutha.

The Toiro Section, extending 4 miles southwards from Balclutha, was reserved for the "unemployed" of Dunedin, and has been done almost entirely by piece-work, the result being as satisfactory as on the Waikouaiti Section. The works are fast approaching completion, and the first three miles, to Waitepeka, will probably be opened next month.

The Clinton contract, extending from the end of the Toiro section to Clinton, 16½ miles, did not at first progress so rapidly as it should have done, but latterly the works have been pushed on as vigorously as the weather would permit. The formation is finished for about 10 miles, and the laying of the rails on that portion is well advanced. I trust to see the whole contract finished in October.

Beyond the completion of the plate-laying from Clinton to Waipahi, which was finished in November, there was no constructive work of importance done on the section from Clinton to Bluff during the past year. The only thing wanted to complete this railway is increased station accommodation at Invercargill. As the lines centring there approach completion, the present deficiency becomes every day more apparent.

Winton-Kingston Railway, with Branches.

Main Line.—With the exception of the last nine miles, which will be open in a few days, this railway is finished to the Township of Kingston. It is however necessary to connect it with a pier on Lake Wakatipu, which work is in progress. The completion of this, and the erection of small station buildings at Kingston, are the principal works to be done next year.

Western Branch Lines.—Plate-laying is in progress on that portion of the lines between Wallacetown Junction and Riverton, and a contract is in preparation for the completion of the Otautau branch. The former section should have been opened by this time, but it is still far from being complete; probably it will take three or four months yet. The delay is attributed to the scarcity of labour

and the difficulty of obtaining sleepers, but I do not think this is sufficient to account for the whole of it. The contractors do not seem to have at first pushed on the work as vigorously as might have been done; they are, however, making a special effort now.

The only works contemplated on the Western Railways during the ensuing year are the completion of the Otautau and Orepuki lines.

Rolling Stock.

Considerable additions to the rolling stock of the Middle Island railways have been made during the past year, and further additions and orders to a large extent are being executed. It is calculated that these will meet the requirements of the traffic on the present lines for a long time.

ROADS.

Christchurch to Hokitika Road.

The Government maintains about 43 miles of this road on the eastern and 32 miles on the western side of the range, making a total of 75 miles. At present the Westland County Council maintains the road to the Rangiriri River, 22 miles from Hokitika, but a question has been raised as to whether they should maintain it farther than the Arahura, nine miles from Hokitika, which is practically the end of the settled district.

The ordinary maintenance of the road, keeping the surface in repair, is by no means heavy, the bottom being gravelly, and the drainage good: the difficulty lies in the gorges and river-beds, of which there are about 20 miles. In the gorges it is generally a mere bench cut out of the precipitous hill-side. There is no leaving the road with a vehicle, or even with a single horse: consequently a very small slip blocks up the whole traffic. In the river-beds the road is made impassable by the large boulders and other *débris* brought down in floods. Perhaps there is no place in the colony where the rainfall is so heavy and floods so frequent as in the district traversed by the West Coast Road; therefore a block frequently occurs from the causes just mentioned. Under these circumstances the maintenance must be constant, or the road must be closed altogether. Considering that this is the only line of communication for wheeled traffic between the East and West Coasts, and that the traffic is considerable and constant, I do not think it would be advisable to adopt the latter alternative. The maintenance, which amounts to about £8,000 per annum, could be considerably reduced, and the communication would be kept always open, by the diversion of the road at several places and the erection of bridges. To carry out these works in their entirety would cost £40,000 or £50,000, so they can scarcely be considered at present. If any expenditure on construction is contemplated, I would recommend the bridging of the Taipo (the most dangerous river on the road), the repair of the Hungerford Bridge over the Arahura should it come again into the hands of the Government, and certain diversions in the Otira and Bealey Valleys. These works can be carried out for about £10,000.

West Coast Roads.

Karamea to Westport.—The only work executed during the year is the repairs to the Orowaiti Bridge, damaged by a flood.

Nelson to Buller.—A bridge has been erected over the Lyell.

Westport to Buller.—A contract is now in preparation for a bridge over the Ohika River.

Reefton to Greymouth.—Contracts were entered into last month for bridges over the Grey and Ahaura Rivers, and a commencement is being made with the works.

Greymouth to Okarito.—Contracts for bridges over the Teremakau and Hokitika Rivers are in exactly the same position as those above mentioned. The road from Bowen to Okarito is all contracted for; it is expected to be finished in November or December.

WATER-RACES.

The water-races on the West Coast directly in the hands of Government are now practically complete. The works have throughout been executed in a very satisfactory manner. Water has been sold regularly from each race so soon as it was finished, but the returns have hitherto been comparatively small. I enclose the annual report by Mr. O'Connor, District Engineer, which enters fully into the whole subject.

MISCELLANEOUS WORKS.

Nelson.

The Nelson Harbour works and the Motueka Bridge are the only works of importance that have been in progress during the year. They are both nearly finished.

Canterbury.

Waimakariri Gorge Bridge.—This bridge, a handsome and substantial structure of masonry and iron, was ready for traffic in September. The work has been carried out in a satisfactory manner.

South Waimakiriri Bridge.—This bridge is on the main road from Christchurch to Kaiapoi, and replaces an old one that had become rotten. It consists of fifteen spans of 35 feet each, all of timber, the piles being ironbark. The new bridge was opened for traffic in January.

Hurunui-Greta Bridge.—The contract for this bridge was let in August last, and it should be finished in October, but work is falling somewhat behind; it will scarcely be ready in time. The bridge, which is of timber, consists of five spans of 80, two of 26, and two of 24 feet.

Rakaia Gorge Bridge.—This is an iron bridge, intended for road and railway traffic. It is to have one span of 180 feet, resting on masonry piers. The ironwork has been imported, and tenders are now called for its erection.

Rangitata Road Bridge: Protective Works.—The works executed prior to December last were very much damaged by a heavy flood that occurred in that month; so it was necessary to restore them and increase their strength. This has now been done in what seems to be an effectual manner.

Hurunui Cart Bridge: Repairs.—This bridge, originally weak and lately injured by floods, has been strengthened and repaired.

Lyttelton Harbour Works.—The Gladstone Wharf and Screw-pile Jetty extensions have been completed during the past year.

Malvern Waterworks.—This work is now finished, and, so far as it goes, is a success. The head-works seem to answer very well.

Buildings.—In addition to the foregoing, the officers of this department, throughout the Island, have had the general supervision of the Colonial Architect's works, which has taken up a considerable part of their time.

SURVEYS.

The work performed during the past year on surveys of main and branch railway lines has been of an unusually extensive and important character, consequently it is made the subject of a separate and special report.

MAP.

A Map of the Middle Island, showing the state of the works and surveys is hereto, appended.

I have, &c.,
W. N. Blair,
Engineer in Charge, Middle Island.

Enclosure 1 in Appendix D.

TABLE A.—NEW ZEALAND RAILWAYS—MIDDLE ISLAND.

TABLE of Lengths of Government Lines Constructed and Surveyed up to 30th June, 1878.

Appropriation.	Name of Line.	Mileage.	Sub-division.	Main Line.	Sidings.	Total.	State of Line.										
							Surveyed.	Under Formation	Under Plate-laying	Opened.							
										Date.	To June, 1872.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	Total.
		M. chs. lks.		M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.		M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.	M. chs. lks.
Nelson–Foxhill ...	Nelson–Foxhill ...	20 11 0	Port Extension ...	1 1 0	0 30 0	1 31 0	...	1 1	...	...	...	...	...	...	...	...	...
			Nelson–Foxhill ...	19 10 0	0 66 0	19 76 0	...	...	...	31 Jan., 1876	...	...	...	...	19 10 0	...	...	19 10 0
Westport–Ngakawau	Westport–Ngakawau	19 63 0	Station	0 29 0	1 73 0	2 22 0	...	...	0 29 0	...	...	...	...	...	...	...	...	...
			Westport ...	6 20 0	1 55 0	7 75 0	...	...	...	5 Aug., 1876	...	...	...	...	...	6 20 0	...	6 20 0
			Waimangaroa ...	3 60 0	0 10 0	3 70 0	...	...	...	5 Aug., 1876	...	...	...	...	...	3 60 0	...	3 60 0
			Ngakawau ...	8 70 0	0 20 0	9 10 0	...	...	...	26 Sept., 1877	...	...	...	...	...	...	8 70 0	8 70 0
			Extension of Survey	0 44 0	...	0 44 0	0 44 0	...	...	...	...	...	...	...	...	...	...	...
Picton–Blenheim ...	Picton–Blenheim ...	18 31 46	Picton–Blenheim ...	17 10 0	0 75 50	18 5 50	...	...	...	18 Nov., 1875	...	...	...	...	17 10 0	...	...	17 10 0
			Extension ...	1 21 46	0 50 0	1 71 46	1 21 46	...	...	...	...	...	...	...	...	...	...	...
Greymouth–Brunnerton	Greymouth–Brunnerton	7 50 17	Greymouth–Brunnerton	7 50 17	3 14 0	10 64 17	...	...	...	7 April, 1876	...	...	...	...	7 50 17	...	...	7 50 17
Survey of New Lines	Hokitika–Greymouth	23 60 0	Hokitika–Greymouth	23 60 0	2 0 0	25 60 0	23 60 0	...	...	...	...	...	...	...	...	...	...	...
Canterbury Province	Main Lines ...	28 65 67	Lyttelton–Christchurch	6 16 57	20 18 43	26 35 0	...	...	...	9 Dec., 1867	6 16 57	...	...	...	...	...	...	6 16 57
			Christchurch–Addington	1 30 40	3 17 90	25 67 0	...	...	...	7 Oct., 1867	1 30 40	...	...	...	...	...	...	1 30 40
			Addington–Selwyn	21 18 70						7 Oct., 1867	21 18 70	...	...	...	...	...	...	21 18 70
Amberley–Waitaki ...	Selwyn–Rakaia ...	12 61 28	Selwyn–Dunsandel	1 77 0	...	1 77 0	...	...	...	15 Feb., 1873	...	1 77 0	...	...	...	...	...	1 77 0
			Dunsandel–Rakaia	10 64 28	...	10 64 28	...	...	...	29 May, 1873	...	10 64 28	...	...	...	...	...	10 64 28
	Rakaia–Ashburton	18 7 92	Rakaia–Ashburton	17 6 0	1 16 0	18 22 0	...	...	...	24 Aug., 1874	...	...	...	17 6 0	...	...	...	17 6 0
			Ashburton (South end of Bridge)	1 1 92	...	1 1 92	...	...	...	31 May, 1875	...	...	...	1 1 92	...	...	...	1 1 92
	Ashburton–Temuka	34 20 54	Ashburton–Rangitata	18 28 79	1 12 0	19 40 79	...	...	...	31 May, 1875	...	...	...	18 28 79	...	...	...	18 28 79
			Rangitata Bridge ...	2 26 75	...	2 26 75	...	...	...	24 Aug., 1875 Tempor. Bridge	...	...	...	...	2 26 75	...	...	2 26 75
			Orari	13 45 0	0 24 0	13 69 0	...	...	...	4 Feb., 1876	...	...	...	...	13 45 0	...	...	13 45 0
	Timaru–Temuka ...	11 74 17	Temuka	3 14 0	1 4 0	4 18 0	...	...	...	26 Oct., 1875	...	...	...	...	3 14 0	...	...	3 14 0
			Young's Creek ...	8 60 17	...	8 60 17	...	...	...	26 Oct., 1875	...	...	...	...	8 60 17	...	...	8 60 17
	Timaru–Waitaki ...	38 2 27	Pareora	6 65 6						1 July, 1876	...	...	...	...	...	6 65 6	...	6 65 6
			Hook (part) ...	3 44 50						1 July, 1876	...	...	...	...	...	3 44 50	...	3 44 50
			„ „ ...	3 66 0						1 Sept., 1876	...	...	...	...	...	3 66 0	...	3 66 0
			„ „ ...	3 63 0	1 20 0	39 22 27	...	...	...	30 Oct., 1876	...	...	...	...	...	3 63 0	...	3 63 0
			„ „ ...	3 65 5						1 Feb., 1877	...	...	...	...	...	3 65 5	...	3 65 5
			Southern (part) ...	15 40 0						1 Feb., 1877	...	...	...	...	...	15 40 0	...	15 40 0
			„ „ ...	0 58 66						17 April, 1876	...	...	...	...	0 58 66	...	...	0 58 66
	Addington–Kowai ...	32 10 0	Addington–Kaiapoi	11 65 0						1 April, 1872	11 65 0	...	...	...	...	...	...	11 65 0
			Kaiapoi–Southbrook	5 18 0	1 42 0	22 22 0	...	...	...	2 Sept., 1872	...	5 18 0	...	...	...	...	...	5 18 0
			Southbrook–Rangiora	1 61 0						5 Nov., 1872	...	1 61 0	...	...	...	...	...	1 61 0
			Rangiora–Ashley ...	1 76 0						17 April, 1875	...	...	...	1 76 0	...	...	...	1 76 0
			Ashley–Amberley (pt.)	7 56 0	1 20 0	12 50 0	...	...	...	3 Nov., 1875	...	...	...	...	7 56 0	...	...	7 56 0
			„ „	3 54 0						9 Feb., 1876	...	...	...	...	3 54 0	...	...	3 54 0
Canterbury Branches	Canterbury Branches	107 35 22	Rangiora–Oxford (pt.)	11 65 0						1 Dec., 1874	...	...	...	11 65 0	...	...	...	11 65 0
			„ „	5 55 0	2 5 0	23 56 0	...	...	...	26 April, 1875	...	...	...	5 55 0	...	...	...	5 55 0
			„ „	4 11 0						21 June, 1875	...	...	...	4 11 0	...	...	...	4 11 0
			Kaiapoi–Eyreton ...	14 40 0	1 30 0	17 13 28	...	...	...	27 Dec., 1875	...	...	...	...	14 40 0	...	...	14 40 0
			Junction on Main Line	...	1 23 28													
			Eyreton Extension	5 59 0	0 20 0	5 79 0	...	...	...	1 Feb., 1878	...	...	...	...	...	...	5 59 0	5 59 0
			Racecourse–Southbridge (part)	14 6 22	2 0 0	27 28 22	...	...	...	26 April, 1875	...	...	...	14 6 22	...	...	...	14 6 22
			Racecourse–Southbridge (part)	11 22 0						13 July, 1875	...	...	...	...	11 22 0	...	...	11 22 0
			Rolleston–Sheffield	24 12 0	2 59 0	38 31 0	...	...	...	1 Dec., 1874	...	...	...	24 12 0	...	...	...	24 12 0
			White Cliffs Branch	11 40 0						3 Nov., 1875	...	...	...	...	11 40 0	...	...	11 40 0
			Waimate Branch ...	4 45 0	0 42 0	5 7 0	...	...	...	19 Mar., 1877	...	...	...	...	...	4 45 0	...	4 45 0
Canterbury Province	Branch Lines ...	25 51 79	Point Contract ...	9 6 79	0 55 0	9 61 79	...	...	...	24 Dec., 1875	...	...	...	...	9 6 79	...	...	9 6 79
			Opawa Extension ...	16 45 0	0 60 0	17 25 0	...	...	...	1 Jan., 1877	...	...	...	...	...	16 45 0	...	16 45 0
Waitaki Bridge ...	Waitaki Bridge ...	0 56 60	Waitaki Bridge ...	0 56 60	...	0 56 60	...	...	...	17 April, 1876	...	...	...	...	0 56 60	...	...	0 56 60
Waitaki–Invercargill	Waitaki–Moeraki ...	39 34 0	Waitaki–Oamaru ...	13 20 0	1 56 0	14 76 0	...	...	...	25 Sept., 1875	...	...	...	...	13 20 0	...	...	13 20 0
			Oamaru–Moeraki ...	24 39 0	2 53 0	27 12 0	...	...	...	4 Nov., 1876	...	...	...	...	...	24 39 0	...	24 39 0
			Moeraki Branch ...	1 55 0	0 22 0	1 77 0	...	...	...	15 Feb., 1877	...	...	...	...	...	1 55 0	...	1 55 0
	Moeraki–Dunedin ...	46 42 0	Moeraki Junction Station	0 27 0	0 46 0	0 73 0	...	...	...	4 Nov., 1876	...	...	...	...	...	0 27 0	...	0 27 0
			Kartigi (part) ...	12 65 0	1 11 0	18 69 0	...	...	...	22 May, 1878	...	...	...	...	...	...	12 65 0	12 65 0
			„ „ ...	4 73 0					4 73 0	...	...	...	...	...	...	...	...	...
			Waikouaiti (part) ...	4 4 0	0 60 0	10 27 0	...	...	4 4 0	...	...	...	...	...	...	...	...	...
			„ „ ...	5 43 0					...	7 May, 1878	...	...	...	...	...	...	5 43 0	5 43 0
			Blueskin	7 0 0	0 40 0	7 40 0	...	...	...	7 May, 1878	...	...	...	...	...	...	7 0 0	7 0 0
			Purakanui, part ...	1 74 0	...	1 74 0	...	...	...	7 May, 1878	...	...	...	...	...	...	1 74 0	1 74 0
			„ „ ...	5 73 0	0 20 0	6 13 0	...	...	...	20 Dec., 1877	...	...	...	...	...	...	5 73 0	5 73 0
			Deborah Bay ...	1 13 0	...	1 13 0	...	...	...	20 Dec., 1877	...	...	...	...	...	...	1 13 0	1 13 0
			Port Chalmers ...	2 70 0	0 10 0	3 0 0	...	...	...	20 Dec., 1877	...	...	...	...	...	...	2 70 0	2 70 0
	Dunedin–Port Chalmers	8 0 0	Dunedin–Port Chalmers	8 0 0	1 25 0	9 25 0	...	...	...	9 April, 1873	...	8 0 0	...	...	...	...	...	8 0 0
	Dunedin–Clutha ...	51 35 0	Dunedin Station ...	0 30 0	2 40 0	2 70 0	...	...	...	1 July, 1874	...	...	...	0 30 0	...	...	...	0 30 0
			Dunedin Section ...	1 53 0						1 July, 1874	...	...	...	1 53 0	...	...	...	1 53 0
			Caversham Section	1 57 0						1 July, 1874	...	...	...	1 57 0	...	...	...	1 57 0
			Kaikorai Section ...	2 25 0	4 10 0	55 15 0	...	...	...	1 July, 1874	...	...	...	2 25 0	...	...	...	2 25 0
			Taieri	34 55 0						1 Sept., 1875	...	...	...	...	34 55 0	...	...	34 55 0
			Clutha	10 55 0						1 Sept., 1875	...	...	...	...	10 55 0	...	...	10 55 0
	Clutha–Mataura ...	47 64 0	Clutha Bridge ...	0 18 0						22 Jan., 1878	...	...	...	...	...	...	0 18 0	0 18 0
			Balclutha ...	1 22 0					...	22 Jan., 1878	...	...	...	...	...	...	1 22 0	1 22 0
			Toiro Section ...	4 0 0					4 0 0	...	...	...	...	...	...	...	...	...
			Clinton Section ...	16 31 0	2 8 0	49 72 0	...	...	16 31 0	...	...	...	...	...	...	...	...	...
			Clinton Station ...	0 7 0					0 7 0	...	...	...	...	...	...	...	...	...
			Waipahi Extension	9 60 0					...	1 Nov., 1877	...	...	...	...	...	...	9 60 0	9 60 0
			Waipahi	15 64 0						21 June, 1877	...	...	...	...	...	15 64 0	...	15 64 0
			Mataura Bridge ...	0 22 0						30 Aug., 1875	...	...	...	...	0 22 0	...	...	0 22 0
	Tokomairiro–Lawrence	22 0 0	Tokomairiro ...	5 54 0						22 Jan., 1877	...	...	...	...	...	5 54 0	...	5 54 0
			Glenore	1 16 0						22 Jan., 1877	...	...	...	...	...	1 16 0	...	1 16 0
			Round Hill ...	3 22 0						22 Jan., 1877	...	...	...	...	...	3 22 0	...	3 22 0
			Waitahuna ...	4 68 0	1 70 0	23 70 0	...	...	...	22 Jan., 1877	...	...	...	...	...	4 68 0	...	4 68 0
			„ ...	1 0 0						2 April, 1877	...	...	...	...	...	1 0 0	...	1 0 0
			Tuapeka	6 0 0						2 April, 1877	...	...	...	...	...	6 0 0	...	6 0 0
	Invercargill–Mataura	39 56 0	Invercargill–Woodlands	11 11 0						11 Feb., 1874	...	...	11 11 0	...	...	...	...	11 11 0
			Woodlands–Mataura Bridge	20 79 0	3 0 0	42 56 0	...	...	...	7 June, 1875	...	...	...	20 79 0	...	...	...	20 79 0
			Mataura Bridge–Gore	7 46 0	...	...	...	...	...	30 Aug., 1875	...	...	...	...	7 46 0	...	...	7 46 0
Winton–Kingston ...	Winton–Kingston ...	68 35 0	No. 1 Contract ...	22 18 0	1 64 0	24 2 0	...	...	...	20 Oct., 1875	...	...	...	...	22 18 0	...	...	22 18 0
			Plate-laying Contract	8 32 0	0 40 0	8 72 0	...	...	...	7 Feb., 1876	...	...	...	...	8 32 0	...	...	8 32 0
			Lowther Contract ...	6 10 0	0 20 0	6 30 0	...	...	...	15 Jan., 1877	...	...	...	...	...	6 10 0	...	6 10 0
			Athol Contract ...	13 27 0	0 20 0	13 47 0	...	...	...	28 Jan., 1878	...	...	...	...	...	...	13 27 0	13 27 0
			Kingston Contract (part)	9 20 0	0 12 0	18 30 0	...	...	...	29 April, 1878	...	...	...	...	...	...	9 20 0	9 20 0
			Kingston Contract (part)	8 78 0					8 78 0	...	...	...	...	...	...	...	...	...
			„ Wharf ...	0 10 0	0 10 0	0 20 0	0 10 0	...	...	...	...	...	...	...	...	...	...	...
Otago Province ...	Main Lines ...	37 0 0	Invercargill–Bluff ...	18 0 0	1 50 0	19 50 0	...	...	...	5 Feb., 1867	18 0 0	...	...	...	...	...	...	18 0 0
			Invercargill–Winton	19 0 0	0 45 0	19 45 0	...	...	...	22 Feb., 1871	19 0 0	...	...	...	...	...	...	19 0 0
	Branch Lines ...	85 18 63	Awamoko ...	21 32 0	0 21 65	21 53 65	...	...	...	1 Dec., 1875	...	...	...	...	21 32 0	...	...	21 32 0
			Waiareka ...	14 72 0	0 25 0	15 17 0	...	...	...	2 April, 1877	...	...	...	...	...	14 72 0	...	14 72 0
			Green Island ...	2 17 0	0 13 22	2 30 22	...	...	...	1 July, 1874	...	...	...	2 17 0	...	...	...	2 17 0
			„ ...	0 38 63	...	0 38 63	0 38 63	...	...	...	...	...	...	...	...	...	...	...
			Outram–Mosgiel ...	8 79 0	0 67 0	9 66 0	...	...	...	1 Oct., 1877	...	...	...	...	...	...	8 79 0	8 79 0
			Wallacetown ...	11 74 0	0 30 0	12 24 0	...	...	11 74 0	...	...	...	...	...	...	...	...	...
			Orepuki	8 4 0	0 20 0	8 24 0	8 4 0	...	...	...	...	...	...	...	...	...	...	...
			Otautau (part) ...	11 19 0	...	17 62 0	...	11 19 0	...	...	...	...	...	...	...	...	...	...
			„ ...	6 3 0	0 40 0		...	...	6 3 0	...	...	...	...	...	...	...	...	...
			Seaward Bush ...	11 8 0	...	11 8 0	11 8 0	...	...	...	...	...	...	...	...	...	...	...
	Branch Lines ...	21 13 50	Palmerston–Waynes	10 5 50	...	10 5 50	10 5 50	...	...	...	...	...	...	...	...	...	...	...
Totals ...	...	866 19 22		866 19 22	85 50 98	951 70 20	55 31 59	12 20 0	56 59 0		77 50 67	27 60 28	11 11 0	127 42 93	249 30 14	153 60 61	94 53 0	741 68 63

Enclosure No. 2 in Appendix D.

WESTLAND DISTRICT—ANNUAL REPORT ON WATER-RACES.

The DISTRICT ENGINEER, Hokitika, to the ENGINEER in CHARGE, Middle Island.

SIR,— District Engineer's Office, Hokitika, 31st May, 1878.

I have the honor to report that the water-races in this district, with which the General Government have been connected during the year just ended, have been as per list below:—

Nelson South-West Gold Fields—
- Four-Mile Water-race—Charleston District.
- Nelson Creek Water-race—Grey Valley District.

Westland Gold Fields—
- New River Water-race—Marsden District.
- Hibernian Water-race—Marsden District.
- Hohonu Water-race—Greenstone District.
- Waimea Water-race—Waimea District.
- Waimea Extension to Kumara—Waimea and Kumara Districts.
- Kanieri Lake Water-race—Kanieri District.
- Mikonui Water-race—Totara District.

Four-mile Water-race (Proposed).—Length, 8 miles; capacity, 15 statute heads. Estimate, including probable cost of increasing capacity of Argyle Company's reservoir, £13,400. This project was fully described in annual report furnished last year. A vote of £14,000 was taken for it in the appropriations of 1877, but no instructions have been received relative to commencing the works. It is doubtful if it would be remunerative, and the inhabitants of the locality do not seem to be very eager for it.

Nelson Creek Water-race.—This work as constructed consists of 16 miles 24 chains of main race, capacity 60 statute heads, with reservoir and headworks at Lake Hochstetter, and 1 mile 57 chains main branch race, capacity also 60 statute heads, together with a race known as "Magee's Race," purchased by the Government, and minor branch races, waste-water channels, and foot-tracks. The construction of the main race and main branch race, comprising a total length of 18 miles 1 chain, involved exceptionally heavy work, consisting of 10 miles 2 chains of ditching, 6 miles 39 chains of tunnelling—almost the whole of which is lined with timber—and 1 mile 40 chains of fluming, including five bridges, varying in span from 100 to 150 feet, and standing from 70 to 170 feet above the levels of the creeks which they cross. Some of these structures would be looked upon as works of magnitude in any country; and when the precipitous nature of the country in which they have been carried out is taken into account, the use of horses being in most cases impossible, and the greater portion of the timber used having been drawn or carried on men's backs to the site of the works, it redounds greatly to the credit of the contractors (Messrs. Garven and Price) that they succeeded in bringing their undertaking to a workmanlike and satisfactory completion.

The work done during the year just ended has consisted of 17 chains of fluming and 100 chains of boxing on flumes, with by-washes, waste-water channels, and minor branch races, &c., to the extent in all of £22,500; and the average number of men engaged on the construction works throughout the year has been 66.

In the month of August, 1877, the works were sufficiently advanced to admit of sales of water being commenced, but, as is always the case with new water-races, it took the miners a considerable time to open out their claims, so as to utilize the water to the best advantage, and it was not till February of this year that any considerable revenue has accrued to the Government. Since that time, the revenue has been as follows:—

February, 1878	...	...	...	...	...	£146	10	0
March, 1878	...	...	...	...	...	£159	13	9
April, 1878	...	...	...	...	...	£205	0	0

The whole of the works at present contemplated in connection with this race are now completed, with the exception of some additions to by-washes at headworks, estimated to cost about £2,000, which are in progress by day labour; and a telegraph line from Manager's office, at Hatter's Terrace, to headworks, which is included in estimates forwarded for next year's works, and which it would be very desirable to have carried out.

As the gold workings in connection with this race are now in full operation, and as they will probably in a short time materially affect the level of the creek-bed for some distance below end of race, and thereby possibly give rise to litigation between the miners and the freehold and leasehold owners lower down, some litigation of the sort having already arisen, it has become a question as to whether it would not be well to proclaim the streams likely to be affected as sludge-channels, under "The Gold Fields Act Amendment Act, 1875 (No. 1)." This question is, however, fully gone into in report to Engineer-in-Chief dated 18th March last.

For the year ending 31st May, 1879, the maintenance, including working expenses, of this race, is estimated at £2,500, and the revenue at £3,000; but, as some allowance has been made in estimate of revenue for possible stoppage of works in consequence of complications with freehold and leasehold owners, it is probable that, if the streams likely to be affected were proclaimed under Gold Fields Act above cited, the revenue would exceed the estimate by, say, £1,000 or so.

New River Water-race.—Estimated to cost £10,000, and undertaken under Government subsidy of £5,000; to carry 16 statute heads of water. Length contemplated, 8 miles 70 chains. Of this length 6 miles 53 chains was completed previous to May, 1876, as stated in annual report for that year, and further works have been undertaken since. The amount of subsidy paid to date is £3,502 10s. 3d., leaving £1,497 9s. 9d. still to be paid, in event of works being done by company to entitle them to it. No interest has been paid on Government advances since 20th March, 1876. Up to November last,

some little mining was done by aid of this race, as reported in May, 1877; but since November no work has been done, the race having been injured by floods during that month and the company not having since seen their way to its restoration.

Hibernian Water-race.—Estimated to cost £5,185, of which the Government agreed to contribute £2,000, and completed previous to May, 1875, as stated in annual report for the year. Capacity, 10 statute heads. Length, 5 miles 51 chains. No interest has been paid on the Government advances since 19th June, 1876. This race also suffered severely from floods of November last, and has not since been restored, so that no mining is at present being carried on by its aid.

Hohonu Water-race.—Constructed to carry 50 statute heads. Length, 5 miles 41 chains; with a feeder from reservoir, 1 mile 9 chains in length, constructed to carry 30 statute heads; a catch water-race, 2 miles 8 chains in length, from Mosquito Creek; and a reservoir, in extent about 5 acres. The whole of these works were completed previous to May, 1875, as stated in annual report for that year. The total cost of this undertaking has been about £12,500, of which £2,500 was obtained from the Government as subsidy towards some of the later works undertaken. As stated in annual report for last year, this race was then in a bad state of repair, and it has never since been restored. Practically, no use has therefore been made of it for mining during the year now ended.

Waimea Water-race.—Kawhaka Creek to Ballarat Hill, with Branch B near Goldsborough, and head-works at Kawhaka Creek. The length of main race is 15 miles 75 chains, having a carrying capacity of 40 statute heads; and the length of Branch B is 59 chains, having a capacity of 30 statute heads.

As stated in annual report of last year, the main race above alluded to was completed in July, 1876, but Branch B was only undertaken in September, 1877. Of it, 2 chains of ditching, 43 chains of tunnelling, and 2 chains of fluming have been completed during the year just ended, leaving 9 chains of ditching and 3 chains of tunnelling still to be completed. These are in hand, and will be finished in a month.

The headworks at present contemplated at Kawhaka Creek, as described in annual report of last year, are designed for the purpose of admitting of all the water available in the creek being sold during the eight hours of daylight, from 8 a.m. to 4 p.m., as the nature of the workings at Waimea precludes the use of water at night to any great extent, and the night water in the creek is thereby at present lost. For these headworks a contract was entered into on 13th of April, 1878, to be completed 9th January, 1879.

Since the date of last annual report the sales of water on this race have increased, having averaged £124 per month for the five months ending May, 1878, as against £86 per month for the five months ending May, 1877, and it is probable that they will still further increase materially on completion of headworks and Branch B. continued.

Waimea Water-race (continued): Extension to Kumara.—This undertaking as at present contemplated consists of 4 miles 60 chains of main race, known as the "Kawhaka Supply-race," having a capacity of 30 statute heads, and extending from Kawhaka Creek to Kapitea Creek, with headworks at Kawhaka about 100 chains below the site of the Waimea Race headworks, together with a main race from Kapitea Creek to Kumara, having a length of 3 miles, and a capacity of 50 statute heads, with headworks on Kapitea Creek, and branch races at Kumara to the extent of 3 miles 76 chains; also a sludge-channel at Kumara and a reservoir at Kapitea Valley, above the Loop-line Road. Of these works, the main race from Kapitea Creek to Kumara, together with the water-right of Kapitea Valley, was purchased by Government from the Kumara Water-race Company; and the remainder of the works above described, with the exception of the reservoir near Loop-line Road, and the sludge-channel at Kumara, have been constructed during the year just ended, the expenditure upon them during the year having been a little over £11,000. The said reservoirs and sludge-channel have not yet been taken in hand, but it is desirable that they should be, and the probable cost of each is included in estimates for 1878–79 lately forwarded.

The number of miners who have been enabled to work at Kumara by means of the water supplied by this race has been very considerable, having averaged 742 men throughout the year, while the revenue for water sold has increased from £122 for May, 1877, to £223 for May, 1878. It is probable that the sales would be further and considerably increased by the construction of the loop-line dam and Kumara sludge-channel.

Kanieri Lake Water-race.—Length, 12 miles 21 chains; constructed to carry 60 heads of water. Total cost, about £23,800, of which the Government has contributed £10,000. This work was completed previous to May, 1875, as stated in the report of that year. This, like the New River and Hibernian races, is now in a bad state of repair, and practically no use has been made of it for gold-mining purposes during the last twelve months.

Mikonui Water-race.—Length contemplated, 15 miles; capacity contemplated, 40 statute heads. An appropriation of £15,650 was taken last session for the construction of the works known as the "long tunnel" on this race—namely, 155 chains of continuous tunnelling through the hill intervening between Totara and Donnelly's Creek Valleys; and the Appropriation Act also of last session enacted that the Government could pay 3 per cent. on the cost of the remainder of the work, provided that the local bodies would guarantee a similar amount, and that a company could be got to undertake the project on those terms. No company has however as yet been formed for the undertaking, and, although several projects for its completion have been mooted, it is doubtful if any of them will prove practicable. If, however, the Government were to offer £30,000 on condition of a company being got up with a capital of like amount, it is possible that a company could be formed on that basis, and that by very careful management the work might be carried out for the £60,000 thus provided, although the estimate is £81,000; and it would be rather in favour of the Government, too, to have the work done in this way, as they would thus be providing only £30,000, at a cost to them, say, of £1,350 per annum, as against the arrangement contemplated in the Appropriation Act, which, if carried out, would probably involve the paying of interest on £65,000 at 3 per cent., or £1,950 per annum.

I have, &c.,

The Engineer in Charge, Middle Island.

C. Y. O'Connor,
District Engineer.

APPENDIX E.

REPORT ON RAILWAY SURVEYS IN THE MIDDLE ISLAND BY THE ENGINEER IN CHARGE.

The Engineer in Charge to the Hon. the Minister for Public Works.

Sir,— Public Works Office, Dunedin, 1st July, 1878.

I have the honor to submit the following report on the railway surveys now in progress in the Middle Island, together with considerations as to the directions in which they should be extended:—

General.

The proper completion of the railway system of the Middle Island is of such importance that no decisive step should be taken in any particular direction till the question is fully considered as a whole, and, in doing so, other considerations besides engineering must have due weight: the resources of the country traversed, the industries likely to spring up in particular localities, and the extension of settlement generally, all bear directly on the subject.

The routes of the main lines and many of the branches already constructed were obvious, and could not well be improved, but some of the branches do not admit of being extended or worked in with a general system. The ultimate destination of every new line that is undertaken should be determined on before the first instalment is begun. Indeed, I would recommend that reconnaissance surveys be made of the whole Island, and a skeleton map prepared of a railway system, up to which we should, if possible, work. In the meantime the particulars given herein will, at least, indicate the routes likely to be followed by what will some day be considered "main lines."

East and West Coast and Northern Railways.

The survey of these railways has been continued during the past year, and a great amount of valuable information collected. As I have not had time to consider the matter fully for myself, Mr. Carruthers has kindly given me the following *précis* of the results arrived at so far:—

"At your request I give a short report on the surveys which have been made of the several lines between Christchurch and the West Coast, Picton and Nelson. I was instructed to bear in mind the necessity of connecting all these places with the railway system of the South Island, so that the surveys have been treated as a whole, and an endeavour made to find the cheapest way of connecting them all.

"*Browning's Pass.*—A survey was made through this pass by Mr. Browning, but it is far inferior to all the other passes, and need not be taken into further consideration.

"*Taipo Pass.*—Mr. Campbell made a reconnaissance survey of the passes at the head of the Taipo and Waimakariri, showing a not very unfavourable line. If the branch to the West Coast were alone to be considered, I am inclined to think this line should be further explored.

"*Picton and Nelson Lines.*—The best direction for the line to the West Coast will depend on the line to Picton, from which it would be a branch. Several lines have been tried for this, but they are all very unfavourable. Mr. Foy's best line is shown in blue on the map attached. It is tolerably favourable except for about 20 miles between the Waiau and Kaikoura, which would be very costly and difficult to work. Mr. Dobson's line, shown in red, 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. If either of these lines be adopted, I think the West Coast would be best reached by the Taipo Pass already mentioned, or by the Hope Pass as surveyed by Mr. Foy, and Lake Sumner and the Hurunui.

"A separate line would be required for Nelson. One line from Nelson to the Grey, at Cobden, was surveyed very fully by Mr. Rochfort, and another examined by the Happy Valley to Blenheim. The latter would best bring Nelson into railway communication with the rest of the Island, but would be very costly and difficult to work. A third way of reaching Picton and Nelson is now being examined by Mr. Foy. It is to follow the Waiau to the pass at Cannibal Gorge. From the summit, lines can be run as shown on the plan to Nelson, Picton, and Greymouth. I am satisfied this will be found by far the cheapest way of connecting these three places with the South Island railway system, and it will open up whatever good land there is, which is, however, very limited in quality. The gradients will be more favourable than by any other route. The objection to this plan is that all traffic between Picton and Christchurch will have to be taken over the summit at Cannibal Gorge, a height of nearly 3,000 feet, and the distance between Greymouth and Christchurch would be fully sixty miles further than by the Taipo Pass. In view of the small probable traffic, I am disposed to think this Cannibal Gorge scheme is the best, as it meets the requirements at a cost far below that of any other. If, however, even a moderate traffic is looked for, I think the three distinct lines would be better—*i.e.*, by Taipo to the West Coast, by Cheviot to Picton, and by Happy Valley to Nelson."

Mr. Foy, who has been on the survey of the East and West Coast and Northern Railways for upwards of two years, is now engaged in collating the information already obtained. This will enable us to determine on further operations during next summer, should the Government decide on proceeding with the work, a course I would strongly recommend. As the explorations for both lines in the direction of the Hope and Amuri saddles are tolerably complete, I think attention should be directed to the Waimakariri and Taipo route for the West Coast line. Geographically this is one of the best yet proposed for simply connecting the two coasts: it comes nearest the centre of the Island of all the routes suggested north of Mount Cook. With reference to the extension to Picton, Mr.

Dobson's line seems entitled to further consideration. I think the country should be thoroughly explored, so as to ascertain if there is a possibility of reducing the heavy work shown on his section.

The location of the main lines north and westwards is particularly difficult. The shape of the Island points to one main central line north and south, with branches to the harbours on each side; but the character of the country precludes the adoption of such a system. I believe that ultimately there will be a main line up each side, joining at Invercargill and Picton or Blenheim. The course of the western line would be from the termination of the present railway at Kingston, *viâ* Frankton, Cromwell, Lake Wanaka, and Haast Pass and River to the West Coast; thence along the coast to Greymouth; from Greymouth to Foxhill and Nelson by Mr. Rochfort's line and the present railway; and from thence *viâ* Havelock to the junction with the East Coast line at Picton or Blenheim. From the map it will be seen that the line just described goes almost in a direct line through the centre of the southern part of the Island, from the Bluff to Lake Wanaka. The Haast Pass over which it goes is the lowest in the range, being only about 1,700 feet above sea-level, against 3,000 the next lowest. The East Coast extension from Amberley to Picton will probably follow either Mr. Foy's or Mr. Dobson's line.

The line *viâ* Lake Wakatipu above described is unfavourably situated as regards the rest of the Island, and for a great part of the distance—viz., from Kingston to Cromwell—the country is too rough for close settlement, consequently this section will only be made as a connection between the southern and midland railway systems, or to complete the through communication between Southland and the West Coast. If the Haast Pass is adopted as a crossing place in the main range, it can be best reached by the Otago Central (Strath Taieri) route now being surveyed, and ultimately by the Waitaki Valley and the Lindis Pass. The latter, a route to which much attention has not hitherto been given, is favourably situated as regards the centre of the Island, and it taps a considerable extent of good country in the Upper Waitaki and McKenzie Plains; but the engineering difficulties are somewhat formidable, it being necessary to cross a range 3,500 feet high before reaching the Clutha watershed. The Waitaki Valley and Lindis Pass line cannot of course be substituted for the Otago Central, as it leaves out the Strath Taieri, Maniototo, Ida Valley, and Manuherikia Plains, as well as the principal centres of mining in Otago. Its main object will be to give direct communication between the Oamaru and Timaru Districts, and the southern parts of the West Coast.

If one connection only is expected to be made between the East and West Coasts, probably the Waimakariri and Taipo route is the best; but if there is any chance of two, I should be inclined to recommend the Hope and Haast Pass routes, and the former, as offering readiest communication between the present centres of population, should be constructed first. I should, however, remind you that the line will be costly to make and maintain; it will have a tunnel of a mile in length at the summit and other heavy works, and the ruling gradient is about 1 in 25. The distance from Greymouth to Christchurch by the Hope Pass route is about 150 miles. It is just possible that it will pay to carry coals this distance by rail; but they cannot be taken much farther, and certainly will not bear the cost of transhipment at Lyttelton. Notwithstanding these objections, the importance of providing ready means of communication by land between the East and West Coast entitles the line to a favourable consideration.

With reference to the extension of the main line from Amberley to Picton, I do not think the work is urgently called for at present. There is comparatively little good country to open up, and the through passenger traffic which the railway is especially intended to accommodate will certainly not pay for its construction for many years to come.

Canterbury Branch Railways.

During the past year surveys have been made of the proposed Canterbury Branch Railways, the particulars being as follows:—

White Cliffs Branch to Rakaia Gorge.—Two lines have been surveyed, one leaving at the Coalgate, and the other at the Hawkins Station of the White Cliffs Branch; they converge at the Hororata Township. A reconnaisance survey is also being made of a third line, leaving the White Cliffs Branch near its terminus, and following the Wakaena Valley. I fear, however, that it will give too steep an approach to the Rakaia River bed. With the exception of the three miles next the Rakaia, the two former lines are of easy construction, being of much the same character as the railways already made on the Canterbury Plains; but the last three miles, getting from the terrace to the river bed, is rather rough. The works include 50 chains of tunnelling, a viaduct 500 feet long, and heavy earthworks. The line *viâ* Coalgate is 19½ miles, and its estimated cost £91,000; and the one *viâ* Hawkins is 22 miles long, and estimated cost £95,000. These figures do not include rolling stock and engineering.

Ashburton to Alford Forest and Mount Somers.—This line commences at the South Ashburton Station, and runs directly inland, keeping parallel with the Ashburton River about three miles off. At present the line is surveyed 20 miles to a point where it is proposed to branch off into two—one towards Mount Somers, and the other towards Alford Forest—to connect eventually with the Rakaia and White Cliffs Branch. The works on the Ashburton to Alford Forest and Mount Somers line are particularly light; the estimate, exclusive of rolling-stock, is £40,500.

Orari to Hilton viâ Geraldine.—The distance from Orari to Hilton is eight miles; and from Winchester, the nearest point on the main line, seven miles. These two routes have been surveyed, and the line continued up the Kakahu Valley, beyond Hilton, five miles. The lines are both easy, the estimate for the former being £45,500, and for the latter £41,000, exclusive of rolling-stock as above.

The alignment of the Orari–Hilton line is not good, and it runs very much into country already tapped by the Albury Branch; so I do not recommend its construction. I shall again refer to this subject further on.

Albury to Fairlie Creek.—This is simply an extension of the Albury Branch, 10 miles towards Burke's Pass. The works are somewhat heavy, but the gradients and curves are good. The estimate is £49,000 for formation, permanent way, and stations. A reconnaisance survey is in progress of the

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

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

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

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

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

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

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

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

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

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

Railways in Otago.

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

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

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

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

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

contract in about three months. The survey of the railway is not sufficiently far advanced for me to give an exact estimate of its cost, but, from the information obtained, I believe that the whole line from Dunedin to Albert Town on Lake Wanaka, a distance of 160 miles, could be constructed and equipped with rolling-stock for £1,100,000, or an average of £6,300 per mile. This is about the cost of the Canterbury Railways or a half less than that of the Otago ones.

Further acquaintance with it strengthens me in the opinion expressed last year that the line now under consideration is undoubtedly the best for opening up the interior of Otago; and, further, that its construction would be beneficial to the colony at large.

Tapanui Branch Railway.—A reserve of land having been made for the construction of this line last session, working surveys and drawings were prepared, and contracts are now advertised.

This branch leaves the main line at the Waipahi Station, follows down the Waipahi River to its junction with the Pomahaka, then runs up the Pomahaka Valley to Kelso, the total length being 15½ miles. A considerable agitation was got up in favour of getting the line brought right into the Township of Tapanui, which is passed at a distance of 90 chains. I recommended against this, on the ground that an extension through the middle of the best country would then be impossible; and the surveyed line was adhered to. I sent you a special report on the subject on the 14th May. (Copy enclosed.)

The location of the Tapanui Branch is particularly good: it goes right into the heart of one of the best agricultural districts in the Middle Island, and it is capable of extension to Waikaka, Switzer's, or Tuapeka. In fact, it should have been made long ago. The gradients and curves are considerably easier than on the main line, and the works are light. My estimate of the cost, when ready for working and fully equipped with rolling-stock, is £72,000. The contract now advertised includes formation, permanent-way, and stations.

Duntroon and Hakateramea Railway.—This line, which is being constructed by a company, is a continuation of the Awamoko Branch. It runs up the Waitaki and Hakateramea Valleys about 34 miles, through easy country, consequently the curves and gradients are favourable. This branch is well located as regards working in with a general system, and it opens up good country for settlement. The survey has been made by Government.

Waimea Plains Railway.—This line connects the main line at Gore with the Winton and Kingston Railway at Lumsden. Its length is about 40 miles, almost quite straight, and with very flat gradients. The Government is making the survey, but a company has been formed to construct the line. The Waimea Plains Railway goes through a rich agricultural country; it forms an important link in the general railway system of Southland, and shortens the distance between Dunedin and the Lakes by about 52 miles.

The only question with reference to the Waimea Plains Railway is whether it should not commence at Waikaka instead of Gore, then run through McNab's Flat to a crossing of the Mataura and a junction with the surveyed line near the Otemeita. This would accommodate the numerous settlers on the eastern bank of the Mataura, without leaving out much of the good country on the opposite side, and shorten the through line by about a mile. On the other hand, it would add a mile to the length of new line, it would necessitate the erection of a second bridge over the Mataura, and otherwise add to the cost of construction.

Riverton to Orepuki Branch Railway.—The formation of this line for about four miles was made by the Provincial Government of Otago. It is now proposed to finish the branch to Orepuki, 18 miles, as originally intended, and the estimates provide for the work. The survey, which is now nearly finished, shows the country to be favourable to railway construction.

Green Island Branch.—This line wants to be extended half a mile, to join the Brighton Road, its present terminus being in the middle of a field, through which there is no access. The extension has been set out, and the work is provided for in the estimates.

Waiareka Branch to Livingston.—A reconnaisance survey has been made of four different lines from the Waiareka Branch to Livingston, leaving respectively at Ngapara, Jessop's Gully, Windsor, and Teaneraki. The best line is the one leaving at Windsor. The ground over which it goes is rather rough and irregular, and the works, which include about 30 chains of tunnelling, are somewhat heavy; still there is no formidable obstacle in the way; the gradients and curves are favourable. The length of the line is 16 miles, and estimated cost for formation alone, £88,000. With stations, rolling-stock. engineering, land, and other charges, the total will amount to about £105,000.

The proposed branch passes through one of the finest wheat-growing districts in New Zealand, still I do not think it is urgently required at present. About ten miles out of the sixteen is in no place more than four miles from the present Waiareka line, and the remaining six can be equally well accommodated by a loop-line which is suggested coming up the Kakanui Valley from the main line, passing through the low ground at the head of the Awamoko, and down the Maruwenua Valley, to a junction with the Awamoko Branch at Duntroon. I think this loop would accommodate the most country at the least expense of any of the lines hitherto proposed.

Green Island to Taieri River.—A reconnaisiance survey has been made of this line. It leaves the Green Island Branch near Abbott's Creek, and follows the general line of the Kaikorai Stream and the coast to the Taieri River, its total length being 15½ miles. With the exception of about half a mile at the Otakia Creek, where there is some little cutting and five chains of tunnelling, the works are remarkably light throughout; probably the whole line could be made and equipped for about £3,000 a mile. There is comparatively little settlement to warrant the construction of a railway in the district traversed by the Green Island–Taieri line, but it would become popular as a summer resort for the people of Dunedin. The line does not, however, open up new country, and the traffic will scarcely pay; so I do not recommend the Government to consider it with a view to making.

Catlin's River Branch.—Several routes have been examined for this line, but the choice lies between two, one leaving the main line at Invertiel, on the southern bank of the Clutha, and the other at Stirling Station, near the northern bank. The Invertiel line runs in a tolerably straight course past the east end of Telford's Bush to the foot of the Omaru Valley, where it joins the Stirling line, coming direct across Inch Clutha. From this point onwards there is only one line: it follows

the Omaru Valley to "Hay's Pre-emptive," thence through McDonald's Saddle to the Owake Valley and Catlin's River. The length of the Invertiel line is about 17½ miles, and of the Stirling one 18½. The curves and gradients are good, but the works, which include about 20 chains of tunnelling, are somewhat heavy. The estimate for the Invertiel line complete is £95,000. The Stirling one will cost much the same, with the addition of the bridges over the two branches of the Clutha; if built at a low level in the ordinary way these will cost about £10,000, but if the one over the Koau Branch is constructed so as not to interrupt the river traffic the item of bridging will require to be increased to about £30,000. The main object in adopting the Stirling line is to accommodate the traffic on Inch Clutha; it will also save about four miles in the distance from Dunedin to the Bluff should the Catlin's River Branch be extended along the coast as a through-line.

The Catlin's River Branch, after running through a rich agricultural country, terminates in one of the best-timbered districts in Otago, consequently the traffic will be considerable—it also forms a link in the through communication above alluded to.

Edendale to Fortrose.—Three routes have been examined for this branch, going more or less into the country north of the Mataura, but preference is given to the one next the river. It starts from the Edendale Station on the main line, and for five miles follows generally the course of the Fortrose Road. After crossing the Wyndham it diverges southwards and keeps along the Wyndham and Mataura Valleys to the lower end of Mataura Island, after which it follows the foot of the terraces to the terminus at Fortrose. The total length of the line above described is about 23 miles. A saving of about three or four miles might be effected by at once running southwards from Edendale to a crossing near the ninth mile, but this would leave out a portion of the closely-settled country on the Otago side of the Mataura. Possibly a modification of the two alternatives will be found the most suitable.

The alignment and gradients of the Edendale and Fortrose Branch are particularly good, and the works are very light, the approximate estimate for the whole line, including equipment, being £110,000.

The Fortrose Branch, up to within five miles of the coast, is well located; but I do not think it should go any further in that direction, as the country immediately surrounding Toitoes Harbour is fairly accommodated by water carriage. The line should turn off at the point named, and run up the Wamak Valley, five or six miles into the heart of the Toitoes District. In addition to opening up more country, the latter portion will possibly come in as a link in a through line to the Clutha. I believe that a branch railway from some point, or other on the main line to the Toitoes District is required, and that it would amply repay its cost.

In connection with the Catlin's River and Fortrose Branches, and another branch that the Provincial Government of Otago intended to make into the Seaward Bush from Invercargill, it is a question whether the interests of the country would not be best served by making instead one through loop line from Greenhills on the Bluff Railway, *via* Toitoes and Catlin's River, to the Clutha. Such a line would open up a great extent of rich agricultural and timber country. It would afford communication in both directions to the districts traversed, and shorten the journey from Dunedin and Christchurch to the Bluff by fifteen or twenty miles. So far as can be ascertained without a regular survey there are no serious engineering difficulties in the way of its construction; the only doubtful part is about twenty miles in the Tautuku Forest, not yet explored.

If this idea can be entertained at present, the section from Greenhills to Toitoes should be substituted for the Edendale–Toitoes Branch; they are exactly the same length, and the former is somewhat easier to make, and much superior in alignment and levels; indeed it might be made perfectly straight and level for nearly twenty miles.

The objection to the Greenhills line as against the Edendale is that it leaves out a better-settled country in the Wyndham District than is brought in at Oteramika, and that, under any circumstance, a connection will ultimately be required between the two lines along the Mataura Valley, so the Edendale Branch does not become useless when the other is constructed. If it is not necessary to make the Seaward Bush Line, these objections will probably hold good, and the Edendale Branch should be constructed first; but, if the former is considered a necessity, the Greenhills–Toitoes line is decidedly preferable to separate branches at Seaward Bush and Edendale.

Estimates.

Since commencing this report I have received your instructions to furnish approximate estimates of the lengths and costs of lines in the Middle Island the construction of which I would recommend for consideration. In accordance therewith, and acting on the principle already laid down of making every extension, however small, a link in the general railway system of the Island, I have considered the subject in all its bearings, so far as our present information will permit. Although our knowledge of the country traversed by the various lines suggested is such as to make the general direction tolerably correct, the details of lines and distances must not be taken as conclusive. The estimates of cost, which are only approximate, are in most cases based on a comparison between them and railways already constructed in other parts of the colony; they are intended to cover cost of main line, sidings, stations, rolling-stock, land, and engineering, together with all other charges required to construct and equip the lines.

I have divided the railway system I suggest for the Middle Island into four classes, thus: Extension, 1st class; Extension, 2nd class; Future Extensions, first class; and Future Extensions, 2nd class, according to what I consider their importance and the order in which they should be constructed. The future extensions being a matter of much uncertainty, it is not necessary at present to give details of length and cost; their enumeration is mainly useful in showing the general system.

Extensions, First Class.

Main Lines.	Length, Miles.	Cost.
Dunedin to Albert Town, Otago Central	160	£1,100,000
Amberley to Brunnerton	110	950,000
Greymouth to Hokitika	26	220,000
Totals for Main Lines	296	£2,270,000

Branches.	Length, Miles.	Cost.
Subsidiary main line in lieu of Canterbury Branches ...	85	£380,000
South Ashburton to Ashburton Forks	20	55,000
Albury extension	20	110,000
Waikaka to Heriot Burn	25	115,000
Edendale or Greenhills to Toitoes	26	110,000
Otautau to Nightcaps	16	75,000
Totals for Branch Lines	192	845,000
Totals for Main Lines and Branches in Extensions, First Class	488	£3,115,000

Extensions, Second Class.

	Length, Miles.	Cost.
Palmerston to Waihemo	12	£55,000
Clutha to Catlin's River	18	95,000
Waimea to Switzers	15	70,000
Lumsden (Elbow) to Mararoa	35	180,000
Totals for Extensions, Second Class ...	80	£400,000

Future Extensions.

First Class.—Brunnerton to Buller Valley, Albert Town to Hokitika *viâ* Haast's Pass, Amberley to Hurunui, Kakanui to Livingston, Switzers to Kelso, Otautau to Waiau and Mararo.

Second Class.—Westport to Foxhill, Ngakawau towards Karamea, Nelson to Picton, Hurunui to Blenheim, Upper Clutha Valley to Waitaki Valley *viâ* Lindis Pass, Waitaki Valley to Albury Branch *viâ* McKenzie Plains, Livingston to Duntroon, Kingston to Cromwell, Kelso to Lawrence, Greenhills to Catlin's River, Nightcaps to Upper Oreti, Orepuki to Waiau.

The general map accompanying my annual report shows such of the lines above enumerated as have been surveyed, and I think the routes of the others can be followed from the descriptions already given.

I have, &c.,
W. N. Blair,
Engineer in Charge, Middle Island.

The Hon. the Minister for Public Works.

Enclosure in Appendix E.

REPORT ON ROUTE FOR TAPANUI BRANCH RAILWAY.

The Engineer in Charge, Middle Island, to the Hon. the Minister for Public Works.

Sir,— Public Works Office, Dunedin, 14th May, 1878.

I have the honor to enclose herewith a plan showing the various lines suggested in the vicinity of the Tapanui Township, and to submit the following memoranda thereon :—

The blue line going right into the township is the one originally surveyed by the provincial authorities, and was apparently intended to terminate at the township, without reference to further extension.

I recently made a careful examination of the whole country between the Clutha River at Beaumont, and the Mataura at Gore, and I had no hesitation in concluding that the Tapanui Railway should and could be made an instalment of a railway system that would ultimately open up the whole of this rich agricultural country, and that the best method of obtaining this object was to continue it up the Pomahaka Valley to Kelso. By this means communication is immediately afforded to the populous settlements on the western side of the Pomahaka, opposite Kelso, as well as the Heriot Burn District, and the branch will form a connection with a through railway which is, sooner or later, bound to be constructed from the main line at Wakaka to the Beaumont and Tuapeka. If the line now proposed is brought right into Tapanui, it cannot possibly regain the Pomahaka Valley ; it can only be produced through McKellar's Plain. The advantages it presents in affording direct communication to those places are not, in my opinion, to be compared with the benefits that will result from following the Pomahaka Valley ; besides, they are by no means remote from the Kelso line. The Tapanui Township is only about 90 chains from it ; and the traffic from McKellar's Plain can reach the line by the present road to Kelso, or by the Crookston or Heriot Burns, as easily as it can to the Tapanui Township. Of course, the Tapanui Township is a very important centre, consequently its claims to a direct railway communication are intitled to great consideration. I have given them every possible consideration, but fail to see that they are sufficient to alter the conclusions arrived at.

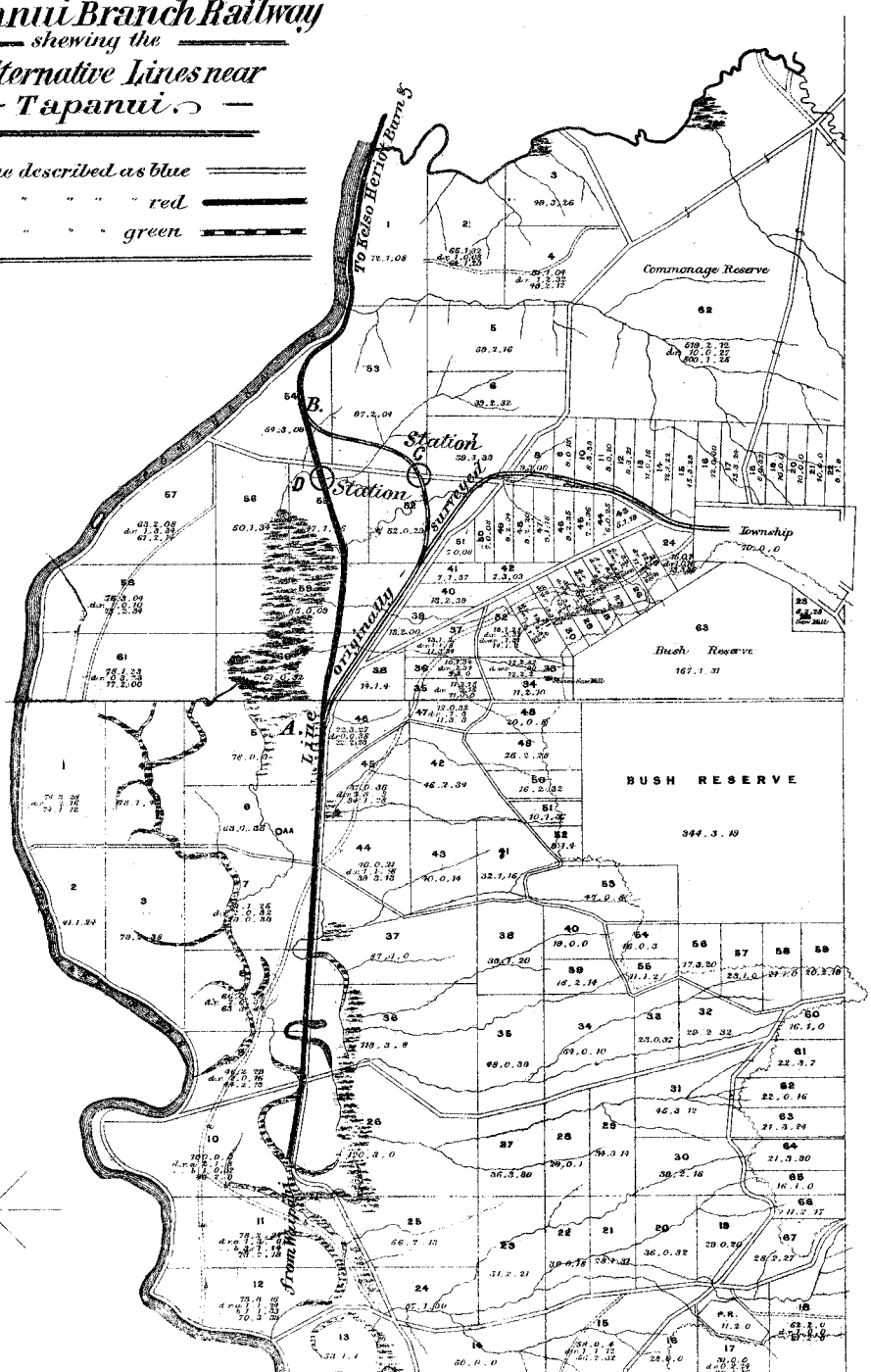
With the view of coming as close as possible to the Tapanui Township, I have had an alternative line surveyed (coloured green on plan) : it is 24 chains longer than the direct red line, but brings the line 24 chains nearer the township. I do not, however, recommend its adoption ; it makes a very objectionable detour on the line, and would not, I am convinced, give complete satisfaction to the residents of Tapanui.

I have, &c.,
W. N. Blair,
Engineer in Charge, Middle Island.

The Hon. the Minister for Public Works.

Plan accompanying Mr Blair's Report on the Tapanui Branch Railway shewing the Alternative Lines near — Tapanui —

Note – Line described as blue
" " " " " red
" " " " green



Note: Distance from A to B on red line - 1 M 4½ Chains
" " " blue & green D^r 1 M 28¾ ch. "
Tapanui Boundary to Station C 70 ch "
" " " D = 94 ch "

SCALE
80 60 40 20 0 20 40 60 80 100 120 Chains

NOTE – A circular area 20 feet diameter over each Trig Station & right of way thereto is reserved by Government.

APPENDIX F.

CONTRACTS FOR CONSTRUCTION OF RAILWAYS.

SCHEDULE of CONTRACTS for the CONSTRUCTION of RAILWAYS from 1st July, 1877, to 30th June, 1878.

	£ s. d.	£ s. d.
KAIPARA—PUNIU:—		
D. Henderson, No. 4 station buildings	230 9 0	
D. Henderson, No. 5 station buildings	2,163 19 11	
Topham and Angus, Newcastle-Ohaupo permanent way, 19 m. 60 ch., sidings 60 ch....	9,948 17 0	
E. Fitzpatrick, painting bridges	975 16 3	
H. P. Kavanagh, No. 7 station buildings	224 4 0	
F. Scherff, 1,200 cubic yards rough stone	865 0 0	
W. Cameron, Helensville Station water supply	883 0 0	
W. Cameron, additions to workshops	635 14 6	
J. Marks, Auckland Station water supply	1,040 0 0	
D. Henderson, plate-layer's cottage, Ohaupo...	229 10 6	
H. P. Kavanagh, Pukekohe Telegraph Office...	173 17 6	
Butterwick and Wishart, No. 8 station buildings	640 0 0	
J. Duce, Mercer Wharf	474 2 4	
W. Foughy, "Ohaupo"	22,516 8 5	
Neild and Co., "Lagoon"	345 0 0	
		41,345 19 5
NAPIER—MANAWATU:—		
J. McSweeney, Waipukurau Station buildings	£385 0 0	
Shepherd and Stock, Spit Quay	1,425 15 0	
Weir and Marshall, Spit goods-shed	120 0 0	
Shepherd and Stock, carriage-repairing shed...	220 0 0	
Weir and Marshall, Napier engine-shed	393 15 9	
D. McLeod, Kopua Stationmaster's house	491 0 0	
Richard Phillips, additions to Waipawa Station	142 10 0	
Angus McKay, Post and Telegraph Office	110 0 0	
D. E. Lindsay, Napier Stationmaster's house	413 18 6	
Proudfoot and McKay, Papetu bridges	15,195 4 8	
Meredith and Stadum, painting bridges	1,200 0 0	
		20,097 3 11
WELLINGTON—MASTERTON:—		
Kincaid, McQueen, and Co., 40 sets points and crossings (part of contract for 50 sets)	£719 10 0	
W. J. Ridler, Kaitoke Station buildings	1,778 17 2	
J. Sutherland, Featherston Station	3,549 3 0	
Richard Dickson, Carterton formation and permanent way, 20 m. 41 ch., sidings 1 m. 40 ch.	51,954 0 0	
Gilchrist and Waters, 200 sets points and crossings	2,480 0 0	
W. J. Ridler, Summit water supply	828 17 6	
W. J. Ridler, Cross Creek Station buildings	1,297 1 9	
C. H. Ellaby, discharging 2 locomotive boilers ex "Pleione" ...	30 0 0	
Zohrab, Knocker, and Co., 5,000 sleepers	666 13 4	
Richter, Nannestad, and Co., 10,000 sleepers	1,166 13 4	
Stewart Brothers, 5,000 sleepers	812 10 0	
W. Booth and Co., 6,740 large sleepers	2,274 1 8	
W. Strachan, 5,000 sleepers	625 0 0	
W. Booth and Co., 25,000 sleepers	2,900 0 0	
W. Booth and Co., 10,000 sleepers	1,708 6 8	
W. Booth and Co., 5,000 sleepers	604 3 4	
G. Stewart, 5,000 sleepers	562 10 0	
W. W. Corpe, 15,000 sleepers	1,604 3 4	
		75,561 11 1

	£ s. d.	£ s. d.
WAITARA—PATEA :—		
Alexander Macdonald, No. 1 masonry culverts	915 8 0	
D. McIntyre and Co., freight to Waitara, rails ex "Robina Dunlop"	109 12 8	
D. Glendinning, Ngatoro Bridges	4,833 0 0	
J. C. George, engine-shed at Inglewood	408 9 6	
E. L. Humphries, 220 barrels of cement	264 0 0	
Alexander Macdonald, No. 2 masonry culverts	979 8 0	
J. C. George, 30 gates	139 0 0	
R. McGonagle, No. 1 timber culverts	188 0 0	
		7,836 18 2
PATEA—MANAWATU :—		
Kincaid, McQueen, and Co., 10 sets points and crossings (part of contract for 50 sets)	£719 10 0	
Burgess and Thompson, Feilding Stationmaster's house ...	220 0 0	
W. Rowe, Wanganui Town, formation and permanent way, 2 m. 71 ch. 50 lk., sidings 38 ch.	4,336 0 0	
Plimmer, Reeves, and Co., freight to Wanganui, rails and fastenings ex "City of Madras"	257 16 2	
W. Bishop, freight on rails to Foxton	162 18 0	
T. Denby, No. 2 Marton permanent way, 13 m. 57 ch., sidings 40 ch.	4,474 0 0	
Harvey and McCall, 20,000 posts	703 2 6	
G. M. Chalmers, Wanganui Station	685 0 0	
E. Whiting, additions to engine-shed	766 9 9	
G. M. Chalmers, Wanganui coal store	117 11 0	
J. J. Campbell, erection of 19 high-side wagons and 2 timber trucks	545 0 0	
Nathan and Wilkie, "Halcombe" permanent way, 9 m. 75 ch. 35 lk., sidings 70 ch.	4,607 12 0	
Alexander and Macfarlane, Marton and Bonnie Glen Station buildings	1,097 3 0	
Thomas Sexton, 5,000 posts	156 5 0	
Henry Harris, erection 8 timber trucks	135 12 0	
W. Bassett, painting bridges	627 2 0	
R. and E. Tingey, painting Oroua and Rangitikei Bridges ...	355 0 0	
C. Dunn, painting Manawatu Gorge Bridge	271 0 0	
J. Milverton, painting Foxton and Palmerston Stations ...	100 0 0	
Plimmer, Reeves, and Co., freight on rails and locomotives, Wellington to Wanganui, ex "Canmore," "Craigmullen," and "Craigie Lee"	330 17 0	
J. and C. Bull, Greatford and Halcombe Station buildings ...	2,845 9 6	
Collie, Scott, and Wilkinson, "Waitotara," 12 m. 70 ch., sidings 65 ch.	39,791 14 3	
C. H. Ellaby, freight on 1,248 tons rails, Wellington to Wanganui, ex "Whittington"	1,034 12 8	
J. Andressan, Foxton Wharf, additions	690 0 0	
Richter, Nannestad, and Co., 23,000 sleepers	2,970 16 8	
Zohrab, Knocker, and Co., 5,000 sleepers	645 16 8	
Harvey and McCall, 7,000 sleepers	448 8 9	
W. H. Lash, 30,000 sleepers	2,625 0 0	
		70,719 16 11
NELSON—FOXHILL :—		
D. McIntyre and Co., freight on rails ex "Orari" from Wellington to Nelson	£76 10 0	
E. O'Malley, "Port" formation, 61 ch. 45 lk.	6,229 8 10	
		6,305 18 10
PICTON—BLENHEIM :—		
G. Thomas, freight on 2 carriages from Wellington to Picton ...	£25 0 0	
D. McIntyre, freight on 67 tons rails and fastenings, from Wellington to Picton, ex "Orari"	39 17 4	
George Satherley, removing bridge	85 0 0	
		149 17 4
BRUNNER—GREYMOUTH :—		
Plimmer, Reeves, and Co., freight on rails and fastenings ex "Orari" to Greymouth	£55 18 0	
Kincaid, McQueen, and Co., steam dredge	2,414 0 0	
C. Holder, 5,000 sleepers	750 0 0	
		3,219 18 0
WESTPORT—NGAKAWAU :—		
Robertson and Co., ironwork for altering 88 sets hopper wagons	£504 18 0	
Kincaid, McQueen, and Co., 1 set points and crossings ...	15 1 0	
Hercules Brinkley, painting bridges	111 0 6	
		630 19 6

	£ s. d.	£ s. d.
Amberley–Waitaki:—		
M. Lake, Eyreton extension, formation and permanent way, 5 m. 58 ch. 90 lk., sidings 20 ch.	£5,351 3 2	
W. Stocks, Racecourse branch, formation 71 ch., sidings 13 ch. ...	449 0 0	
Campbell Brothers, erection 150 high-side wagons	2,340 0 0	
W. Langdown, erection 100 low-side wagons	1,185 0 0	
W. Langdown, erection 36 low-side, 2 high-side, 10 covered goods, and 2 cattle wagons	887 15 0	
C. Ellaby, freight on rails and fastenings from Wellington to Lyttelton	390 1 5	
Kincaid, McQueen, and Co., 15 sets points and crossings ...	213 7 6	
W. R. Williams, freight on 207 tons rails from Wellington to Lyttelton	121 12 3	
Murdoch and Phillips, No. 1 bridges painting	2,583 0 0	
James Craigie, No. 2 bridges painting	1,862 15 5	
D. McIntyre, freight on 1 locomotive and fittings from Wellington to Lyttelton, and discharging 2 locomotives at Wellington ex "Canmore"	107 0 0	
Sparrow and Co., 100 sets points and crossings (part of contract for 200 sets)	1,400 0 0	
J. Lee, 10,000 sleepers	1,229 3 4	
J. E. Thacker, 25,000 sleepers	3,437 10 0	
		21,557 8 1
Waitaki—Bluff:—		
McAllister and Turnbull, Waipahi Station	£137 14 2	
McAllister and Turnbull, Waipahi goods shed	308 11 0	
G. Mackney, Invercargill Station store	584 19 0	
R. Martin, carriage-repairing shed	1,279 11 8	
H. C. Hanchard, painting bridges	758 0 0	
Proudfoot and McKay, "Clinton" formation and permanent way, 16 m. 31 ch., sidings 30 ch.	37,600 0 0	
W. Mills, Palmerston Station	193 6 0	
Peter Dey, Waikouaiti Bridge	4,298 5 0	
G. Wilson, Lawrence Stationmaster's house	467 0 0	
D. A. McLachlan, Clinton goods shed	473 0 0	
J. B. Blair, Roseneath Station	354 15 0	
J. Hollick, Mount Stuart Station, master's house	256 0 0	
Henderson and Fergus, engine-shed	191 3 10	
J. Hollick, Inspector's house, Wairepa	188 2 11	
J. Hollick, Inspector's house, Waitapeka	407 9 7	
W. Mills, No. 6 station buildings	935 10 0	
W. Mills, No. 7 station buildings	888 10 0	
P. Dey, No. 8 station buildings	705 16 0	
D. Low, No. 5 station buildings	647 18 4	
D. A. McLachlan, Waipahi Station...	304 2 8	
J. Brodrick, freight on rails and fastenings from Bluff to Port Chalmers	161 5 0	
Sparrow and Co., 50 sets points and crossings (part of contract for 200 sets)	700 0 0	
Menzies and Hughes, cattle pens	436 0 0	
Henry Jaggers, Josephville goods shed	259 0 0	
Blair and Stevens, Glendermid Stationmaster's house ...	435 17 8	
J. Murdoch, 25,000 sleepers	4,270 16 8	
		57,242 14 6
Winton—Kingston:—		
W. H. Topham, "Athol," 13 m. 27 ch., sidings 20 ch. ...	£3,845 15 4	
H. Jaggers, No. 7 station buildings	942 8 0	
Robert Burns, post and telegraph office	325 12 0	
Topham and Angus, "Kingston," permanent way, 18 m. 17 ch. 50 lk., sidings 12 ch.	7,322 13 11	
Sparrow and Co., 50 sets points and crossings (part of contract for 200 sets)	700 0 0	
J. Whittaker, Kingston Wharf	2,668 3 1	
Henry Jaggers, No. 8 station buildings	724 15 0	
		16,529 7 4
Western Railways:—		
Millar, Murray, and Walker, Wallace Town branch, formation and permanent way, 11 m. 74 ch., sidings 1 m. 20 ch. ...	£11,358 18 0	
J. R. Stuck, private crossings	678 15 0	
Menzies and Hughes, erection 10 cattle-wagons, 4 horse-boxes, 4 cattle-trucks, 6 timber-trucks, and 8 brake-vans ...	1,492 8 0	
J. Murray, Otautau branch, 6 m. 3 ch., sidings 40 ch. ...	4,512 9 6	
Kincaid, McQueen, and Co., 40 sets points and crossings (portion of contract for 50 sets)	719 10 0	
J. Murdoch, 10,000 sleepers	958 6 8	
James Angus, 20,000 sleepers	3,333 6 8	
		23,053 13 10
Total		£344,251 6 11

APPENDIX G.

CONTRACTS FOR CONSTRUCTION OF ROADS.

SCHEDULE of CONTRACTS for the CONSTRUCTION of ROADS from 1st July, 1877, to 30th June, 1878.

	£ s. d.	£ s. d.
WESTLAND ROAD CONTRACTS:—		
John Allen, contract for section 4, 3 miles, Bowen-Okarito Road, north end	949 15 0	
John Allen, contract for section 5, 3 miles, Bowen-Okarito Road, north end	829 4 0	
Rikard O'Donovan, contract for section 6, 3 miles, Bowen-Okarito Road, north end	834 0 0	
John Butler, contract for section 7, 3 miles, Bowen-Okarito Road, north end	694 17 0	
Rikard O'Donovan, contract for section 8, 296 ch., Bowen-Okarito Road, north end	1,472 12 0	
James Clarke, contract for section 9, 251 ch., Bowen-Okarito Road, north end	1,563 10 0	
James Clarke, contract for section 10, 285 ch., Bowen-Okarito Road, north end	3,164 0 0	
James Clarke, contract for section 11, 320 ch., Bowen-Okarito Road, north end	2,958 0 0	
James Clarke, contract for section 12, 286 ch., Bowen-Okarito Road, north end	1,391 0 0	13,856 18 0
NELSON AND SOUTH-WEST GOLD FIELDS CONTRACTS:—		
Maurice O'Connor, contract for construction of bridge over the Grey River	4,543 15 0	4,543 15 0

APPENDIX H.

ANNUAL REPORT ON WORKING RAILWAYS BY THE COMMISSIONER OF RAILWAYS, NORTH ISLAND.

The COMMISSIONER of RAILWAYS, North Island, to the Hon. the MINISTER for PUBLIC WORKS.

Wellington, 1st August, 1878.

SIR,—

I have the honor to report on the working of the North Island railways for the twelve months ending 30th June, 1878.

The mileage of railways opened for traffic in the North Island on the 30th June, 1877, was 206 miles 17 chains, and on 30th June, 1878, 309 miles 1 chain, being an increase of 102 miles 63 chains.

The dates of opening the several lengths are given in Table No. 1.

Length of Main Line and Branches.

Section.	Main Line. Mls. Chs.	Branches. Mls. Chs.	Totals. Mls. Chs.
Kaipara	15 68	...	15 68
Auckland	94 0	2 53	96 53
Napier	64 13	...	64 13
Wellington	27 7	...	27 7
Wanganui	85 27	...	85 27
New Plymouth	11 13	8 60	19 73
Totals	297 48	11 33	309 1

Revenue and Expenditure.

The gross revenue for the year amounted to £102,581 18s. 4d., against £69,722 1s. of the previous year. The total expenditure was £83,925 2s. 7d., against £56,156 8s. 4d for the previous year, as per following comparative statement:—

Section.	Receipts. £ s. d.	Expenditure. £ s. d.	Expenditure per cent. of Receipts.
1877–78.			
Kaipara	3,925 3 10	4,765 4 1	121·40
Auckland	37,321 10 6	29,133 15 4	78·06
Napier	25,263 13 11	18,216 10 2	72·10
Wellington	16,100 3 9	11,718 15 4	72·78
Wanganui	15,040 19 1	15,015 14 6	99·83
New Plymouth	4,930 7 3	5,075 3 2	102·93
Total	102,581 18 4	83,925 2 7	81·81
1876–77.			
Kaipara	3,778 4 5	4,296 11 6	113·72
Auckland	21,868 3 9	17,663 8 10	80·75
Napier	21,374 13 10	13,239 19 2	61·94
Wellington	11,518 18 3	9,893 19 2	85·89
Wanganui	8,540 1 8	7,791 7 6	91·23
New Plymouth	2,641 19 1	3,271 2 2	123·81
Total	69,722 1 0	56,156 8 4	80·54

My connection with the North Island being of such recent date, I am scarcely prepared to say much as to the future prospects of its railways, but, considering the present disconnected character of the lines, it appears to me that the results, as shown by the above comparative statement of receipts, are fairly satisfactory.

Certain tariff modifications in connection with the Auckland lines, and the extension to the Queen's and Railway Wharves, will, I am satisfied, result in a largely increased revenue.

I also anticipate a large increase on the Wellington and Masterton Railway as soon as the line taps the Wairarapa District, which will probably be accomplished about the middle of September next.

The opening of the connecting link between the Foxton and Wanganui Districts took place in May last, and the beneficial result is already apparent in a rapidly-increasing traffic. Hitherto the Wanganui District has been mainly dependent for timber supplies upon a seaborne trade, whereas now it has access to the Feilding and other timber districts by railway. I also understand that the farmers of the Rangitikei District are likely to grow grain and other produce, which has hitherto been kept back for want of the communication now supplied.

The great drawback on several of the lines has been inadequate engine power and rolling stock, but the most pressing wants are being attended to, and I trust complaints will shortly cease.

Kaipara Line.

The total receipts for the year on this section amounted to £3,925 3s. 10d., being an increase of £146 19s. 5d. over the previous year.

I do not anticipate much increase here until the line is connected with Auckland. It is a very isolated district, and in itself possesses few elements for development.

The road, culverts, and bridges are in fair condition, and the engines and rolling-stock in good working order.

Changes in the staff recently made will effect a saving of £266 per annum.

Auckland Line.

The total receipts for the year on this section amounted to £37,321 10s. 6d., being an increase of £15,453 6s. 9d. over the previous year.

The Waikato coal is growing in public favour, and I have no doubt a modified tariff will enable the colliery proprietors to successfully compete with the Newcastle and Bay coal for local steamers as well as domestic consumption. The coal answers admirably for locomotives, and we use no other on this line.

Large quantities of live stock are driven from up country to the Auckland market, the carriage of which, it is expected, will be secured to the railway by a reduced tariff now under consideration. Several other modifications are contemplated tending to an increase of traffic, and I am hopeful that the current year's working will show a more satisfactory result.

Notwithstanding the extension of the railway to Newcastle and Ohaupo the Waikato Steam Navigation Company still continue to receive the traffic at Mercer. Steps are, however, being taken to change this state of things, and I trust we shall shortly arrange to effect an interchange of the river traffic at Newcastle instead, and thus secure thirty-one additional miles of freight to the railway.

In view of a largely-increased traffic on this line, I would strongly urge the easing of the curves and grades near Pokeno. There are now four 6-chain reverse curves on very heavy grades in a distance of a little over three miles. Three of these curves occur in a distance of 37 chains, and, as the bulk of the traffic passes over this portion of the railway, it is a serious question of extra cost in working.

Since last year this line has been extended as follows:—

	m.	ch.
August 13th, 1877.—From Mercer to Newcastle	30	69
December 19th, 1877.—From Newcastle to Hamilton	10	76
March 26th, 1878.—From Hamilton to Ohaupo	9	24

The length from Auckland to Mercer, 43 miles, is well ballasted, and in all respects in good running order; that from Mercer to Ohaupo is also in fair condition; but the embankments crossing the swamps between Mercer and Newcastle will for some time require careful watching, and extra cost of maintenance.

During the year a large amount of material has been used for renewals; these consist of 858 52-lb. rails, 1,351 sleepers, and the necessary fastenings; a considerable amount of ballasting, widening of embankments, and fencing has also been done.

The locomotives and rolling-stock are in very fair working order, but the cost of maintenance has been somewhat heavy.

The workshops are most inconveniently placed, being right in the middle of the goods yard at Auckland, and in consequence greatly impede the working of the traffic, and the sooner they are removed to Newmarket, where a reserve has been provided for the purpose, the better.

Several changes tending to economy are being effected in the workshops arrangements. The foundry will be closed, and tenders called for castings; the large staff hitherto maintained for conducting the works as a general workshop will be reduced to an extent equal to the work required on the Auckland line only, as it has been found that the practice of sending work for repairs from the other sections costs more for freight charges than the job is worth; hence the desirability of calling for tenders for work to be done locally, until arrangements are made for each railway having its own workshop.

Reductions have been made in the staff, effecting a saving of over £7,000 per annum.

Napier Line.

The total receipts for the year on this section amounted to £25,263 13s. 11d., being an increase of £3,889 0s. 1d. over the previous year.

The traffic generally on this line has been steadily increasing, but not proportionally with the additional mileage opened during the year. I have no doubt that ere long the timber district tapped by the extension will supersede the large import of timber from the northern districts.

The road generally is in good working order. The embankments have been widened, and the line substantially ballasted where requisite. The Oregon sleepers used in the construction of this line have proved a failure. During the year 2,658 have been replaced with totara, and about 4,000 more will have to be removed during the current year.

The locomotives and rolling-stock are in excellent condition, and very creditable to the management.

The saving effected in the staff amounts to about £500 per annum.

Wanganui Line.

The total receipts for the year on this section (including the Foxton end) amounted to £15,040 19s. 1d., being an increase of £6,500 17s. 5d. over the previous year.

Up to May 20th, 1878, the railways in this district were detached, and under separate management. On the date named the connecting link between Halcombe and Marton was handed over to the working department, and a daily through service was at once established in connection with the coaches between Wellington and Wanganui, *viâ* Foxton, and *vice versâ*.

In justice to my department, I am bound to mention that proper provision in engine power and rolling-stock was not made for this extension, and the consequence is that bitter complaints are continually made by the public, and serious loss arises through our inability to carry the traffic with proper despatch, owing to the scarcity of wagons; inconvenience is also felt by our inability to provide sufficient passenger train accommodation for the want of engines. Some relief will shortly be afforded, and I trust we shall be able to cope satisfactorily with the largely increased and increasing traffic.

The line runs through a fine country, and has the great advantage of a port at each terminus.

In one month after the connection of the two districts the receipts went up to an average of £22 per mile, as against £14 in the corresponding month of the previous year.

When we have adequate engine power and rolling-stock, and the saw-mills get into full work, with the addition of extended operations likely to ensue in agricultural production by reason of the railway communication afforded, the results will be highly satisfactory to the railway department and all concerned.

I take this opportunity of urging the necessity of speedy action being taken in the matter of additions and improvements contemplated for Wanganui and Foxton wharves connecting with the railway, as I feel sure these works are essential to the development of the railway traffic.

Several miles of the main line are laid with 30-lb. rails, and it is desirable to replace these with heavier ones with as little delay as possible.

The engines and rolling-stock are in fair working order.

The permanent-way is also in good order, except between Foxton and Palmerston, a considerable length of which requires ballasting. This work has been kept back for want of engine power.

A considerable saving has been effected on this line by the merging of the management consequent on the through connection.

Wellington Line.

The total receipts for the year on this section amounted to £16,100 3s. 9d., being an increase of £4,581 5s. 6d. over the previous year.

The main purpose for which the line at present open was constructed will shortly, in a measure, be realized by the extension across the Rimutaka Range to Featherston, and no doubt the access to the Wairarapa District will result in a very largely increased traffic; but it will be done at the cost of greatly increased expenditure by reason of the very heavy grades, which will have to be worked by Fell engines specially imported.

The engines, rolling-stock, and permanent way are in good working order, and when the line is extended, and a full complement of engines, &c., obtained, I hope to be in a position to afford better facilities for both passenger and goods traffic than exists at present.

New Plymouth Line.

The total receipts for the year on this section amounted to £4,930 7s. 3d., being an increase of £2,288 8s. 2d. over the previous year.

This line, like the Kaipara section, is too much isolated at present to expect great results; still, it is progressing very satisfactorily.

The engines are too light for the grades on some partions of the line, and provision has been made for two of a better class to be supplied, as well as an increase of rolling-stock, especially timber trucks. The wants referred to have been subject of public complaint for some time, and I think with good reason.

The road and rolling-stock are both in good order, and, upon the whole, the line has been properly worked with the inadequate means at the manager's disposal.

In conclusion, I have great pleasure in bearing testimony to the zealous co-operation of the managers and employés generally, who, during my tour of inspection, afforded every information and assistance necessary to give me an insight into the working of the lines, and the peculiarities of their respective districts.

Attached herewith you will please find the following tables:—

I have, &c.,
J. Lawson,
Commissioner of Railways, North Island.

The Hon. the Minister for Public Works.

Enclosures in Appendix H.

TABLE 1.

NEW ZEALAND RAILWAYS.—NORTH ISLAND.

Statement showing the Number of Miles of Road Opened for Traffic during the Year ending 30th June, 1878.

Designation of Line.	Date when Opened.	Length.				Remarks.
		M.	CH.	M.	CH.	
Auckland	13th August, 1877	31	2			
„	19th Dec., 1877 ...	10	33			
„	14th June, 1878...	9	24			
				50	59	
Napier	25th Jan., 1878 ...	5	60			
				5	60	
Wellington	1st Jan., 1878 ...	7	43			
				7	43	
Wanganui	21st Jan., 1878 ...	2	71			
„	4th Feb., 1878 ...	9	10			
„	22nd April, 1878...	18	0			
				30	1	
New Plymouth	30th Nov., 1877...	8	60			
				8	60	
Total opened	...			102	63	

TABLE 2.—Appendix H.

NORTH ISLAND.

CLASSIFIED STATEMENT showing Receipts and Expenditure, and Proportion of each Class of Expenditure to Mileage and Receipts, for Year ending 30th June, 1878.

Section.	Total Train Mileage.	Receipts.			Classified Expenditure.							Proportion of each Class of Expenditure to Mileage and Receipts.															
												Total for Year.			Maintenance.		Locomotive.		Carriage and Wagon Repairs.		Traffic Expenses.		General Charges.		Sundries.	
		Total.	Per Mile of Railway per Annum.	Per Train Mile.	Maintenance of Way.	Locomotive Power.	Repairs of Carriages and Wagons.	Traffic Expenses.	General Charges.	Sundries.	Total.	Per Cent. of Receipts.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.	Per Mile of Railway.	Per Train Mile.
		£ s. d.	£ s. d.	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.																
*Kaipara ...	12,018	3,341 19 11	208 17 6	5 6½	2,302 10 8	818 0 1	56 0 1	722 13 4	460 18 1	5 16 2	4,365 18 5	130·63	272·87	87·18	143·91	45·98	51·12	16·33	3·50	1·12	45·17	14·43	28·81	9·20	0·36	0·12
*Auckland ...	206,479	36,251 19 0	455 11 2	3 6	9,885 16 9	8,518 5 0	1,663 8 3	6,945 2 6	1,895 3 6	32 8 5	28,940 4 5	79·83	363·67	33·63	124·23	11·49	107·04	9·90	20·90	1·93	87·28	8·07	23·81	2·20	0·41	0·04
Napier ...	79,246	25,263 13 11	410 10 8	6 4½	6,873 9 9	4,937 17 11	1,303 17 9	4,072 10 10	1,018 16 9	9 17 2	18,216 10 2	72·10	296·01	55·16	111·68	20·81	80·24	14·95	21·19	3·95	66·18	12·33	16·56	3·09	0·16	0·03
Wellington ...	69,133	16,100 3 9	670 16 10	4 8	3,439 4 9	4,082 18 2	1,062 10 4	2,530 10 9	598 8 2	5 3 2	11,718 15 4	72·78	488·23	40·68	143·30	11·94	170·12	14·17	44·27	3·69	105·44	8·78	24·93	2·08	0·22	0·02
*Wanganui ...	85,047	13,984 7 7	211 10 3	3 3½	5,999 13 7	3,710 13 9	310 5 6	3,155 3 4	1,179 9 1	13 17 0	14,369 2 3	102·74	217·31	40·54	90·74	16·93	56·11	10·47	4·69	0·87	47·72	8·90	17·84	3·33	0·21	0·04
*New Plymouth	32,684	4,777 6 9	272 8 5	2 11	1,819 0 8	1,481 2 10	119 12 1	1,039 18 6	450 10 3	...	4,910 4 4	102·77	279·96	36·05	103·72	13·36	84·45	10·87	6·81	0·87	59·29	7·64	25·69	3·31	...	...
		99,719 10 11									82,520 14 11															

* Wharf Receipts and Expenditure not included.

TABLE 3.—Appendix H.

NORTH ISLAND.

STATEMENT of Passenger and Goods Traffic for the Year ending 30th June, 1878.

Section.	Passengers.		Goods.						Live Stock.		Receipts.				Total Receipts, 30th June, 1877.
	First Class.	Second Class.	Wool.	Timber.	Grain.	Merchandise.	Minerals.	Firewood.	Horses, &c.	Sheep, &c.	Passengers.	Goods.	Wharf.	Total.	
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Kaipara ...	2,350	7,918	40 8 0	1,119 1 0	146 3 0	4,035 9 0	245 10 0	56 0 0	15	111	1,396 9 6	1,945 10 5	583 3 11	3,925 3 10	3,823 8 0
Auckland ...	17,073	108,370	329 0 0	4,282 12 0	1,978 1 0	17,799 4 3	16,830 14 0	12 0 0	869	24,963	19,717 15 6	16,534 13 6	1,069 11 6	37,321 10 6	22,313 13 1
Napier ...	20,859	53,085	2,909 11 0	5,789 6 1	1,548 14 0	7,288 16 1	4,190 6 2	2,644 0 0	518	6,146	13,688 17 5	11,574 16 6	...	25,263 13 11	21,374 17 10
Wellington ...	25,643	88,622	377 16 0	4,495 6 3	58 8 0	7,317 15 2	12,762 8 0	2,544 0 0	116	1,029	10,316 8 0	5,783 15 9	...	16,100 3 9	11,518 18 3
Wanganui ...	7,085	25,700	362 16 0	6,509 19 2	457 11 2	5,383 4 0	2,784 18 0	1,560 0 0	218	627	6,606 17 9	7,377 9 10	1,056 11 6	15,040 19 1	...
New Plymouth ...	1,963	24,880	20 4 0	2,003 4 3	478 4 0	1,781 17 0	739 0 0	620 0 0	5	112	2,808 0 6	1,969 6 3	153 0 6	4,930 7 3	2,641 19 1
														102,581 18 4	

TABLE 4.—Appendix H.

New Zealand Railways (North Island).

Statement of Revenue and Expenditure for Wharves, for the Year ending 30th June, 1878.

Wharf.	Revenue.	Expenditure.	Percentage of Receipts.
	£ s. d.	£ s. d.	
Kaipara	583 3 11	399 5 8	68·46
Auckland	1,069 11 6	193 10 11	18·09
Wanganui	1,056 11 6	646 12 3	69·19
New Plymouth	153 0 6	164 18 10	107·78
Totals	£2,862 7 5	£1,404 7 8	49·06

TABLE 5.—Appendix H.

Statement of Accounts (North Island).

KAIPARA SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Earnings,—		By Amount paid into Public Account to June 30, 1878	3,953 11 1
Cash in hand of General Manager, July 1, 1877	57 17 0	Amount of Cash in hand of General Manager, June 30, 1878	27 0 0
Outstanding on Goods, July 1, 1877 ...	19 13 5	Outstanding on Goods, June 30, 1878 ...	22 3 2
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	3,341 19 11		
Wharves	583 3 11		
	£4,002 14 3		£4,002 14 3
To amount paid into Public Account, June 30, 1878 £3,953 11 1		By Expenditure to June 30, 1878, Railway ...	4,365 18 5
Less Cash in hand and outstanding, July 1, 1877 ... ... 77 10 5		„ „ Wharf ...	399 5 8
	3,876 0 8		
Cash in hand of Manager, June 30, 1878	27 0 0		
Outstanding on Goods, June 30, 1878 ...	22 3 2		
Loss	840 0 3		
	£4,765 4 1		£4,765 4 1

NAPIER SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Cash in hand of General Manager, July 1, 1877	261 15 0	By Amount Paid into Public Account, June 30, 1878	25,551 10 3
Outstanding on Goods, July 1, 1877 ...	238 9 6	Cash in hand of Manager, June 30, 1878	143 1 10
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	25,263 13 11	Outstanding on Goods, June 30, 1878 ...	69 6 4
	£25,763 18 5		£25,763 18 5
To Amount Paid into Public Account, June 30, 1878 £25,551 10 3		By Expenditure to June 30, 1878	18,216 10 2
Less Cash in hand and outstanding on Goods, July 1, 1877 ... ... 500 4 6			
	25,051 5 9		
Cash in hand of General Manager, June 30, 1878	143 1 10		
Outstanding on Goods, June 30, 1878 ...	69 6 4	Balance towards payment of Interest ...	7,047 3 9
	£25,263 13 11		£25,263 13 11

AUCKLAND SECTION.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Earnings—				By Amount paid into Public Account, &c., June 30, 1878	37,256	9	6
Cash in hand of General Manager, July 1, 1877	280	3	1	Cash in hand of General Manager, June 30, 1878...	264	2	2
Outstanding on Goods, July 1, 1877 ...	66	18	2	Outstanding on Goods, June 30, 1878 ...	148	0	1
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	36,251	19	0				
Wharves	1,069	11	6				
	£37,668	11	9		£37,668	11	9
To Amount paid into Public Account to June 30, 1878 ... ... £37,256 9 6				By Expenditure to June 30, 1878, Railways	28,940	4	5
Less amount of Cash in hand and outstanding, July 1, 1877 ... 347 1 3				„ „ Wharves	193	10	11
	36,909	8	3	Balance towards payment of Interest ...	8,187	15	2
Cash in hands of Manager, June 30, 1878	264	2	2				
Amount outstanding on Goods, June 30, 1878	148	0	1				
	£37,321	10	6		£37,321	10	6

WELLINGTON SECTION.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Earnings—				By Amount paid into Public Account, June 30, 1878	15,995	15	9
Cash in hands of General Manager, July 1, 1877	31	18	0	Cash in hands of General Manager, June 30, 1878	70	3	9
Outstanding on Goods, July 1, 1877 ...	0	13	6	Outstanding on Goods, June 30, 1878 ...	66	15	9
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	16,100	3	9				
	£16,132	15	3		£16,132	15	3
To Amount paid into Public Account, June 30, 1878 £15,995 15 9				By Expenditure to June 30, 1878	11,718	15	4
Less Cash in hand and outstandings, July 1, 1877 32 11 6				Balance towards payment of Interest ...	4,381	8	5
	15,963	4	3				
Cash in hands of General Manager, June 30, 1878	70	3	9				
Outstanding on Goods, June 30, 1878 ...	66	15	9				
	£16,100	3	9		£16,100	3	9

WANGANUI SECTION.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Earnings—				By Amount paid into Public Account, June 30, 1878 £14,905 3 1			
Cash in hands of General Manager, July 1, 1877	27	19	9	Less refund of Revenue 1 19 11			
Outstanding on Goods, July 1, 1877 ...	82	19	1		14,903	3	2
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	13,984	7	7	Cash in hands of General Manager, June 30, 1878	221	19	2
Wharves	1,056	11	6	Outstanding on Goods, June 30, 1878 ...	26	15	7
	£15,151	17	11		£15,151	17	11
To Amount paid into Public Account, June 30, 1878 £14,903 3 2				By Expenditure to June 30, 1878, Railway	14,369	2	3
Less Cash in hand and outstanding, July 1, 1877 110 18 10				„ „ Wharf ...	646	12	3
	14,792	4	4	Balance towards payment of Interest ...	25	4	7
Cash in hand, June 30, 1878	221	19	2				
Outstanding on Goods, June 30, 1878 ...	26	15	7				
	£15,040	19	1		£15,040	19	1

NEW PLYMOUTH SECTION.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Earnings—				By Amount paid into Public Account, June 30, 1878	4,921	10	6
Cash in hand, July 1, 1877	10	3	6	Cash in hand, June 30, 1878	26	14	10
Outstanding on Goods, July 1, 1877 ...	10	5	5	Outstanding on Goods, June 30, 1878	2	10	10
Passengers' Parcels, Goods, Cattle, &c., to June 30, 1878	4,777	6	9				
Wharves	153	0	6				
	£4,950	16	2		£4,950	16	2
To Amount paid into Public Account, June 30, 1878 ... ... £4,921 10 6				By Expenditure to June 30, 1878, Railway	4,910	4	4
Less Cash in hand, and Outstanding, July 1, 1877 ... ... 20 8 11				„ „ Wharf ...	164	18	10
	4,901	1	7				
To Cash in hand of General Manager, June 30, 1878	26	14	10				
Outstanding on Goods, June 30, 1878	2	10	10				
Loss	144	15	11				
	£5,075	3	2		£5,075	3	2

TABLE 6.—Appendix H.

Summary of Statement of Accounts (North Island).

Dr.	£	s.	d.	Cr.	£	s.	d.
To Cash in hand and outstandings, July 1, 1877	1,088	15	5	By Payments into Public Account, June 30, 1878	102,582	0	3
Passengers, Parcels, Goods, Cattle, &c. ...	99,719	10	11	Cash in hand and outstandings ...	1,088	13	6
Wharves	2,862	7	5				
	£103,670	13	9		£103,670	13	9
To Payments into Public Account, June 30, 1878... £102,582 0 3				By Expenditure to June 30, 1878, Railway ...	82,520	14	11
Less Cash in hand and outstandings, July 1, 1877 1,088 15 5				„ „ Wharves...	1,404	7	8
	101,493	4	10	Balance towards payment of Interest ...	18,656	15	9
Cash in hand and outstandings, June 30, 1878	1,088	13	6				
	£102,581	18	4		£102,581	18	4

TABLE 7.—Appendix H.

Return of the Number and Nature of the Accidents and Injuries to Life and Limb which have occurred on each of the several Lines of New Zealand Railways from 1st July, 1877, to 30th June, 1878.

Name of Railway.	Date of Accident.	Passengers Killed or Injured.				Servants of the Department, or of the Contractors, Killed or Injured.				Persons Killed or Injured while crossing at Level Crossings.		Nature and Cause of Accident.
		From Causes beyond their own Control.		From their own Misconduct or Want of Caution.		From Causes beyond their own Control.		From their own Misconduct or Want of Caution.				
		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	
Wellington and Masterton	Dec. 7, 1877	...	...	...	...	...	2	...	...	...	...	Ballast wagons ran away; two men on brakes injured.
Auckland and Waikato	Dec. 27, 1877	...	...	...	...	...	2	...	...	...	...	Collision between passenger and goods trains between Huntley and Taupiri. One man's leg broken, and another injured.
Auckland and Waikato	June 25, 1878	...	...	...	...	...	...	...	...	1	...	Knocked down and killed by train at crossing near Onehunga.

TABLE No. 8.—Appendix H.

STATEMENT showing Quantity and State of Rolling-Stock on the Railways open for Traffic on 30th June, 1878.

Name of Section.	Locomotives.																Carriages.									Brak.		Trucks.					Wagons.				
	Fairlie.			Bogie.													1st Class.			Composite			2nd Class.													
	Centre rail system.	28 tons, 10-in. cyl.	25 tons, 9-in. cyl.	25 tons, 14-in. cyl., 6-whl., cpld.	Tender.	17 tons, 10½-in. cyl., 4-whl, cpld.	4-whl. Bogie.	17 tons, 10½-in. cyl., 4-whl., cpld.	Bissel Bogie.	12 tons, 9½-in. cyl., 4-whl., cpld.	23 tons, 13-in. cyl., 6-whl., cpld.	17 tons, 10½-in. cyl., 6-whl., cpld.	12 tons, 8-in. cyl., 6-whl., cpld.	12 tons, 9½-in. cyl., 4-whl., cpld.	10 tons, 8-in. cyl., 4-whl., cpld.	8 tons, 8-in. cyl., 4-whl., cpld.	6 wheels.	4 wheels.	4-wheel saloon.	6 wheels	4 wheels.	4-wheel cross-seated.	6 wheels.	4 wheels.	4-wheel saloon.	Passenger.	Goods.	Platform, Coal.	Timber.	Cattle.	Sheep.	Horse-boxes.	Covered Goods.	High-side.	Low-side.	Iron Hopper, or Mineral.	Tarpaulins.
Kaipara.																																				
In good order	...	...	...	...	...	...	1	...	...	...	1	...	...	...	1	...	...	2	...	...	3	...	...	2	...	6	...	...	...	...	4	10	4	...	20
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Auckland.																																				
In good order	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	3	3	...	...	4	...	7	4	...	1	8	...	34	8	8	5	30	83	53	42	80
Undergoing heavy repairs	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	6	...	...	...	...	...	3	...	...	8	6	..	3	4	...	2	7	...	...	4	4	1	3	15	6	9	...
Napier.																																				
In good order	...	...	...	...	...	...	1	...	1	...	2	...	...	1	1	...	5	...	...	4	5	...	2	3	...	...	2	4	2	3	62	37	...	40
Undergoing heavy repairs	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	1	...	...	...	...	...	2	1	...	2
Wellington.																																				
In good order	4	1	...	...	...	...	2	...	...	...	...	...	...	...	...	...	1	1	...	2	8	...	2	4	...	2	5	...	12	4	4	4	15	23	7	...	32
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
In hands of contractors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	16	...	...
Wanganui.																																				
In good order	...	1	...	...	...	...	...	...	...	...	3	...	...	...	...	...	1	1	...	1	2	...	4	2	...	...	6	...	16	4	8	5	25	14	6	...	32
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	42	...	...
Waitara.																																				
In good order	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	2	...	...	5	...	2	...	...	...	...	...	4	4	6	...	8
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	4	2	1	...	...	2	4	...	16	...	6	...	2	9	7	...	16	26	...	21	27	...	9	33	...	70	22	28	17	84	218	178	51	214

TABLE 9.—APPENDIX H.

STATEMENT showing QUANTITY and STATE of MISCELLANEOUS STOCK on the Railways Open for Traffic on 30th June, 1878.

NAME OF SECTION.	TURN-TABLES.				CRANES.						WEIGH-BRIDGES.			WEIGHING MACHINES.											
	Wagon Traversers.	16 feet.	15 feet.	13 feet.	11 feet.	12-ton Steam Travelling.	10-ton Workshop, Overhead Travelling.	10-ton Hand Wharf.	2-ton Hand Wharf.	5-ton Breakdown.	2-ton, with Vertical Boiler.	1½-ton Warehouse.	Railway Wagon, 12-tons.	Cart, 7 tons.	Cart, 3 tons.	2-ton 10 cwt.	15-cwt.	10-cwt.	8-cwt.	7-cwt.	5-cwt.	4-cwt.	3-cwt.	Platform Trucks.	Sleeper-dressing Machines.	Rail Presses.	Wheel Presses.	Platelayers' Trollies.	Drilling Machines.	Lathes.
KAIPARA.																													
In good order	...	...	...	1	...	...	...	...	...	2	...	...	...	...	...	1	...	...	...	...	2	...	...	3	...	...	...	4	1	...
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
AUCKLAND.																														
In good order	1	...	1	2	...	...	1	...	...	1	1	1	1	...	3	...	2	2	...	...	9	...	11	30	...	2	1	22	2	7
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
NAPIER.																														
In good order	...	...	...	5	...	...	...	...	1	2	...	2	2	...	...	...	1	2	...	...	6	...	5	13	...	1	...	11	3	1
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
WELLINGTON.																														
In good order	...	...	...	...	...	...	...	...	2	1	1	2	...	...	1	...	...	2	...	...	2	1	...	10	...	1	1	6	2	1
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
WANGANUI.																														
In good order	...	...	...	...	...	...	...	...	2	2	...	3	...	...	...	...	...	2	1	1	4	1	1	13	...	1	...	9	4	1
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	3	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
NEW PLYMOUTH.																														
In good order	...	1	...	...	1	...	...	...	1	1	...	...	...	...	...	...	...	1	...	...	3	...	1	8	...	...	...	3	1	1
Undergoing heavy repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	1	1	1	8	1	...	1	...	6	7	4	8	3	...	4	1	3	9	1	1	28	2	18	77	...	5	2	60	13	11

APPENDIX I.

ANNUAL REPORT ON WORKING RAILWAYS BY THE COMMISSIONER OF RAILWAYS FOR THE MIDDLE ISLAND.

The COMMISSIONER of RAILWAYS, Middle Island, to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Christchurch, 24th July, 1878.

I have the honor to submit the following report on the working of the Middle Island Railways for the twelve months ending 30th June, 1878:—

Length of Lines open.—At the close of the year ending 30th June, 1877, the length of the lines opened for traffic in the Middle Island was 641 miles 19 chains, and on the 30th June, 1878, 750 miles 66 chains, showing an increase of 109 miles 47 chains for the year. The dates of opening the several lengths are given in the Appendix A.

Length of Main Line and Branches.

Section.	Main Line. M.	ch.	Branches. M.	ch.	Total. M.	ch.
Christchurch	227	61	173	42	401	23
Dunedin	85	5	35	45	120	50
Invercargill	166	49	...		166	49
Greymouth	7	20	...		7	20
Westport	18	70	...		18	70
Nelson	19	12	...		19	12
Picton	17	2	...		17	2
Total	541	59	209	7	750	66

Revenue and Expenditure.—The gross revenue for the year amounted to £467,316 9s. 11d., against £399,329 6s. 7d. The total expenditure was £321,970 11s. 6d., against £281,288 18s. 8d. for the previous year.

The subjoined tables give the receipts and expenditure on the various sections :—

1877–78.

Section.	Receipts.	Expenditure.	Expenditure per cent. of Receipts.
	£ s. d.	£ s. d.	
Christchurch	293,991 12 4	197,925 12 11	67·32
Dunedin	104,146 0 6	71,430 1 7	68·58
Invercargill	47,852 6 8	34,149 11 5	71·36
Greymouth	8,763 1 1	5,738 4 1	65·48
Westport	1,382 16 11	1,749 6 11	126·50
Nelson	6,189 5 6	5,903 14 4	95·38
Picton	4,991 6 11	5,074 0 3	101·66
Total	£467,316 9 11	£321,970 11 6	68·89

1876–77.

Christchurch	248,661 13 5	177,635 8 11	73·48
Dunedin	89,141 5 5	57,661 4 4	64·68
Invercargill	40,806 6 0	30,155 17 11	73·89
Greymouth	7,920 11 7	4,346 19 6	54·88
Westport	858 12 6*	833 6 6	97·05
Nelson	6,209 13 3	5,490 9 5	88·42
Picton	5,731 4 5	5,165 12 1	90·35
Total	£399,329 6 7	£281,288 18 8	70·44

* From 5th August, 1876.

It will be observed, from the above, that the traffic is being rapidly developed, and, so far as the railways in Otago and Canterbury are concerned, we are now only beginning to realize what may ultimately be expected when the interior of the country is opened up. Hitherto the earnings have been gathered chiefly within a few miles of the large towns, principally on the short lengths connecting the chief towns with the several ports, such as Christchurch to Lyttelton, Dunedin to Port Chalmers, and Invercargill to the Bluff. Business is now fast extending to the interior; therefore both passenger and goods traffic is largely on the increase, the result of which will be a considerable outlay of fresh capital for some time to come, in providing additional rolling stock, improved station accommodation, erection of goods-sheds, new sidings, and the building of commodious workshops and engine-sheds. The increased traffic necessitating all this expenditure insures the financial success of the railways, which, I feel confident, will in two or three years, with careful management, fully cover the interest of the capital expended in their construction.

Christchurch Section.

Traffic.—The total receipts for the year on this section amounted to £293,991 12s. 4d., being an increase of £45,329 18s. 11d. over the previous year's receipts. Of this increase £26,437 was derived from passenger traffic alone. The revenue from merchandise has not kept pace with the increased tonnage carried, which is to be attributed to reductions in the tariff, and the system of charging all goods for the interior by actual weight instead of measurement as heretofore. The number of tons of goods carried was 450,641, being an increase of 93,721 tons over the previous year.

The proportion of expenditure to receipts is 67·32 per cent., as compared with 73·48 per cent. for the year 1876–77, showing a reduction of nearly 6¼ per cent. on the gross receipts, equal to a sum of £17,570.

The gross tonnage handled at Lyttelton Station, exclusive of carriages, sheep and cattle, amounted to 262,836, being an increase of 27,183 tons over the previous year.

The amount of grain carried over the whole line was 145,614 tons, being an increase of 44,558 tons for the year 1877–78. This increase had to be met without a corresponding addition to the supply of rolling stock. The consequence was that the resources of the department were strained to the very utmost, but I am pleased to say that the efforts made by the staff were fully appreciated by the public.

Maintenance.—The main line and branches on this section have been well maintained during the year. The total cost of the maintenance has been £59,361 3s. 7d., equivalent to £154 7s. 4d. per mile per annum. Details of this expenditure are given in the Appendix H. There are several descriptions of rails in use, some of which give excellent results, the heaviest weighing 75 lb., and the lightest 28 lb., to the yard. The greatest length of road is laid with 40-lb. iron rails, fitted with "Ibbotson's patent clip-joints." These are wearing out rapidly; the joint is a bad one, causes great trouble, and it is impossible to keep it tight. The Resident Engineer (Mr. Lowe) reports, "The joint holds the rail ends against lateral movement, but allows considerable vertical play, so that they are always depressed; they will, however, last out the life of the rails." The 52-lb. rail, which is now being imported, is an immense improvement, as also the fish-joint used with it.

Of the Oregon sleepers laid between Oamaru and Moeraki, although down only two years, large numbers have already been replaced, and but a very small proportion will last beyond another year. About two and a half miles of 40-lb. iron rails have been replaced, costing about 6 per cent. of the total maintenance. This expenditure will continue to increase year by year until the whole of the main road is laid with heavier material.

There are ninety-five bridges exceeding 20 feet in length: of these seven have iron girders, and one, the Waitaki, has iron cylinders in addition. The others are chiefly constructed of wood. The aggre-

gate length of the iron-girder bridges is 4,487 feet; the wooden bridges, 35,447 feet—giving a total length of 7½ miles. These bridges have cost about 12 per cent. of the gross amount of maintenance, or about 2s. 6d. per foot, being equal to 2½ per cent. of the cost of construction. Floods in the Rakaia and Ashburton Rivers have from time to time rendered necessary considerable repairs and additions to protective works, involving heavy expenditure. These have, however, to a great extent checked further encroachments.

The Rangitata River is a source of great trouble. A special report prepared by the Resident Engineer is attached herewith (*see* Appendix I), to which I would beg to call your earnest attention.

The traffic on the North line, Christchurch to Amberley, has been suspended three times during the past year through the overflow of the Waimakariri River: these stoppages caused great public inconvenience through the suspension of all traffic, besides incurring an expenditure of £2,100 in making good the damage done to the line on these occasions. Works are now in progress which I have no doubt will prevent a recurrence of the kind in future, the line being raised above flood-level, and a 400-feet opening provided for carrying off floodwater.

Several new and extensive works have been executed during the year: these include the rearranging of the Christchurch Station Yards, and extensions to the Ashburton Station Yard, including the removal and re-erection of several large buildings, cranes, &c. Two new platforms made of concrete, respectively 740 and 350 feet in length, with verandahs, have also been constructed.

The gauge of the North line was altered from 5 feet 3 inches to the New Zealand standard gauge of 3 feet 6 inches on the 20th of December, the alteration being effected without necessitating the suspension of either passenger or goods traffic beyond one day. The length altered, including sidings, is 44 miles. The gauge of the Lyttelton Station Yard was altered during the night of the 8th of May. The Christchurch and Lyttelton new passenger stations were opened for public traffic on the 21st of December, since which date all passenger traffic has been carried on the narrow-gauge road.

The broad-gauge rolling stock was purchased by Mr. Mais, Engineer-in-Chief for the South Australian Government, the price obtained being less than what was anticipated, but it was absolutely necessary that it should be disposed of. The bulk of it left Lyttelton on the 22nd of June, in the ship "Hyderabad."

Locomotive.—Considerable improvements have taken place in the Christchurch workshops, but they are still far from being in a position to cope successfully with the constantly increasing demands made upon them for work. The Locomotive Engineer reports, "The inconveniences of the present situation of the shops in the station yard are beyond conception, and the cost of work is vastly increased by the want of proper tools and elbow-room." Twenty-one locomotives have received extensive repairs. Two tank engines from Invercargill, two tender engines from America, and one tank engine from England were received, erected, and put to work. One hundred and sixty sets of switches were made, as also 570 lamps of various patterns, 120 new goods wagons built, 25 erected, and 8 rebuilt, 43 sheep trucks converted into covered goods wagons, 9 new carriages erected, 323 wagons thoroughly repaired and painted, and 7 locomotive engines fitted for burning native coal, which I have no doubt will be brought into general use for locomotive purposes. (*See* special report, Appendix K.) With regard to the American engines, the Locomotive Engineer reports, "They have now proved themselves to be both good and economical, and, as for attention to detail in design and general excellence in workmanship, they stand out first in our catalogue of locomotives. American engines I thoroughly believe to be more suited for our lines than anything we can get built in England." The train mileage for the year was 799,972, and the engine mileage 1,120,845. The total expenditure of the department was £44,421 17s. 4d., equal to 13·33d. per train mile, and 9·51d. per engine mile. On the Christchurch section 8,651 tons of coal were used, being 197 tons per engine; the consumption per engine mile 17·28 lb., and cost 2·76d. per mile. Correct data wherewith to institute a comparison with the previous year's expenditure are not obtainable, but the Railway Engineer's report for 1875 gives the cost per train mile at 18·15d., and cost per engine mile at 12·63d. This shows a reduction on the expenses per train mile of 4·80d., and per engine mile 3·06d., being equivalent to a sum of £16,032 for the year's train mileage, or £14,290 for the year's engine mileage.

Dunedin Section.

Traffic.—The total earnings amounted to £103,606 8s. 5d., which with £539 12s. 1d., received for rents, &c., amounts to £104,146 0s. 6d., showing an increase over the previous year of £15,004 17s. 1d. The total number of passengers carried was 351,723, realizing £51,191 3s. 7d., being an increase in number over the year of 1876–77 of 57,973, and in amount of £6,779 0s. 3d. In addition to this, 64,128 passengers were carried over the Ocean Beach line, which is worked by the Government (a portion of the main trunk line being used by the Company), which brings the total number of passengers carried to 415,851, a very extraordinary traffic certainly, when compared with the population of the district. Great inconvenience was experienced on this section owing to the deficiency of wagon stock, which I have no doubt has in a measure tended to check the development of mineral and other traffic. A heavy loss was sustained through the severe floods which occurred during the month of June, the traffic being almost entirely suspended for a week.

There were carried during the year 144,251 tons of goods, 41,548 bales of wool, 5,175,491 feet of timber, besides 252 truckloads of heavy timber, the increase over the previous year's work being 8,940 bales of wool, 4,165,031 feet and 214 truckloads of timber. The total receipts for this traffic were £52,415 4s. 10d., and for the preceding year £48,220 17s. 2d., showing an increase of £4,194 7s. 8d. The General Manager reports that "the working of the railway has been crippled through the want of sufficient pier accommodation; the wharves are too short to afford ample berthing for shipping, and too narrow for the proper conduct of the extensive traffic upon them, while worse and more immediate in its damaging effects than either is the insufficient depth of water at their sides." The result of this is that many masters of vessels prefer to remain in the stream and discharge their cargoes into lighters for conveyance to Dunedin.

The effect of raising the rates on the Port Chalmers line at the commencement of the year was a serious check to the shipping traffic; the use of lighters, which had been declining, was at once

resumed, and, notwithstanding that the rates are now lower than those charged by the Provincial Government, the traffic is only gradually reverting to the railway.

I would here briefly refer to the station accommodation at Port Chalmers. It is very unsatisfactory. The shed, which is utilized as a passenger station, is in a most dilapidated state, aud is also most inconveniently situated. The necessity for increased and improved accommodation at the Dunedin Station is most pressing, and unless the work is at once put in hand, and pushed forward vigorously, the public will be subjected to much inconvenience, and the department will be quite unable to meet the demands that are expected to be made upon it when through communication is established with Christchurch and Invercargill.

Maintenance.—The cost for maintenance has been £21,825 11s., or equal to £224 13s. per mile. Of this sum, £3,826, or £36 per mile, has been expended in new rails and fastenings. The line on this section suffered severely from floods in the early part of June: that portion intersecting the Taieri Plain sustained considerable damage, the several points of interruption corresponding with the breaches made by the flood in the month of February, 1877. These recurring damages might be considerably mitigated by the construction of openings in the embankments at the points broken through by the water. The embankments impound the water until it rises level with the rails, when it rushes in a torrent across to the other side, washing away the ballast and cutting gaps, and often carrying away several chain-lengths of rails and sleepers. It is intended to construct several 15-feet openings, with a view to equalize the water-level, and thereby reduce the depth of water by increasing the area submerged. It will take some time to get this portion of the line into good running order. The sleepers are decaying fast; a large proportion are Oregon, and will require to be replaced this year. The native sleepers, of matai and totara, are still quite sound. The Resident Engineer reports that "Ibbotson's patent clip-joint has signally failed, and the present rough condition of the road is in a great measure due to its failure. In spite of constant attention, the bolts work loose or break, and, though screwed up as tight as the strength of the material will admit of, the passage of every wheel creates a vertical action which in a short time destroys the joint: this increases the cost of maintenance, and causes great discomfort to passengers from the continued jolting imparted to the carriages." I can fully indorse the foregoing, after very careful observation. The Port Chalmers line is being relaid with steel rails. The Lawrence line is in good working order, but it is very expensive to work, and requires the greatest attention. It abounds in reverse curves of extremely small radii, laid without straight line between them, the result being severe shocks to the rolling-stock and heavy wear and tear. Engines working over this line have had their wheels turned up after running 2,000 miles only—about one month's work. All renewals on this line should be made with steel rails; the 40-lb. iron rails are too light either for safety or economy.

Locomotive.—The train miles run on this section have been 337,636, engine miles 423,771, and the total expenses of the department amounted to £18,122 0s. 8d., equal to 12·88d. per train mile, and 10·26d. per engine mile. The engines, eighteen in number, ran an average distance of 23,543 miles each during the year. Each engine consumed 223 tons of coal, or 26 lb. per mile. Six of these engines are Fairlie's patent, their consumption of fuel being high as compared with the ordinary engine.

Experiments were carried out with a view to test the adaptability of the native coal for locomotive use, but, although not so successful as could be desired, I am hopeful that this coal only will, ere long, be used on the New Zealand railways. The level lines in Canterbury are far better suited to a light fuel than the heavy grades prevailing in Otago (*see* Appendix J).

The rolling stock has been carefully attended to, and is in good working order.

Considerable alterations and additions are required to the workshops at Hillside.

Port Chalmers Forge.—The forge has been fairly employed during the year, the largest work executed being a double-throw crank-shaft, weighing 50 cwt. Several smaller shafts, stern-frames, &c., have been turned out for various parts of the colony; and, for departmental use, wagon-axles, buffers, and various other forgings have been made. For all these, old scrap-iron has been used. Machinery is now in course of erection for the working of scrap-iron into carriage and wagon wheels, so that the only parts that will have to be imported will be the steel tires.

Invercargill Section.

Traffic.—The total receipts have been £47,584 8s. 1d., which with £267 18s. 7d. received for rents, &c., amounts to £47,852 6s. 8d., as against £40,806 6s. for the preceding year, showing an increase of £7,046 0s. 8d. The working expenses amounted to £34,149 11s. 5d., as against £30,155 17s. 11d. for the year 1876-77. The number of passengers carried was 92,907, as against 82,806 for the previous year. The tonnage of goods was 64,716, as against 51,839 for the year 1876-77, showing an increase of 12,877 tons.

Maintenance.—The expenditure under this head was £13,022 4s. 6d., being equal to £90·12 per mile of railway per annum, and 12·90d. per train mile. This low rate as compared with other New Zealand lines is in a great measure to be accounted for by the excellent road extending from the Bluff to Winton. The rails (72 lb. per yard) on this portion of the line, although in use several years, are apparently as sound as when first laid.

The difference between the cost of maintaining one mile of the Invercargill lines and an equal part of the Dunedin lines for one year is £116. This sum would yield 5 per cent. interest on £2,320. Had one-third only of this sum been expended in addition on each mile of road, the result would have been an enormous saving in maintenance, good road, much higher speed, with greater safety. The old bridges have been repaired and strengthened, and are now in safe condition. The Taipo Creek Bridge of five spans has been removed entirely, and a substantial brick culvert substituted.

Considerable alterations are required at the Invercargill workshops. A new engine-shed and extensive alterations are also required at the Invercargill Station Yard.

Floods, causing considerable damage to the line, have occurred, which interrupted the traffic for

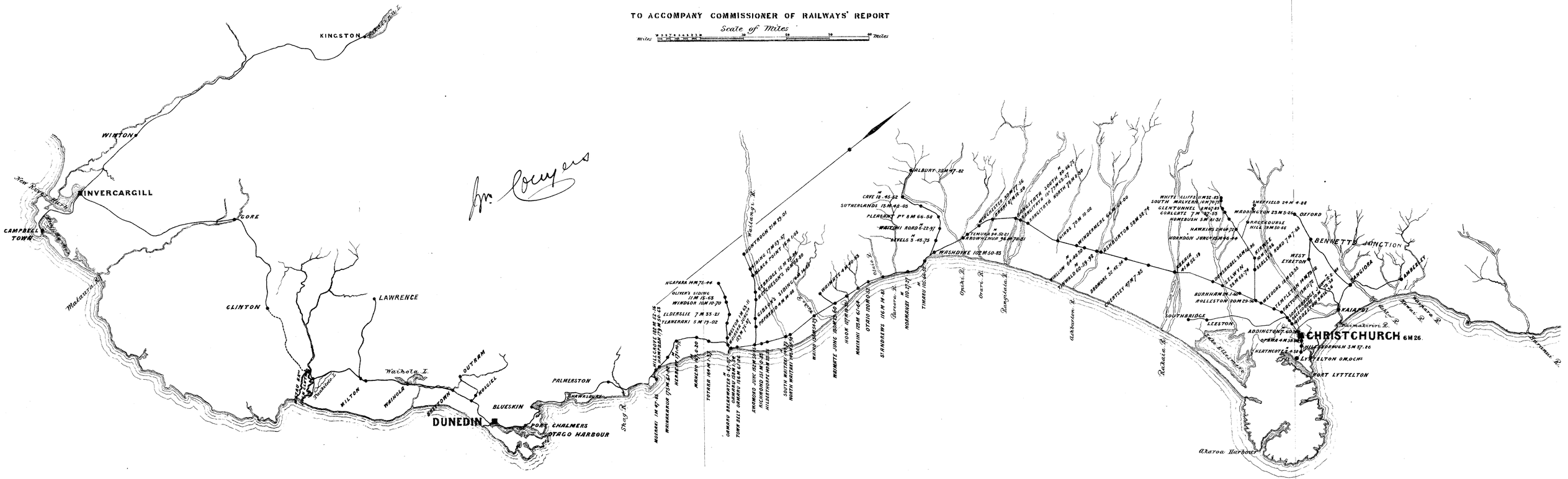
SKETCH MAP OF PART OF SOUTH ISLAND

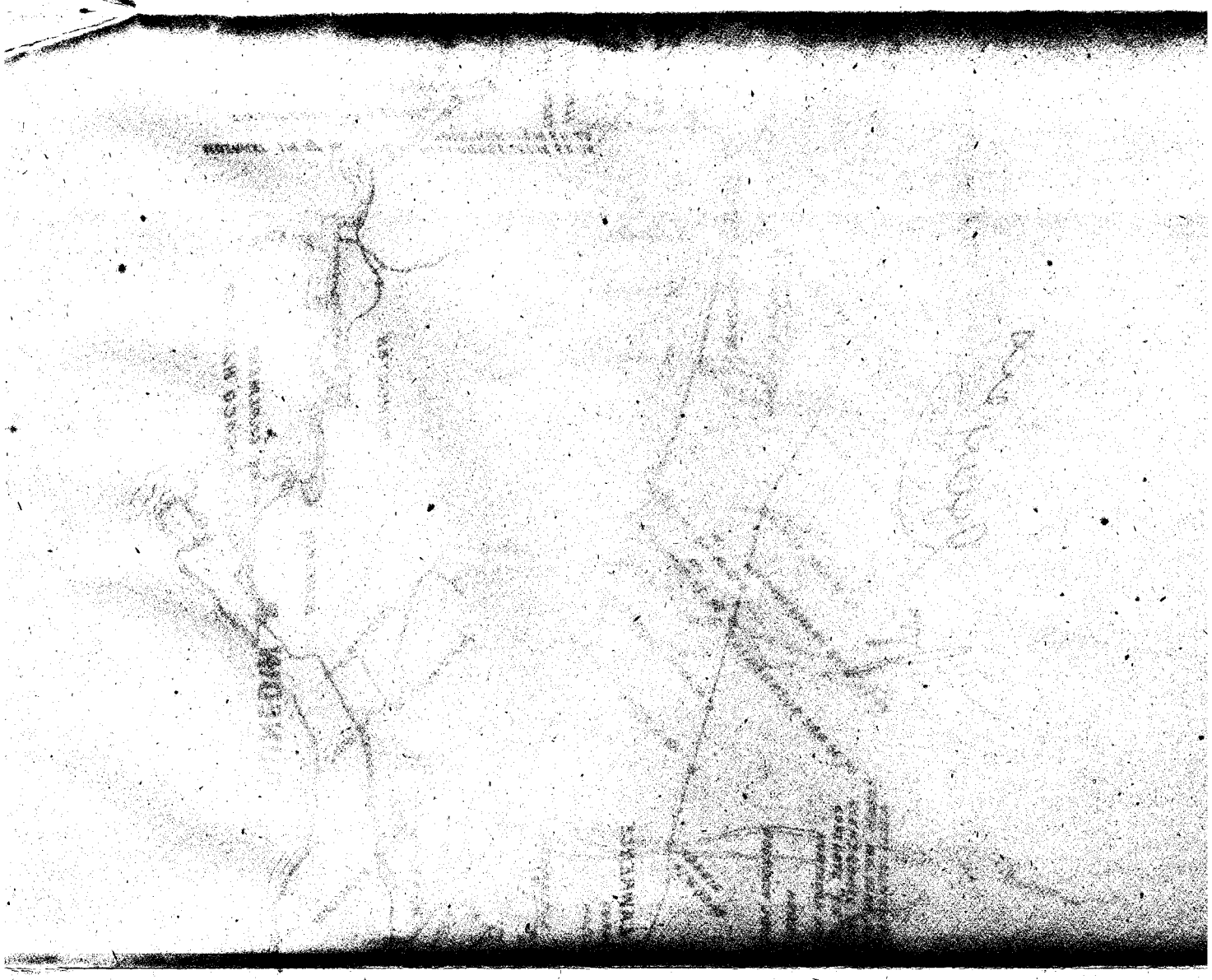
SHOWING RAILWAYS IN OPERATION

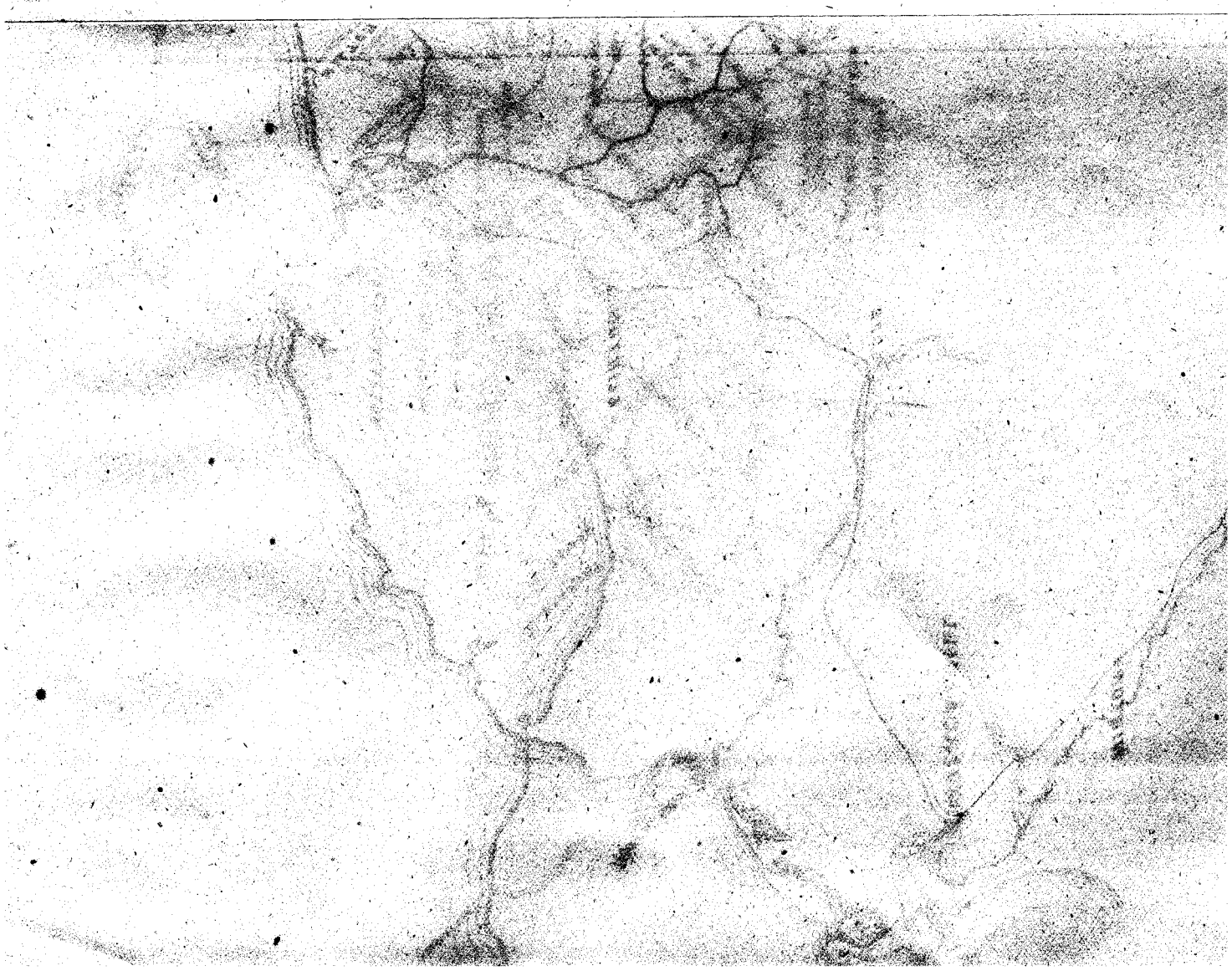
TO ACCOMPANY COMMISSIONER OF RAILWAYS' REPORT

Scale of Miles

Miles 0 5 10 15 20 30 40 50 60 Miles







four days between Gore and Clinton. The railway bridge over the Mataura River at Gore has been planked, and made available for dray traffic.

Locomotive.—The engines, carriages, and wagons have received careful attention, and are in good order. One engine was damaged by falling through a breach in the road during a heavy flood, but it has since been repaired.

I made my first official inspection of the Greymouth, Westport, Nelson, and Picton Sections in the month of May last.

Greymouth Section.

This line carries a large mineral traffic, and leaves a fair balance over working expenses. 34,462 tons of goods and minerals were conveyed over the line during the past year, against 21,446 tons for the previous year, showing an increase of 13,016 tons. The facilities provided for working the traffic are very defective; the want of sufficient accommodation is one of the chief causes of delay and expense. Coal staiths should be erected without delay, as the existing mode of shipping this article of traffic is both tedious and expensive, and is a source of general dissatisfaction. Reductions in the staff have been effected, which will result in a saving of £500 per annum. Twenty additional wagons have recently been placed on the line, which is now fairly supplied. The engines, carriages, and wagons are in fair working order. The line has been kept in good running condition; since it was opened for traffic, curves have been eased, embankments widened, and a large amount of ballast laid. Although the line has only been opened a little over two years several rails have already had to be replaced in consequence of wear.

Westport Section.

The traffic on this section is very light: between Waimangaroa and Ngakawau it was so trifling that it was deemed expedient to close the section entirely, which effected a saving of £864 per annum. The opening of one or more of the excellent coal mines in the district, which may shortly be expected, will create a large and profitable traffic over a portion of the line.

Nelson Section.

This section is kept in good order; the embankments have been widened; and, although not long opened for traffic, a considerable amount of bridge-work has had to be renewed, some of the stringers and sills being quite rotten. The engines, carriages, and wagons are also kept in good condition. A third engine is much needed, which I purpose sending from Christchurch, immediately on the arrival of the engines shortly expected from England. A mixture of Grey River and West Wanganui coals is the fuel used on the engines on this section, and with satisfactory results.

The traffic, though light, is steadily on the increase; the number of passengers carried during the year was 40,811, being an increase of 8,225 over the previous year, and, although the tonnage of goods carried is much higher, the total revenue is somewhat lower for the same period. This is accounted for by the great reduction in rates which took place at the beginning of the financial year.

The staff on this section has also been slightly reduced.

Picton Section.

On this section the traffic is very light: in fact it does not cover working expenses. The receipts for the past year were £4,991 6s. 11d., as against £5,731 4s. 5d., showing a decrease of £739 17s. 6d. The rates now charged are considerably below those of the year previous. Another cause for the reduction in receipts is attributable to the destruction of the bridge over the Opawa River, connecting the railway terminus with Blenheim. The extension of the line into the latter will no doubt tend to give more encouraging results. The line is in fair working order. Some important alterations have recently been carried out, grades lowered and curves eased, which were done by the permanent hands. A slight reduction in the staff of this section also has been effected.

General.

A new office, that of Steward of Railway Reserves, was organized on the 15th of December, last, the duties of which are immediately connected with the leasing of reserves and surplus lands, cottages, refreshment rooms, book-stalls, advertising at stations, grain store, coal and timber sites collection of rents, and such other matters as do not strictly come within the province of the Traffic Department. The increase in revenue from these sources since the creation of the office up to the 30th ultimo amounts to £728.

Contracts for the delivery of goods were entered into during the year at Dunedin, Invercargill, and Christchurch. At the two former stations similar contracts existed previously, and were found to work remarkably well. At Christchurch the system was commenced on the 1st of September, and has since given very general satisfaction.

Tariff.

Several alterations have been effected in the tariff during the past year. The changes generally have been the placing of goods in a lower class, as under:—

Hay, Straw, and Chaff.—From double rates, Class E, to Class N, 6s. per truck for five miles; each additional mile, 7d. per truck to fifty miles.
Class E.—In quantities less than two tons to be charged Class A, altered to Class D.
Class F.—In quantities under two tons, Class B, altered to Class D.
Classes F and G.—Each loading and unloading reduced from 6s. 3d. to 5s.
Ships' Goods, Lyttelton to Christchurch, reduced to 5s. 6d. per ton, A, B, C, D.
Pigs, Sheep, Goats, &c.—After first ten miles, reduced from 9d. per truck per mile to 5d.

Through Passenger Traffic.

Complaints are of frequent occurrence, and with some reason, at the slow speed of the trains and the oscillation of the carriages, but it should be borne in mind that these railways were built, and all plant, stock, &c., ordered, for a slow speed, fifteen miles per hour being considered the maximum.

The long carriages obtained from England are most uncomfortable to travel in: the provision made by the designer for passing easily round curves leaves a very unstable connection between the body and the frames carrying the end wheels, the result being violent lateral motion when running on the straight line, especially so if the speed is at all excessive. It will be necessary to fit all the carriages for through traffic either with double bogies or Cleminson's patent radiating axles. One carriage already altered on the former principle has given every satisfaction. On the arrival of the locomotives shortly expected from America, it is intended to run one mail train each way daily between Dunedin and Christchurch, running the distance, 236 miles, in about ten hours. It is also contemplated to run similar trains between Dunedin and Invercargill, running the distance of 139 miles in about six hours. These trains will stop at the principal stations only, and will be timed to leave sufficiently late in the day to allow passengers from intermediate stations to travel by the ordinary early morning train to any of the stopping-places.

The amount expended out of capital in the construction of all the railways in the Middle Island, inclusive of the sections in course of construction, is, approximately, to 30th June, 1878, £5,462,000; while the excess of earnings over expenditure on the various sections for the financial year just ended is £145,345 18s. 5d., which is equivalent to 2⅔ per cent. interest on the capital.

It affords me much pleasure to bring under your notice the valuable and cordial assistance I have received from general managers, resident and locomotive engineers, and other officers, and employés generally.

Attached herewith you will please find the following tables:—

Statement showing dates of opening the several lengths of line ...	Table A.
Statement of classified expenditure	„ B.
Statement of passenger traffic	„ C.
Statement of wages paid	„ D.
Statement of revenue and expenditure for wharves	„ E.
Statement of accounts	„ F.
Return of accidents	„ G.
Detailed statement of cost of maintenance, Christchurch Section	„ H.
Report of encroachments of the Rangitata River	„ I.
Report of trial of native coal in locomotives, Dunedin Section ...	„ J.
Report of trial of native coal in locomotives, Christchurch Section	„ K.
Return of locomotives	„ L.
Return of rolling-stock (carriages and brakes)	„ M.
Return of rolling-stock (wagons and tarpaulins)	„ N.
Return of miscellaneous stock	„ O.
Return of turntables, weighbridges and machines	„ P.
Return of cranes	„ Q.

I have, &c.,
W. Conyers,
Commissioner of Railways, Middle Island.

The Hon. the Minister for Public Works.

Enclosures in Appendix I.

TABLE A.

NEW ZEALAND RAILWAYS.—MIDDLE ISLAND.

Statement showing the Number of Miles of Road Opened for Traffic during the Year ending 30th June, 1878.

Designation of Line or Branch.	Date Opened for Traffic.	Length.		Remarks.
		M. CH.	M. CH.	
Christchurch Section—				
West Eyreton to Bennett's	1st Feb., 1878 ...	5 59		
Hillgrove to Palmerston	22nd May, 1878...	12 65		
			18 44	
Dunedin Section—				
Mosgiel to Outram	1st Oct., 1877 ...	9 1		
Glendermid to Blueskin	20th Dec., 1877 ...	9 78		
Balclutha Terminus to Balclutha Township	22nd Jan., 1878...	0 70		
Blueskin to Waikouaiti	7th May, 1878 ...	14 37		
			34 26	
Invercargill Section—				
Gore to Waipahi	1st Sept., 1877 ...	15 74		
Waipahi to Clinton	1 Nov., 1877 ...	9 68		
Lowther to Athol	28th Jan., 1878 ...	13 46		
Athol to Fairlight	29th April, 1878...	9 20		
			48 48	
Westport Section—				
Westport to Ngakawau	20th Sept., 1877...	8 29		
			8 29	
Total opened	...		109 67	

TABLE B.—Appendix I.

NEW ZEALAND RAILWAYS, MIDDLE ISLAND.—Comparative Statement of Earnings and Expenditure, Twelve Months ending 30th June.

EARNINGS.

Sections.	Miles Open.	Coaching.						Merchandise.				Recoveries.	Gross Total.
		1st and 2nd Class Passengers.	Season Tickets.	Total Passengers.	X's Luggage and Parcels.	Mails.	Total Coaching.	Wharfage.	Miscellaneous.	Goods.	Total Merchandise.		
1877–78.		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Christchurch	400	112,681 7 1	2,142 0 9	114,823 7 10	5,335 17 8	465 0 0	120,624 5 6	...	12,571 2 10	153,593 4 8	166,164 7 6	7,202 19 4	293,991 12 4
Dunedin	122	45,995 16 4	2,417 1 2	48,412 17 6	2,763 6 1	15 0 0	51,191 3 7	...	6,053 14 9	46,361 10 1	52,415 4 10	539 12 1	104,146 0 6
Invercargill	161	19,217 17 6	181 4 9	19,399 2 3	904 8 3	...	20,303 10 6	...	511 14 4	26,769 3 3	27,280 17 7	267 18 7	47,852 6 8
Greymouth	8	1,304 17 4	75 7 6	1,380 4 10	261 4 3	...	1,641 9 1	2,415 0 11	127 8 1	4,579 3 0	7,121 12 0	...	8,763 1 1
Westport	19	469 12 9	...	469 12 9	12 8 5	...	482 1 2	277 16 6	20 0 0	602 19 3	900 15 9	...	1,382 16 11
Nelson	20	3,984 15 4	150 6 11	4,135 2 3	68 9 0	...	4,203 11 3	...	49 3 9	1,936 10 6	1,985 14 3	...	6,189 5 6
Picton	18	1,939 4 10	62 15 0	2,001 19 10	69 8 6	...	2,071 8 4	708 12 6	...	2,211 6 1	2,919 18 7	...	4,991 6 11
Totals	...	185,593 11 2	5,028 16 1	190,622 7 3	9,415 2 2	480 0 0	200,517 9 5	3,401 9 11	19,333 3 9	236,053 16 10	258,788 10 6	8,010 10 0	467,316 9 11
1876–77.													
Christchurch	381	85,066 0 0	1,635 7 6	86,701 7 6	7,659 12 11	290 12 6	94,651 12 11	6,923 18 9	9,660 0 8	137,426 1 1	154,010 0 6	...	248,661 13 5
Dunedin	84	36,682 7 7	2,173 3 7	38,855 11 2	2,064 17 1	...	40,920 8 3	...	3,151 7 4	45,069 9 10	48,220 17 2	...	89,141 5 5
Invercargill	112	13,729 2 4	235 3 6	13,964 5 10	210 7 3	...	14,174 13 1	...	904 12 3	25,727 0 8	26,631 12 11	...	40,806 6 0
Greymouth	8	2,254 14 6	117 16 8	2,372 11 2	77 2 4	...	2,449 13 6	2,580 6 8	...	2,890 11 5	2,890 11 5	...	7,920 11 7
Westport	19	440 7 0	...	440 7 0	33 9 0	...	473 16 0	...	7 0 0	377 16 6	384 16 6	...	858 12 6
Nelson	20	4,131 10 10	107 8 2	4,238 19 0	179 10 10	...	4,418 9 10	...	52 12 0	1,738 11 5	1,791 3 5	...	6,209 13 3
Picton	18	1,781 7 0	33 0 0	1,814 7 0	145 6 4	...	1,959 13 4	733 10 10	...	3,038 0 3	3,038 0 3	...	5,731 4 5
Totals* ...	...	144,085 9 3	4,301 19 5	148,387 8 8	10,370 5 9	290 12 6	159,048 6 11	10,237 16 3	13,775 12 3	216,267 11 2	236,967 2 2	...	399,329 6 7

* Where returns have not come to hand, particulars have been taken from Public Works Statement of last year.

EXPENDITURE.

Sections.	1877–78.							1876–77.
	Maintenance.	Locomotive Power.	Repairs, &c., Carriages and Wagons.	Traffic Expenses.	General Charges.	Sundries.	Total.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Christchurch	59,361 3 7	44,421 17 4	9,601 2 11	76,552 17 10	6,609 6 4	1,379 4 11	197,925 12 11	177,635 8 11
Dunedin	21,825 11 0	18,122 0 8	3,833 10 1	24,784 9 4	2,698 10 11	165 19 7	71,430 1 7	57,661 4 4
Invercargill	13,022 4 6	9,598 15 3	1,648 1 6	8,071 10 1	1,765 19 3	43 0 10	34,149 11 5	30,155 17 11
Greymouth	1,642 3 5	953 18 1	353 9 11	2,195 14 6	592 18 2	...	5,738 4 1	4,346 19 6
Westport	333 14 2	488 19 9	15 5 6	516 7 2	385 9 0	9 11 4	1,749 6 11	833 6 6
Nelson	2,177 9 10	1,823 8 0	245 19 7	1,103 12 5	547 4 6	6 0 0	5,903 14 4	5,490 9 5
Picton	2,231 2 8	990 13 6	135 13 7	1,161 7 7	555 2 11	...	5,074 0 3	5,165 12 1
Totals	100,593 9 2	76,399 12 7	15,833 3 1	114,385 18 11	13,154 11 1	1,603 16 8	321,970 11 6	281,288 18 8

TABLE C.—Appendix I.

NEW ZEALAND RAILWAYS, MIDDLE ISLAND.

Comparative Return of Passenger and Goods Traffic, Number of Trains Run, and Miles Travelled, for Year ending 30th June, 1878.

Sections.	Miles Open.	Passengers.			Season Tickets.	Carriages.	Horses.	Cattle.	Sheep.	Pigs.	Coal.	Other Minerals.	Timber.	Grain.	Wool.	General Merchandise.	Trains.			Miles Travelled by Trains.				Total.
		1st Class.	2nd Class.	Total.													Passenger and Mixed.	Goods.	Total.	Passenger.	Goods.	Total Train Miles.	Shunting Ballasting, &c.	
1877–78.		No.	No.	No.	No.	No.	No.	No.	No.	No.	Tons.	Tons.	Tons of 500 super. feet each.	Tons.	Tons.	Tons.	No.	No.	No.	No.	No.	No.	No.	No.
Christchurch ...	400	154,397	465,893	620,290	1,416	668	3,614	1,798	74,028	12,030	55,124	31,008	76,116	145,614	14,393	128,386	15,912	4,368	20,280	656,434	143,520	799,954	320,891	1,120,845
Dunedin	122	82,817	268,906	351,723	2,345	211	985	503	12,579	733	45,394	25,156	11,611	14,150	8,310	59,551	12,557	646	13,203	330,094	7,542	337,636	86,135	423,771
Invercargill ...	161	15,509	77,398	92,907	209	84	433	115	7,828	226	1,242	13,068	22,811	6,668	3,637	17,290	2,297	...	2,297	201,134	...	201,134	43,088	244,222
Greymouth ...	8	6,958	23,240	30,198	49	7	...	...	11	2	30,652	1,168	1,589	...	14	2,642	1,968	...	1,968	15,571	...	15,571	2,603	18,174
Westport	19	850	3,880	4,739	...	...	1	3	83	11	5,352	...	80	...	...	456	214	...	214	7,184	...	7,184	1,218	8,402
Nelson	20	9,142	31,669	40,811	142	7	11	7	135	69	124	2,426	2,428	967	178	2,456	1,711	...	1,711	34,006	...	34,006	...	34,006
Picton	18	3,924	14,564	18,488	47	...	...	19	618	...	...	2,556	9,569	584	18	597	1,476	...	1,476	26,282	...	26,282	4,042	30,324
Totals ...	748	273,597	885,550	1,159,147	4,208	977	5,044	2,445	95,282	13,071	137,888	75,382	124,204	167,983	26,550	211,378	36,135	5,014	41,149	1,270,705	151,062	1,421,767	457,977	1,879,744
1876–77.								Trucks of Live Stock.																
Christchurch ...	381	216,662	641,922	858,584	804	309	2,184	3,283			41,553	8,413	63,946	101,056	11,775	130,177			Not	recorded.				912,570
Dunedin	84	65,335	226,290	291,625	2,125	...	50	104			33,442	31,291	2,261	13,115	6,522	55,300	6,353	314	6,667	227,717	...	227,717	61,090	288,807
Invercargill ...	112	12,603	70,203	82,806	...	5	...	15			691	4,604	25,801	5,148	3,423	12,172	2,313	...	2,313	159,293	...	159,293	44,769	204,062
Greymouth ...	8	6,744	14,143	20,887	52	1	...	2			19,641	...	1,500	...	1	1,806	2,000	...	2,000	16,004	...	16,004	...	16,004
Westport	19	...	3,111	3,111	...	...	...	1			...	...	86	...	...	500	196	...	196	4,160	...	4,160	...	4,160
Nelson	20	7,208	25,368	32,576	28	7	5	7			15	1,826	1,035	350	116	2,482	1,631	...	1,631	33,418	...	33,418	...	33,418
Picton	18	3,154	11,853	15,007	...	...	5	21			...	...	8,172	...	5	4,029	1,472	...	1,472	25,878	...	25,878	...	25,878
Totals ...	642	311,706	992,890	1,304,596	3,009	322	2,244	3,433			95,342	46,134	102,801	119,669	21,842	206,466	13,965	314	14,279	466,470	...	466,470	105,859	1,484,899

Note.—On the Christchurch and Dunedin Sections for 1876–77, all return and Saturday tickets were counted as two.
Where returns have not come to hand, particulars have been taken from Public Works Statement of last year.

TABLE D.—Appendix I.

NEW ZEALAND RAILWAYS, MIDDLE ISLAND.

Return of the Total Amount Paid for Wages in the different Branches of the Railway Department for the Year ending 30th June, 1877–78.

Branch.	Christchurch Section.	Dunedin Section.	Invercargill Section.	Nelson Section.	Westport Section.	Picton Section.	Greymouth Section.	Total.
1877.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Traffic ...	67,293 14 0	19,032 17 2	6,537 8 5	1,109 10 11	121 9 6	655 5 8	928 18 8	95,679 4 4
Permanent Way	42,755 18 10	13,511 1 9	10,453 0 0	2,194 0 11	...	2,363 6 6	1,421 10 11	72,698 18 11
Locomotive ...	32,184 9 6	10,144 19 10	5,594 3 6	926 16 5	152 7 0	486 9 2	728 6 7	50,217 12 0
	142,234 2 4	42,688 18 9	22,584 11 11	4,230 8 3	273 16 6	3,505 1 4	3,078 16 2	218,595 15 3
1878.								
Traffic ...	68,601 0 1	22,061 17 0	6,784 8 11	1,235 18 5	156 5 5	753 16 0	1,360 13 3	100,953 19 1
Permanent Way	48,077 14 3	15,517 11 3	11,070 1 3	2,024 0 10	333 14 2	2,148 14 9	1,557 9 1	80,729 5 7
Locomotive ...	33,268 5 2	12,625 4 11	6,467 12 0	1,058 18 6	161 2 0	533 16 3	910 14 1	55,025 12 11
	149,946 19 6	50,204 13 2	24,322 2 2	4,318 17 9	651 1 7	3,436 7 0	3,828 16 5	236,708 17 7
Decrease ...	...	...	...	...	...	68 14 4	...	18,113 2 4
Increase ...	7,712 17 2	7,515 14 5	1,737 10 3	88 9 6	377 5 1	...	750 0 3	

Abstract of the Total Amount Paid for Wages in the Traffic, Permanent Way, and Locomotive Branches, 1877–78.

Section.	Miles Open.		Traffic.		Permanent Way.		Locomotive.		Total.	
	1877	1878	1877.	1878.	1877.	1878.	1877.	1878.	1877.	1878.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Christchch	381	400	67,293 14 0	68,601 0 1	42,755 18 10	48,077 14 3	32,184 9 6	33,268 5 2	142,234 2 4	149,946 19 6
Dunedin ...	84	122	19,032 17 2	22,061 17 0	13,511 1 9	15,517 11 3	10,144 19 10	12,625 4 11	42,688 18 9	50,204 13 2
Invercargill	112	161	6,537 8 5	6,784 8 11	10,453 0 0	11,070 1 3	5,594 3 6	6,467 12 0	22,584 11 11	24,322 2 2
Nelson ...	20	20	1,109 10 11	1,235 18 5	2,194 0 11	2,024 0 10	926 16 5	1,058 18 6	4,230 8 3	4,318 17 9
Westport...	19	19	121 9 6	156 5 5	...	333 14 2	152 7 0	161 2 0	273 16 6	651 1 7
Picton ...	18	18	655 5 8	753 16 0	2,363 6 6	2,148 14 9	486 9 2	533 16 3	3,505 1 4	3,436 7 0
Greymouth	8	8	928 18 8	1,360 13 3	1,421 10 11	1,557 9 1	728 6 7	910 14 1	3,078 16 2	3,828 16 5
Total ...	642	748	95,679 4 4	100,953 19 1	72,698 18 11	80,729 5 7	50,217 12 0	55,025 12 11	218,595 15 3	236,708 17 7
Increase ...	...	106	...	5,274 14 9	...	8,030 6 8	...	4,808 0 11	...	18,113 2 4

TABLE E.—Appendix I.

Statement of Revenue and Expenditure for Wharves for the Year ending 30th June, 1878.

Wharf.	Revenue.	Expenditure.	Percentage of Receipts.
	£ s. d.	£ s. d.	
Greymouth	2,415 0 11	790 9 2	32·73
Westport	277 16 6	80 7 7	28·93
Picton	708 12 6	237 11 10	33·55
Totals	3,401 9 11	1,108 8 7	95·21

Year ending 30th June 1877.

Wharf.	Revenue.	Expenditure.	Percentage of Receipts.
	£ s. d.	£ s. d.	
Greymouth	2,580 6 8	573 0 0	22·2
Westport	...	...	...
Picton	733 10 10	185 15 11	25·32
Totals	3,313 17 6	758 15 11	22·89

TABLE F.—Appendix I.

Statement of Accounts (Middle Island).

GREYMOUTH SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Earnings,—		By Amount paid into Public Account, &c., to June 30, 1878	8,744 13 11
Cash in hands of General Manager, July 1, 1877	27 15 3	Cash in hands of General Manager, June 30, 1878	9 5 6
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	6,348 0 2	Outstandings on goods, June 30, 1878 ...	36 16 11
Wharf, June 30, 1878	2,415 0 11		
	£8,790 16 4		£8,790 16 4
To Amount paid into Public Account, &c., June 30, 1878 ... ... £8,744 13 11		By Expenditure to June 30, 1878, Railway...	4,947 14 11
Less Cash in hand, July 1, 1877 ... ... 27 15 3		„ „ Wharf ...	790 9 2
	8,716 18 8	Balance towards payment of Interest ...	3,024 17 0
Cash in hands of General Manager, June 30, 1878	9 5 6		
Outstandings on Goods, June 30, 1878 ...	36 16 11		
	£8,763 1 1		£8,763 1 1

WESTPORT SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Earnings,—		By Amount paid into Public Account to June 30, 1878	1,408 2 11
Cash in hands of General Manager, July 1, 1877	25 6 0		
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	1,105 0 5		
Wharf, to June 30, 1878	277 16 6		
	£1,408 2 11		£1,408 2 11
To Amount paid into Public Account, &c., June 30, 1878 ... ... 1,408 2 11		By Expenditure to June 30, 1878, Railway...	1,668 19 4
Less cash in hand, July 1, 1877 ... ... 25 6 0		„ „ Wharf ...	80 7 7
	1,382 16 11		
Loss	366 10 0		
	£1,749 6 11		£1,749 6 11

NELSON SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Earnings,—		By Amount paid into Public Account, &c., to June 30, 1878 ... ... 6,191 1 11	
Cash in hands of General Manager, July 1, 1877	26 6 1	Less refund of Revenue ... 3 9 7	
Outstanding on Goods, July 1, 1877 ...	5 0 8		6,187 12 4
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	6,189 5 6	Cash in hands of General Manager, June 30, 1878	31 4 8
		Outstanding on Goods, ditto	1 15 3
	£6,220 12 3		£6,220 12 3
To Amount paid into Public Account, June 30, 1878 6,187 12 4		By Expenditure to June 30, 1878... ...	5,903 14 4
Less Cash in hand and outstanding on Goods, June 30, 1877 ... 31 6 9		Balance towards payment of Interest ...	285 11 2
	6,156 5 7		
Cash in hands of General Manager, June 30, 1878	31 4 8		
Outstanding on Goods, June 30, 1878 ...	1 15 3		
	£6,189 5 6		£6,189 5 6

PICTON SECTION.

Dr.	£ s. d.	Cr.	£ s. d.
To Earnings,—		By Amount paid into Public Account, &c., to June 30, 1878	4,968 13 2
Cash in hands of General Manager, July 1, 1877	33 17 0	Cash in hands of Manager, ditto ...	9 17 10
Passengers Parcels, Goods, Cattle, &c., to June 30, 1878	4,282 14 5	Outstanding on Goods, ditto	46 12 11
Wharf, June 30, 1878	708 12 6		
	£5,025 3 11		£5,025 3 11
To Amount paid into Public Account, June 30, 1878 4,968 13 2		By Expenditure to June 30, Railway ...	4,836 8 5
Less Cash in hand, July 1, 1877 ... ... 33 17 0		Ditto ditto Wharf ...	237 11 10
	4,934 16 2		
Cash in hands of Manager, June 30, 1878	9 17 10		
Outstanding on Goods, June 30, 1878 ...	46 12 11		
Loss	82 13 4		
	£5,074 0 3		£5,074 0 3

CHRISTCHURCH SECTION.

Dr.	£	s.	d.	Cr	£	s.	d.	£	s.	d.
To Cash in hand and outstanding on Goods, July 1, 1877	22,224	18	10	By Amount paid into Public Account, June 30, 1878	304,228	19	3			
Cash in hand omitted to be brought forward, from June 30, 1877 ...	17	1	10	Fines, &c.	33	7	3			
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	286,788	13	0		304,262	6	6			
				Less Refunds of Revenue and Wharfages ...	5,465	10	8	298,796	15	10
				Cash in hand and outstanding on Goods, June 30, 1878				10,233	17	10
	£309,030	13	8					£309,030	13	8
To amount paid into Public Account to June 30, 1878	£ 298,796	s. 15	d. 10	By Expenditure to June 30, 1878 ...				197,925	12	11
Less Cash in hand and outstanding on Goods, July 1, 1877 ...	22,242	0	8	Balance towards payment of Interest ...				96,065	19	5
								276,554	15	2
Cash in hand and outstanding on Goods, June 30, 1878								10,233	17	10
Recoveries								7,202	19	4
								£293,991	12	4

DUNEDIN SECTION.

Dr.	£	s.	d.	Dr.	£	s.	d.	£	s.	d.
To Earnings,—				By Amount paid into Public Account to June 30, 1878	105,218	9	4			
Cash in hand and outstandings, July 1, 1877	4,182	1	11	Transfers to Vote 42 ...	1,413	7	0			
Passengers, Parcels, Goods, Cattle, &c., to June 30, 1878	103,606	8	5		106,631	16	4			
				Less Refunds of Revenue	1,806	18	1	104,824	18	3
				Cash in hand and outstanding on Goods, June 30, 1878				2,963	12	1
	£107,788	10	4					£107,788	10	4
To Amount paid into Public Account to June 30, 1878	£ 104,824	s. 18	d. 3	By Expenditure to June 30, 1878 ...				71,430	1	7
Less Cash in hand and outstandings, July 1, 1877	4,182	1	11	Balance towards payment of Interest ...				32,715	18	11
								100,642	16	4
Cash in hand and outstanding on Goods, June 30, 1878								2,963	12	1
Recoveries								539	12	1
								£104,146	0	6

INVERCARGILL SECTION.

Dr.	£	s.	d.	Cr.	£	s.	d.	£	s.	d.
To Earnings,—				By Amount paid into Public Account, June 30, 1878... ...	£47,513	3	3			
Cash in hand and outstandings, July 1, 1877	693	6	3	Transfer to Vote 42 ...	199	17	10			
Cash in hand and outstandings, omitted to be brought forward by Manager, July 1, 1877	169	19	8	Fines collected... ...	6	0	0			
Passengers, Parcels, Goods, Cattle, &c., June 30, 1878	47,584	8	1		47,719	1	1			
				Less Refunds of Revenue	291	8	5	47,427	12	8
				Cash in hand and outstanding on Goods, June 30, 1878				1,020	1	4
	£48,447	14	0					£48,447	14	0
To Amount paid into Public Account, June 30, 1878	£47,427	12	8	By Expenditure to June 30, 1878 ...				34,149	11	5
Less Cash in hand and outstandings, July 1, 1877	863	5	11	Balance towards payment of Interest ...				13,702	15	3
								46,564	6	9
Cash in hand and outstandings on Goods, June 30, 1878								1,020	1	4
Recoveries								267	18	7
								£47,852	6	8

NEW ZEALAND RAILWAYS (MIDDLE ISLAND).

Summary of Accounts.

Dr.	£	s.	d.	Cr.	£	s.	d.
To Cash in hand and outstandings, July 1, 1877	27,405	13	6	By Payments into Public Account, June 30, 1878	472,358	9	1
Passengers, Parcels, Goods, Cattle, &c., July 1, 1877	455,904	10	0	Cash in hand and outstandings ...	14,353	4	4
Wharves	3,401	9	11				
	£486,711	13	5		£486,711	13	5
To Payments into Public Account, June 30, 1878 ... £472,358 9 1				By Expenditure to June 30, 1878 (Railways)	320,862	2	11
Less Cash in hand and outstandings, July 1, 1877 ... ... 27,405 13 6	444,952	15	7	„ „ (Wharves)	1,108	8	7
Cash in hand and outstandings, June 30, 1878	14,353	4	4	Balance towards payment of Interest ...	145,345	18	5
Recoveries	8,010	10	0				
	£467,316	9	11		£467,316	9	11

TABLE G.—Appendix I.

Return of the Number and Nature of the Accidents to Life and Limb which have occurred during the Year ending 30th June, 1878.

Sections.	Passengers Killed or Injured.				Servants of the Department, or of Contractor, Killed or Injured.				Persons Killed or Injured whilst crossing at Crossings.		Trespassers.		Miscellaneous.	
	From Causes beyond their own Control.		From their own Misconduct or Want of Caution.		From Causes beyond their own Control.		From their own Misconduct or Want of Caution.							
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Christchurch	...	...	1	1	...	4	3	6	...	...	...	...	1	...
Dunedin	...	...	...	...	...	...	1	...	...	1	...	2	...	...
Invercargill	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greymouth	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Westport	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nelson	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Picton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Totals	...	...	1	1	...	4	4	7	...	1	...	2	1	...

TABLE H.—Appendix I.

Detailed Statement of Cost of Maintenance of Way and Works, Christchurch Section, New Zealand Railways.

—	—	Approximate Proportion to Total Cost.
	£ s. d.	Per cent.
Cost of Supervision	2,364 13 7	4
Repairs of Permanent-way	33,010 2 6	55
Ballasting...	680 14 11	1
Sidings, Turntables, &c.	284 8 4	0·5
Grading	522 8 7	1
New Material, Permanent-way	3,486 9 2	6
Roads, Paths, and Approaches	948 12 9	2
Bridges, Culverts, and Drains	6,183 0 3	10·5
Fences, Cattle-stops, Gates, &c.	1,410 1 9	2
Signals and Locking Apparatus	483 16 11	1
Cranes, Weighbridges, &c.	259 14 1	0·5
Watering Stations and Apparatus	819 15 1	1·5
Telegraph...	9 12 0	...
Repairs to Stations and Buildings	4,372 0 5	7
Tools and Implements	1,047 10 6	2
Additions, Alterations, and Improvements	862 3 3	1·5
Casualties	2,232 19 3	4
Workshop Commission	249 14 4	0·5
Total...	59,227 17 8	100

J. Henry Lowe, Resident Engineer.

Enclosure I. in Appendix I.

REPORT on ENCROACHMENTS of the RANGITATA RIVER, by the RESIDENT ENGINEER, CHRISTCHURCH SECTION, NEW ZEALAND RAILWAYS.

SIR,—

I have the honor to append to my annual report on the Christchurch section of New Zealand Railways the following report on the encroachments of the Rangitata River.

The effect of floods in the Rangitata River, and its encroachments on its banks, have for a long period occasioned anxiety. Temporary expedients have been resorted to, which have done service in the past, but the danger increases, and gives rise to very serious apprehension. The subject has been reported on on previous occasions, but, as it is one of such grave importance, it appears desirable that a comprehensive description of the river and banks, effects of floods, and proposals for a system of protective works should accompany the annual report on the railway works which are liable to be so seriously affected by the river.

The Rangitata River flows over a shingly bed in numerous channels. On the north bank is a bold terrace, which completely confines it on that side. The south bank is low and easily flooded, and consists of a gravel substratum, and light sandy soil on the surface. About four miles above the railway crossing the river divides into two branches, forming a large island. The railway crosses by two bridges, the north bridge being 1,950 and the south bridge 1,964 feet in length. The bed of the river, for several miles above the bridges, is considerably higher than the neighbouring country to the right or southward of it, and when the river overflows its southern banks, as it frequently does, the water runs rapidly down a well-defined channel, and crosses the railway about three-quarters of a mile from the end of the south bridge. A temporary opening is left in the railway to allow this water to pass. The river is continually breaking down the natural banks on the south side, to which by reason of the lay of the country it naturally tends. It is much to be feared that it may, during any large fresh, deepen the outlet, and flow down the channel already described with increasing volume, until the whole river leaves its present bed, and takes an entirely new course to the sea. There is nothing that I can see in the natural course of events to hinder such a catastrophe occurring at any time, although it is quite possible that it might not happen for a long while. If this should ever occur the result will be an enormous loss of valuable agricultural and cultivated land, the complete stoppage of railway traffic, destruction of the present station and a considerable length of railway, and the necessity of providing a new bridge at the cost of about £20,000. The interests at stake are therefore very large.

I have, by your instructions, carefully examined the river and neighbourhood, in order to ascertain the possibility of checking the threatened outbreak. It is to be observed that this river has larger boulders and more of them than any other of the Canterbury rivers in the proximity of the railway. The large boulders are chiefly in the stream, and the smaller in the back waters. This indicates that the river is carrying away material from this part of its bed, and therefore the channel must, on the whole, be deepening. If we had to cope with a river-bed where the *débris* brought from above is deposited, protective works might be more easily constructed, but they could not be permanent, for as the bed rises the river must inevitably sooner or later overtop the works. Under such circumstances smaller shingle and sand would appear, for, the fall being too slight to move the larger boulders, they would either remain behind or be buried. Considering it established that the river is already gradually deepening its present channel in the part we have to do with, there is good reason to hope for success in dealing with it, and all that can be done by way of concentrating the scattered streams will assist this natural process, and tend to keep the river within bounds. The first parting of the river, forming the upper end of the Rangitata Island, occurs about four miles above the railway, but there are several cross streams lower down carrying water from the north channel to the south. During floods the quantity thus thrown into the south channel is immensely increased. The points where the river overflows are mainly over a space of half a mile, about halfway between the upper end of the island and the railway bridge.

Some stop-banks where erected when the line was constructed, and they must have done good service formerly, but they were calculated only to stop the surface-water from overflowing the natural banks. This no doubt they did more or less completely for a time, but by degrees the ground they stood upon has been undermined by the action of the river, and they have been partly destroyed, and the flood-water now outflanks them on all sides. As there is no high ground to work from as a base of operations, it is impossible to erect any barrier to the river at this point. I have no hesitation in expressing a full conviction that the points where the river can be most completely and economically controlled are upon the falls where it divides; and this for the reasons that at those points the river has the least tendency to rise upon the works, and, further, that it has the greatest fall away from the works in the opposite course. There are four distinct channels by which the river flows from the north branch to the south; three of these are above the part now being encroached on, and one below.

The next consideration is, what character of works can be constructed in such situations. I propose to form three banks or groins, one in each of the three upper channels above described. The sites chosen for each are just on the turn of the fall to the right, so that they shall stand in the back-water of the current that will flow down the fall to the left when the groin is completed. The *débris* brought down by the floods is expected to be deposited in the backwater, and so will protect the works. Where the groins are exposed to the current they will be constructed of the largest boulders procurable, which will be taken from the channel to the left, so as to improve the flow of the river to the north side. The banks will be made very wide, and very flat, so as to present the least possible face to the scour, the breast of the groin is to be filled with tussock and flax, to stop the silt from washing through, so as to cause the river to grout the boulders full, after which the decay of the grass will not signify. The first groin constructed will be the lowest down stream, and will be formed by working

from the lower end, so that all water turned will be finally diverted. The relative quantity of water flowing in the two branches will not be affected, as all the water turned will still return to its original bed by the fourth channel above named, but below the weak point. The quantity of water flowing down on the threatened breach will be gradually lessened from the commencement of the work. No. 1 groin will be 5 chains in length; No. 2, 16 chains; No. 3, 4 chains. The estimated quantity of material is, in No. 1 groin, 2,640 cubic yards; No. 2, 4,224 cubic yards; No. 3, 1,056 cubic yards. The total cost I estimate approximately at £1,200; the time, three months; employing eighteen men, with two teams of horses and carts. The time and cost of construction in such work as this so entirely depends on the number and volume of the floods experienced during the progress of the works that this estimate cannot be considered reliable. The works are just now being commenced, and the time of year is most favourable, as least liable to heavy floods. Should the works now in hand prove successful the immediate danger threatening the district will be averted. But the river will most probably, before any great lapse of time, make another inroad still higher up, from which point it will breach the railway still further southward, and eventually reach the Orare Lagoon, destroying in its course a far larger tract of country.

I do not think the Railway Department should be looked to to undertake the protection of such extensive areas of valuable freehold land, and I think steps should be taken to establish a permanent Board of Conservators, with statutory powers for rating the land to be protected, similar to that which has been in successful operation on the Waimakariri River.

The works now beginning must be regarded as but the first step of a work of years.

I have, &c.,

J. Henry Lowe,

The Commissioner of Railways, Middle Island. Resident Engineer.

Enclosure J. in Appendix I.

Burning Native Coal in Locomotives.

Sir,— Dunedin, 28th May, 1878.

In compliance with your instructions, I have the honor to report the result of a series of trials made to test the adaptability of lignite or brown coal of this colony for use in locomotives. I originally intended to include the trials of Shag Point, Benhar, Greymouth, and coal from one or two mines in this district, but, owing to the shortness of engine-power and the increasing traffic. I found it impossible to keep the same engine for the special purpose; and the difficulty in doing this in a great measure is the reason of the delay in sending in this report. The coal tried was Newcastle (N.S.W., Australia), Kaitangata, Nightcap, Green Island, and Walton Park (New Zealand), the first being taken as a standard for comparison.

I may state here that I made one trial of a sample of coal from Greymouth with very good results, but, as I expect to be able to complete the trials at some future time, I have withheld the particulars.

As it was necessary that the trains hauled should be weighed, I determined to make the trials with the train known as the "Walton Park Coal Train;" but even with this it was found impossible to weigh every wagon, these being frequently dropped off at sidings; but in every case of this kind a note was made, and the weight approximated. A more serious objection was the amount of shunting that had to be done at Walton Park. This was often very heavy; but the time engaged on this work was always taken, and is entered for comparison. While on this subject it may be interesting to note, as indicating the power of the engine (a 10½ in. cylinder, Class F.), the weights moved on several occasions. In one instance a shunt had to be made on a grade of 1 in 48, when a load of 84 tons was lifted from a dead stand. This does not include the weight of the engine, which, taken at 17 tons, would be 101 tons. Pressure of steam in the boiler was 115 lb., the rails dry and clean.

Every care was taken to make the trials as complete as the appliances at command would admit. The water used was carefully measured, the coal weighed, and the pressure of the steam noted at frequent intervals during the trip, the temperature of the feed-water taken, and the length of time the injector was used. The weather throughout was favourable, being dry.

The engine selected for the trials was a 10½ in. cylinder, 6 wheels coupled, Class F., in good working order, fitted with a spark-arresting chimney, which answered well. I attach a tracing of the longitudinal section of the line between Dunedin and Walton Park, from which it will be observed the grades are severe, and change frequently. These were reduced to an equivalent length of level road, and from that length the load hauled was calculated. This course was rendered necessary through having to pick up and drop wagons at the various sidings on the journey.

From the experience gained during the present trials I do not think it is possible to use profitably any of the four kinds of colonial coal tried, at least with the class of engine at present in use here. No doubt if a locomotive was built with an enlarged fire-box, and with a tender attached to hold sufficient coal for a trip, say, of fifty miles, more favourable results might be looked for; but the action of the blast, increased by the heavy grades prevailing here, on the light coal makes the work of firing a most laborious job, and one that requires the most careful attention to maintain steam, which was done in all the trials, such as in every-day work I could not expect.

One great objection to the use of the Kaitangata coal is its liability to clinker. No engine could use this coal and run more than ten or twelve miles without having the fire-bars cleaned.

The sulphurous fumes emitted from the Walton Park and Green Island coals raises a serious objection to their use on passenger trains. This is especially felt when passing through tunnels. These, however, make no clinker, leaving a very little brown ash.

The Nightcap coal shows a better result than either of the other three, as it burns without forming any clinker, and throws off no gases having objectionable smell. With a locomotive specially designed for burning lignits, I am of opinion this coal could be profitably used.

All the coals tried made plenty of steam, although, as already stated, the work is such that no man would be able for it if employed on a fifty-mile run.

The following analysis of Kaitangata and Green Island (Walton Park Coal Company) was made by Professor Black, of the University of Otago:—

Kaitangata.

Evaporative power	5·34
Carbon	43·56
Gas	36·47
Water	14·93
Ash	6·04

Average of Fourteen Samples.

Green Island—Walton Park Coal Company.

Water	27·75
Ash	2·8
Fixed Carbon	36·16
Volatile hydrocarbon	33·3
Coke	38·96

Average of Three Samples.

Name of Coal or Lignite.	Specific Gravity.	Weight per Cubic Foot.	Cubic capacity to hold One Ton.
Lambton, Newcastle, N.S.W.	1·34	83 lbs.	44·7 cubic feet
Nightcap	1·29	80·5 „	46·4 „
Kaitangata	1·278	78 „	46·9 „
Green Island	1·239	77·3 „	51·5 „
Walton Park	1·236	77·1 „	51·5 „

I have, &c.,
Alex. Armstrong,
Resident and Locomotive Engineer.

W. Conyers, Esq.,
Commissioner of Railways, Middle Island, Christchurch.

Trials of Colonial Coal for Locomotive Purposes, Dunedin Section, New Zealand Railways.

—	Names of Coal.				
	Lambton Coal, Newcastle, N.S.W.	Walton Park Coal, Otago, N.Z.	Kaitangata Coal, Otago, N.Z.	Nightcap Coal, Southland, N.Z.	Green Island Coal, Otago, N.Z.
Number of trials	2	5	5	4	5
Date of trials	Jan. 30, 1878	Jan. 31 to Feb. 7	Jan. 23 to 29	Feb. 20 to Mar. 7.	Feb. 9 to 14.
Actual distance out and in	12 m. 34 ch.	12 m. 34 ch.	12 m. 34 ch.	12 m. 34 ch.	12. m. 34 ch.
Number of tons hauled one mile	2,916 tons	7,513 tons	8,462·5 tons	7,054 tons	7,888 tons.
Coal consumed	720 lb.	3,770 lb.	2,948 lb.	3,048 lb.	4,033 lb.
Cost of coal consumed	9s. 7¾d.	19s. 4¼d.	15s. 9½d.	Not ascertained	22s. 6d.
Coal consumed per ton of load per mile	0·247 lb.	0·502 lb.	0·348 lb.	0·432 lb.	0·511 lb.
Cost of coal per ton hauled	0·039d.	0·031d.	0·0224d.	Not known	0·034d.
Water consumed	582 gallons	1,438 gallons	1,332 gallons	1,271 gallons	1,443 gallons.
Water evaporated per lb. of coal	8·08 lb.	3·81 lb.	4.5 lb.	4·17 lb.	3·58 lb.
Steam pressure, mean	(34 readings) 117 lb. sq. in.	(112 readings) 114 lb. sq. in.	(96 readings) 115·4 lb. sq. in.	(101 readings) 115 lb. sq. in.	(130 readings) 118 5 lb. sq. in.
Temperature of feed water in tank	90° mean Faht.	93·6° mean Faht.	92·7° mean Faht.	80° mean. Faht.	81·3 mean. Faht.
Injector at work	58 min. 18 sec.	2 h. 8 min. 30 sec.	2 h. 3 min. 39 sec.	Not taken	2 h. 15 min. 7 sec.
Actual time running	1 h. 53·5 min.	4 h. 49·5 min.	4 h. 36·5 min.	4 h. 21·5 min.	4 h. 45·5 min.
Actual time shunting	2 h. 29 min.	5 h. 36 min.	5 h. 1·5 min.	4 h. 31·5 min.	4 h. 58 min.
Actual time standing	24 min.	2 h. 51·5 min.	3 h. 25 min.	1 h. 14 min.	3 h. 14·5 min.
Time away on journeys	4 h. 46·5 min.	13 h. 17 min.	13 h. 3 min.	10 h. 7 min.	12 h. 58 min.
Average speed, exclusive of stoppages	Not taken	14·5 m. per h.	Not taken	13·5 m. per h.	14 m. per h.
Cost per ton of coal	30s. at Dunedin	11s. 6d. at pit	12s. at Stirling	Not ascertained	12s. 6d. at pit.

Alex. Armstrong,
Resident and Locomotive Engineer.

Enclosure K. in Appendix I.

TRIAL OF SPRINGFIELD COAL.

11th April, 1878.

IN our last trial of native coal it was found to give very unsatisfactory results, but since then, having fitted up an engine especially to burn it, and having secured the services of an experienced driver and fireman from Auckland to run the engine, I am able to report favourably on its use.

The results given below are obtained from the driver's daily sheets, O 74 engine:—

Date.	Engine Mileage.	Cwt. Coal used.
19th February to 26th March	2,813	Native ... 530
Deduct for Newcastle	100	Newcastle 18
	2,713 miles	

for 530 cwt. of native coal, or something under 22 lb. per engine mile.

The average consumption of coal (Newcastle) on engines O 72 and O 73 may be taken at 18 lb. per mile for the current year, the cost of Newcastle coal is 28s. 9d. per ton at Lyttelton; of native coal, 17s. at Sheffield.

28·75	17
18	22
23000	34
2875	34
51750	5175)374000(72
	36225
	11750
	10350

so that native coal is nearly 28 per cent cheaper than Newcastle, so far as engines of this class are concerned.

With Springfield coal at 7s. 6d., at which rate it should be obtainable if the railway were connected with the mine, the saving would be as under:—

7·5
22
150
150
5175)165000(32
15525
9750

—a saving of more than 67 per cent. On the 20th ultimo I ordered 60 tons more of this native coal for experimenting with the American engines, but, owing to the difficulty of transportation, none has yet been supplied. I am informed by the manager of the pit that he is unable to supply the greater part of the coal he receives orders for, on account of the scarcity of trucks, and the expense of cartage.

As the pit is only about five miles from the terminus, and there is a railway reserve nearly all the way, it becomes a matter of important consideration whether the Government do not see their way to put the pit in direct railway connection with the branch line.

ALLISON D. SMITH,
Locomotive Engineer.

The Commissioner of Railways,
Middle Island.

TABLE L.—Appendix I.

Statement showing Quantity and State of Rolling-stock on the Middle Island Railways on 30th June, 1878.

LOCOMOTIVES.

Description.	8-in. cyl., 4 wheels, coupled, 8 tons. Class A.	9-in. cyl., Fairlie, 8 wheels, coupled, 23 tons. Class B.	9½-in. cyl., 4 wheels, coupled, 12 tons. Class C.	9½-in. cyl., 4 wheels, coupled, Bissel truck, 12 tons. Class D.	10-in. cyl., Fairlie, 8 wheels, coupled. Class E.	10½-in. cyl., 6 wheels, coupled, 17 tons. Class F.	10½-in. cyl., 4 wheels, coupled, with 4-wheel bogie. Class G.	Fell engines, 14-in. cyl. outside, 10-in. cyl. inside, 4 wheels, coupled. Class H.	14-in. cyl., 6 wheels, coupled, Bissel bogie, 25 tons, 6-wheel tender. Class J.	12-in. cyl., American engines, 4 wheels, coupled, 2 Bissel bogies, 8-wheel tender. Class K.	10½-cyl., 4 wheels, coupled, with Widmark's radial box on leading axle. Class L.	13-in. cyl., 6 wheels, coupled, tank engines, 28 tons. Class M.	10½-in. cyl., Fairlie, 8 wheels, coupled, 25 tons. Class N.	10½-in. cyl., 6 wheels, coupled, tank engine, radial box on leading axle. Class O.	8-in. cyl., 6 wheels, coupled, New Zealand-built, 12 tons. Class P.	8-in. cyl., 4 wheels, coupled, 10 tons. Class S.	Total Number.
Christchurch.																	
In good order	11	...	1	1	...	4	4	...	6	2	1	2	...	3	2	1	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	1	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	12	...	1	1	...	6	4	...	6	2	1	2	...	3	2	1	41
Dunedin.																	
In good order	...	1	...	...	5	5	...	...	...	...	...	...	...	7	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	1	...	...	5	5	...	...	...	...	...	...	...	7	...	...	18
Invercargill.																	
In good order	1	...	1	...	...	4	...	...	...	...	...	2	...	6	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	1	...	1	...	...	4	...	...	...	...	...	2	...	6	...	...	14
Greymouth.																	
In good order	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Westport.																	
In good order	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Nelson.																	
In good order	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Picton.																	
In good order	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Grand total	13	1	9	3	5	15	4	...	6	2	1	4	...	16	2	1	82

TABLE M.—Appendix I.

Statement showing Quantity and State of Rolling-stock on the Middle Island Railways on 30th June, 1878.

	Carriages.																		Brakes.				
	1st Class.						Composite.						2nd Class.										
	8 wheels, American Bogies.	6 wheels, end doors.	6 wheels, side doors.	6 wheels, Cleminson's radial axles.	4 wheels, end doors.	4 wheels, side doors.	8 wheels, American Bogies.	6 wheels, end doors.	6 wheels, side doors.	6 wheels, Cleminson's radial axles.	4 wheels, end doors.	4 wheels, side doors.	8 wheels, American Bogies.	6 wheels, end doors.	6 wheels, side doors.	6 wheels, Cleminson's radial axles.	4 wheels, end doors.	4 wheels, side doors.	6 wheels, passenger.	4 wheels, passenger.	6 wheels, goods.	4 wheels, goods.	Special for centre rail.
Christchurch.																							
In good order	1	11	...	...	1	...	...	25	...	...	10	...	...	35	...	...	9	...	...	...	...	26	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	2	...	...	...	...	...	5	...	...	1	...	...	...	...	2	...
Undergoing light repairs	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	...	...
In hands of contractors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	2	11	...	...	1	...	...	28	...	...	10	...	...	40	...	...	10	...	...	4	...	28	...
Dunedin.																							
In good order	...	5	...	...	...	8	...	9	...	...	4	...	...	24	...	...	...	21	...	4	...	7	...
Undergoing heavy repairs ...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	6	...	...	...	8	...	11	...	...	4	...	...	26	...	...	...	21	...	5	...	7	...
Invercargill.																							
In good order	...	7	...	...	2	...	...	13	...	...	...	...	...	18	...	...	4	...	...	1	...	8	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	1	...	...	...	...	...	3	...	...	...	...	...	1	...	1	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	7	...	...	2	...	...	14	...	...	...	...	...	21	...	...	4	...	...	2	...	9	...
Brunner.																							
In good order	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	2	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	...	...	2	...
Westport.																							
In good order	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	2	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	2	...
Nelson.																							
In good order	...	...	...	...	1	...	...	1	...	...	2	...	...	...	...	...	2	...	...	...	...	2	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	2	...	...	1	...	...	2	...	...	...	...	...	2	...	...	...	...	2	...
Picton.																							
In good order	...	...	...	...	1	...	...	2	...	...	...	...	...	1	...	...	1	...	...	2	...	...	...
Undergoing heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	1	...	...	2	...	...	...	...	...	1	...	...	1	...	...	2	...	...	...
Grand Total	2	24	...	...	...	8	...	56	...	...	18	...	...	88	...	...	21	21	...	13	...	50	...

TABLE N,—Appendix I.

Statement showing Quantity and State of Rolling-stock on the Middle Island Railways on 30th June, 1878.

—	WAGONS.											Tarpaulins.
	Horse Boxes.	Cattle Trucks.	Sheep Trucks.	Covered Goods.	High-sided.	Low-sided.	Timber Trucks.	Iron Hopper.	Carriage.	Meat.	Total.	
Christchurch.												
In good order	11	29	...	166	599	187	20	50	2	...	...	707
Undergoing heavy repairs...	1	...	...	...	3	...	...	...	...	...	...	212
Undergoing light repairs ...	...	...	...	2	27	3	...	...	...	...	...	193
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	2	...	10	2	72	...	...	...	...	...	...
Total	12	31	...	178	631	262	20	50	2	...	1186	1112
Dunedin.												
In good order	6	16	...	39	160	104	27	99	...	...	...	260
Undergoing heavy repairs...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	1	5	1	...	1	...	...	...	...
In course of erection ...	...	...	...	4	...	...	...	...	...	...	...	56
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...
Total	6	16	...	44	165	105	27	100	...	...	463	316
Invercargill.												
In good order	2	15	17	48	24	20	50	20	...	...	...	42
Undergoing heavy repairs...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	46	...	...	...	...	...	...
Total	2	15	17	48	24	66	50	20	...	...	242	42
Brunner.												
In good order	...	...	...	...	4	8	...	72	...	...	...	6
Undergoing heavy repairs...	...	...	...	...	...	...	...	4	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	3	...	...	...	...
In course of erection ...	...	...	...	...	3	...	...	3	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	7	8	...	82	...	...	97	6
Westport.												
In good order	...	...	...	...	9	...	...	...	...	...	...	1
Undergoing heavy repairs...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	...	...	...	9	...	...	...	...	...	9	1
Nelson.												
In good order	...	2	2	...	9	8	4	...	...	...	...	12
Undergoing heavy repairs...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	1	2	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	2	2	...	10	10	4	...	...	...	28	12
Picton.												
In good order	...	1	2	3	6	20	6	...	...	...	...	5
Undergoing heavy repairs...	...	...	...	...	...	...	...	...	...	...	...	...
Undergoing light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	1	2	3	6	20	6	...	...	...	38	5
Grand total ...	20	65	21	273	852	471	107	252	2	...	2063	1494

TABLE O.—Appendix I.

MISCELLANEOUS.

—	Steam Pumps.	Hand Pumps.	Windmill Pumps.	—	Steam Pumps.	Hand Pumps.	Windmill Pumps.
Christchurch.				Westport.			
In good order	3	31	1	In good order	...	...	...
Dunedin.				Nelson.			
In good order	...	...	...	In good order	...	...	...
Invercargill.				Picton.			
In good order	...	...	...	In good order	...	...	...
Greymouth.							
In good order	...	...	...				
Totals	3	31	1	Totals	...	...	...

TABLE P.—Appendix I.

Turntables, Weighbridges, and Machines.

—	Traverse Wagon.	Turntables.					Weighbridges.				Weighing Machines.										
		40 feet.	18 feet.	14 feet.	13 feet.	12 feet.	Railway Wagon, 12 tons.	Cart, 8 tons.	Cart, 7 tons.	Cart, 3 tons.	22 cwt.	21 cwt.	16 cwt.	15 cwt.	13 cwt.	11 cwt.	10 cwt.	8 cwt.	6 cwt.	5 cwt.	4 cwt.	3 cwt.
Christchurch.																					
In good order	4	2	3	6	8	3	2	2	1	...	...	1	7	13	1	16	19	3	2	12	1	...
Dunedin.																					
In good order	3	1	...	...	7	...	1	...	1	...	2	...	...	2	...	...	4	...	...	8	1	5
Invercargill.																					
In good order	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Greymouth.																					
In good order	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...
In hands of Public Works ...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Westport.																					
In good order	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
Nelson.																					
In good order	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	2
Picton.																					
In good order	...	...	...	...	1	...	2	...	...	...	...	...	...	...	...	...	2	...	...	4	...	...
Totals ...	8	3	3	6	17	3	7	2	2	1	2	1	7	15	1	16	25	3	2	28	7	7

TABLE Q.—APPENDIX I.

CRANES.

	Stationary.													Travelling.										
	Steam.						Hand.							Steam.						Hand.					
	Tons.	Tons.	Tons.	Tons.	Tons.	Cwt.	12 tons.	10 tons.	5 tons.	3 tons.	1½ tons.	15 cwt.		12 tons.	10 tons.	5 tons.	3 tons.	2 tons.	1½ tons.	Tons.	5 tons.	3 tons.	2 tons.	1½ tons.	15 cwt.
CHRISTCHURCH.																								
In good order ...	...	...	...	...	...	...	1	...	4	...	1	...		...	...	...	1	5	2	...	3	1	2	...	1
Under heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
DUNEDIN.																								
In good order ...	...	...	...	...	...	...	...	1	...	...	...	...		...	...	...	...	2	...	...	...	...	2	...	...
Under heavy repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
INVERCARGILL.																								
In good order ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under heavy repairs ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repairs ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
GREYMOUTH.																								
In good order ...	...	...	...	...	...	...	...	...	...	...	2	...		1	...	...	...	...	...	...	1	...	1	...	...
Under heavy repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	1	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
WESTPORT.																								
In good order ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	1	...	...	1	...	1	...	...
Under heavy repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	...	...		...	1	...	...	...	...	...	...	...	...	...	...
NELSON.																								
In good order ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	1	...	1	...	...
Under heavy repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In course of erection ...	...	...	...	...	...	...	...	...	...	...	2	...		...	...	...	...	...	...	...	...	...	...	...	...
PICTON.																								
In good order ...	...	...	...	...	...	...	...	...	...	...	2	...		...	...	...	...	...	...	...	1	...	1	...	...
Under heavy repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Under light repair ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
In hands of contractors ...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...	...
Totals ...	...	...	...	...	...	...	1	1	4	...	7	...		1	1	...	1	9	2	...	7	1	8	...	1

APPENDIX J.

ANNUAL REPORT ON PUBLIC BUILDINGS, ETC., BY THE ARCHITECT.

Mr. BURROWS to the Hon. the MINISTER for PUBLIC WORKS.

SIR,— Colonial Architect's Office, Wellington, 29th July, 1878.

I have the honor to report for your information upon the buildings and other works which have been commenced, executed, or designed during the financial year 1877–78, in connection with the Architect's Branch of the Public Works Service.

Several large new buildings have been completed during the year, and others in progress are nearly ready for occupation.

Of those completed, the chief contracts were for public offices at Gisborne, Taranaki, and Blenheim—the two former constructed of wood, and the latter of concrete, with slated roof, costing respectively £3,507, £5,287, and £10,717.

At Christchurch large public buildings are in course of erection in brickwork, with stone dressings and slated roofs, the contract for which was taken at £14,521. Good progress is being made with the work, and it is expected the buildings will be ready for occupation in November, and will provide accommodation for the following departments:—Postal, Telegraph, Insurance, Customs, Stamp, and Public Works.

Fourteen buildings have been erected for postal and telegraph accommodation—namely, at Longford, Kawakawa, Tenui, Mataura, Worser Bay, Whangaroa, Mohaka, Waiwera, Port Chalmers, Mongonui, Otago Heads, Kumara, and Reefton. Besides which, additions and alterations have been made at or designed for Dunedin, Russell, Hamilton, Lawrence, Hawera, Port Ahuriri, Carterton, Coromandel, and Queenstown. Designs have also been made for new offices at Dunedin North, Newton (Auckland), Otaki, and Takapau.

Police buildings have been erected and completed at Amberley, Coalgate, Porangahau, Port Chalmers, Rakaia, Hawera, Ohinemutu, and Motueka; while either repairs, additions, or alterations have been made at Greymouth, Havelock, Invercargill, Blenheim, Kumara, Wanganui, Geraldine, Gisborne, Napier, and Thames.

Designs have been prepared and plans made for new police buildings at Mataura Bridge, Reefton, Wanganui, and Picton. A sketch design has also been made for new police barracks at Dunedin North.

Six new Courthouses have been completed at the following places: Hutt (erected by County Council), Maketu, Kaihu, Carterton, Wairoa, and Timaru. The largest of these was that erected at Timaru in concrete, at a cost of £3,719. Designs have been made and plans prepared for new buildings at Picton, Motueka, Akaroa, Alexandra, Hyde, Feilding, and Ohinemutu; also sketch design for new Supreme Courthouse, Wellington, estimated to cost £16,000; besides which, alterations and additions have been effected to Courthouses at Foxton, Wanganui, and Lawrence.

During the year an extensive fire occurred at the Lunatic Asylum, Auckland, by which the greater portion of the east wing was destroyed: this has been restored by a private architect at a cost of £5,787. It also entailed the temporary removal of a number of patients, who were accommodated at the old hospital building, which has been added to, altered, and repaired, to meet the requirements, at a cost of £358.

The above list comprises the principal works which have been either designed, commenced, or finished during the year; besides which very many repairs have been executed to various buildings throughout the colony—viz., Government Printing Office, Wellington; Gaol, Auckland; Gaol, Wellington; converting old hospital at Hamilton into gaol; Lunatic Asylum, Nelson; Hospital, Christchurch; Hospital, Auckland; Gaol, Wanganui; Gaol, New Plymouth; Government House, Auckland; Government House, Wellington; Courthouse, Napier; Post Office, Napier; Industrial Schools, Christchurch; Hospital, Christchurch; Lunatic Asylum, Christchurch; Immigration Depôt, Greymouth; and many others.

Very valuable assistance has been received from the Public Works Engineers or members of their staff by way of inspection and in the execution of various works.

I beg to draw your attention to the great disadvantage the office has laboured under since the decease of the late Colonial Architect, no head of this branch of the public service having been appointed, nor extra assistance granted; the professional work has therefore been done by a very small staff indeed, consisting of one assistant (Mr. Beatson) and a cadet. Since the provinces have been abolished, the work has increased to a great extent, and has been very heavy on those employed.

The total expenditure during the year has been,—

	£	s.	d.
Judicial	11,293	10	0
Postal and Telegraphic	10,281	0	5
Offices for Public Departments	27,221	16	6
Lunatic Asylums	4,183	1	4
Miscellaneous	41,029	8	3
	£94,008	16	6

I have, &c.,
P. F. M. Burrows,
Architect.

The Hon. the Minister for Public Works.

APPENDIX K.

ANNUAL REPORT BY THE ACTING CHIEF INSPECTOR OF MACHINERY.

The Acting Chief Inspector to the Hon. the Minister for Public Works.

Office of the Chief Inspector of Machinery,
Wellington, 2nd August, 1878.

Sir,—

I have the honor to forward the usual annual report—the fourth—on the working of the

Inspection of Machinery Department for the year ended 30th June, 1878, and to state that the Act continues working in a satisfactory manner, financially and otherwise.

The boilers, on the whole, continue to be favourably reported on by the several Inspectors, who find on each subsequent visit an improvement in their keeping and working.

The number of boilers inspected during the year has been 1,129, which shows an increase of 39 over last year. The Nelson North District could not be completed before 30th June (for reasons given below), or the number would have reached 1,167.

There have been extensive repairs effected to 21 boilers, 75 have had slight repairs done to them, 16 were adjudged to be dangerous, and 5 have been condemned.

With reference to the dangerous boilers, I would remark that the chief cause of danger was from corrosion. In each district the Inspectors have caused the brickwork of all old or doubtful boilers to be removed, so that the parts long in contact with the brickwork might be seen, and in several cases the plates were found to be much corroded, the boilers having been set too near the ground.

There have been three boiler explosions, two of which were of a slight character, the other one being of a more serious nature, resulting in the attendant (the owner) being severely scalded.

In the first instance, one (a Cornish boiler) was used at the Wellington Gasworks, the explosion taking place from the plates being over-heated, owing to the fire having been lighted before the water had covered the fire-tube, and, the water being then allowed to flow over the heated plates, the sudden contraction rent the tube, the water then putting out the fire. The boiler was in thorough good order at the time of the accident, and beyond the crack above mentioned no damage was done. The second case was that of a boiler at Glen Oamaru, Otago District, belonging to Stackman and Co., and was used for sawmill purposes—also a Cornish boiler. It would appear from the information to hand that the angle-iron rim connecting the flue to end of boiler must have had a flaw in it. No repairs have been effected, and the boiler remains unused. The third case was again a Cornish boiler, at Messrs. Barrowman and Nordloff's sawmill, Sawyer's Bay, Otago. The accident was caused through collapse of the flue, fortunately unattended by any loss of life, although the owner was scalded on the leg and hand, he having lighted the fire without first ascertaining the quantity of water in the boiler, which must have been very low, as the feed check-valve had been leaking from Saturday till Monday morning; without drawing his fire he injected water on to the heated furnace tube, causing it to collapse and tear asunder, the force of the explosion breaking the furnace-door, and driving out the fire. The necessary repairs are now being effected. Two of the cases above reported have occurred through the carelessness and neglect of the attendants.

There have been eight accidents reported during the year (statement herewith) four of which, I regret to say, were fatal; two of these were persons not employed about the machinery.

An accident to the winding machinery of the Patent Slip at Evans's Bay, Wellington, which might have been attended with fatal results, occurred through the engineer in charge allowing the engine to attain a speed for which the fly-wheel had never been intended; a rupture of the wheel followed. The centrifugal force drove segments of the rim weighing at least 4 cwt. a hundred yards from the scene of the accident. The wheel was by no means well-proportioned, but quite equal to 55 revolutions per minute, the proper speed for such an engine. A new wheel of better design has been fitted.

On reference to Table No. 4 it will be seen that the machinery inspections are twenty-two less than last year. This is accounted for by the Nelson North District not being completed by 30th June, owing to my other duties in connection with marine inspection, caused by the absence of the Chief Inspector of Machinery on leave; the inspections being, in consequence, made in July, and thus omitted from this report.

In almost every case where owners of machinery have been directed to fence the work has been put in hand while the Inspectors were on the spot, and carried out to their satisfaction.

I forward herewith returns showing the number of boilers and different kinds of machinery inspected in the various districts during the year; the number of accidents; the amount of fees collected; and the cost of working the department.

I have, &c.,
H. A. McGregor,
Acting Chief Inspector of Machinery.

The Hon. the Minister for Public Works.

Enclosure No. 1 in Appendix K.

Return shewing the Amount of Fees collected in the Inspection of Machinery Department during the Financial Year ended 30th June, 1878.

Name of District.	Amount Collected. £	s.	d.
Otago	572	0	0
Canterbury	493	0	0
Auckland	454	0	0
Wellington	252	0	0
Marlborough	91	0	0
Taranaki	22	0	0
Nelson North	27	0	0
Nelson South	26	0	0
Westland	53	0	0
Hawke's Bay	60	0	0
Total	£2,050	0	0

Enclosure No. 2 in Appendix K.

RETURN showing the COST of WORKING the INSPECTION of MACHINERY DEPARTMENT during the Financial Year ended 30th June, 1878.

Nature of Expenditure.	Amount Expended. £ s. d.
Salaries	1,331 13 4
Travelling expenses	465 15 7
Sundries	6 18 3
Total	£1,804 7 2

Enclosure No. 3 in Appendix K.

RETURN showing the NUMBER of BOILERS INSPECTED during the Financial Year ended 30th June, 1878.

NAME OF DISTRICT.	No. of Portable Boilers.			No. of Stationary Boilers.			TOTALS.
	Under 5 H.P.	5 to 10 H.P.	Over 10 H.P.	Under 5 H.P.	5 to 10 H.P.	Over 10 H.P.	
Otago	21	110	17	74	40	67	329
Canterbury	13	155	7	65	15	30	285
Auckland	14	21	19	54	39	98	245
Wellington	9	21	11	22	17	42	122
Marlborough	2	13	6	2	8	18	49
Taranaki	...	5	1	2	2	1	11
Nelson North	...	1	1	7	6	1	16
Nelson South	...	1	4	1	...	4	10
Westland	2	2	3	8	5	7	27
Hawke's Bay	3	15	4	5	2	6	35
Totals	64	344	73	240	134	274	1,129

Enclosure No. 4 in Appendix K.

RETURN showing MACHINERY INSPECTED during the Financial Year ended 30th June, 1878.

NAME OF DISTRICT.	DESCRIPTION OF MACHINERY.																							TOTALS.
	Steam Phormium-dressing.	Water Phormium-dressing.	Steam Printing.	Steam Flour-mills.	Steam and Water Flour-mills.	Water Flour-mills.	Steam and Wind Flour-mills.	Wind Flour-mills.	Steam Saw-mills.	Steam and Water Saw-mills.	Water Saw-mills.	Steam Bone-crushing Mills.	Wind Bone-crushing Mills.	Water Bone-crushing Mills.	Steam Woollen Mills.	Steam Foundries.	Steam Planing Machines.	Water Planing Machines.	Steam Quartz-crushing Machines.	Steam and Water Quartz-crushing Machines.	Water Quartz-crushing Machines.	Steam Threshing Machines.	Distilleries.	
Otago	...	...	5	13	3	1	...	...	56	1	...	4	...	1	2	14	46	...	...	...	...	97	...	243
Canterbury	...	...	5	3	...	2	2	...	44	...	...	...	...	...	1	16	5	...	...	...	...	126	...	204
Auckland	4	3	2	4	1	1	...	...	58	...	...	3	...	...	...	13	35	...	15	2	2	7	...	150
Wellington	...	...	5	4	...	3	...	...	35	1	...	1	...	...	...	6	2	...	...	...	...	8	...	65
Marlborough ...	...	3	...	...	...	3	...	...	13	1	...	...	...	...	...	1	...	...	...	...	...	8	...	29
Taranaki	...	...	...	1	...	2	...	...	4	...	...	...	...	...	...	1	...	...	...	...	...	1	...	9
Nelson North ...	...	...	...	1	...	1	...	...	4	...	...	1	...	...	...	2	...	...	...	...	...	...	...	9
Nelson South ...	...	...	...	...	...	...	...	...	4	...	...	...	...	...	...	...	...	...	3	...	...	...	...	7
Westland	...	...	1	...	...	...	...	...	9	...	...	...	...	...	...	1	...	...	...	...	...	...	...	11
Hawke's Bay ...	1	...	...	...	...	...	...	...	7	...	...	...	...	...	...	2	1	...	...	...	...	10	..	21
Totals ...	5	6	18	26	4	13	2	...	234	3	...	9	...	1	3	56	89	...	18	2	2	257	...	748

Enclosure No. 5 in Appendix K.

RETURN showing the NUMBER of ACCIDENTS to PERSONS that have occurred with Machinery, as reported to Inspectors, during the Year ended 30th June, 1878.

Date.	District and Locality.	Nature of Machine, and Owners' Names.	Remarks.
1877.			
July 12	Otago, Dunedin ...	Ironworks, R. S. Sparrow and Co.	A lad, an apprentice, working a drilling machine, lost the thumb of his right hand in attempting to clean the machine while in motion.
August 2	Otago, Tapanui ...	Brickmaking, Andrew Allan	Fatal. Attempted to stop water-wheel with a wooden lever, was knocked into the wheel, and killed instantaneously. No kind of guarding could prevent an accident of this kind.
September 7	Otago, Hillside Brickworks, Dunedin	Brickmaking, Smith and Fotheringham	Fatal. A lad not employed on the works. While playing with a rope, and striking with it a shaft running at high speed, the frayed end of the rope was caught up by the shaft; the lad was wound up with the rope and killed. The shafting being in an almost unused part of the building, the Inspector did not consider fencing necessary. Since the accident occurred, however, it has been fenced.
October 4	Otago, Dunedin ...	Steam Saw-mills, Guthrie and Larnach	A man had the greater portion of his right hand taken off by a circular saw. Fencing could not be applied in this case.
1878.			
March 14	Otago, Elderslie, Oamaru	Thrashing Machine, Dewar and Langmuir	A man feeding the machine, by some unexplained cause had his arm drawn into the drum; so badly hurt that amputation was necessary. Could not be fenced.
June 15	Otago, Sawyer's Bay	Steam Saw-mills, Barrowman and Nordloff	Mr. Nordloff, one of the proprietors, was severely scalded by the collapse of the flue of their Cornish boiler. Accident the result of carelessness.
March	Auckland	Thrashing Machine, F. Andrews	Fatal. Machinery guarded wherever practicable. A man got his foot in the opening for feeding; had been warned several times to be more careful. Died the following day.
April 22	Marlborough, Clover Bay	Steam Saw-mills, Godsiff and Newton	Fatal. A boy, not employed on the works, killed by grindstone belt. No blame attaching to any one but himself. Machinery guarded.

APPENDIX L.

ANNUAL REPORT ON LIGHTHOUSE WORKS BY THE MARINE ENGINEER.

The MARINE ENGINEER to the OFFICER in CHARGE of the MARINE DEPARTMENT.

SIR,— Marine Office, Wellington, 30th June, 1878.

I have the honor to forward, for the information of the Hon. Commissioner of Customs, the annual report on works executed for new lighthouses during the year, viz.,—

Brothers.—At date of last annual report all the works in connection with this lighthouse were near completion, and the light was first exhibited on the 24th September, 1877.

Portland Island.—The contract for this work was completed after considerable delay, and the light established on the 10th February, 1878.

The description of the light is as follows: Tower, 28 feet high, of timber, painted white. The light is of the second order revolving white light, visible all round; greatest brilliancy every thirty seconds.

It is 300 feet above the level of the sea, and, allowing 15 feet for height of eye, it will be seen 24 nautical miles in clear weather.

A fixed red light, having an arc of about six degrees, is shown in the direction of the Bull Rock from the lower part of the tower.

Centre Island, Foveaux Strait.—The works at this lighthouse have all been satisfactorily completed under contract; the lantern and apparatus have since been fixed, and it is expected that everything will be ready for lighting up about the end of August.

The light is of the first order, fixed; with red arcs thrown over the in-shore dangers.

Puysegur Point, Preservation Inlet.—The contract works at this lighthouse have also been satisfactorily completed, and the tower is now ready to receive the lantern and apparatus, the erection of which will be begun in a few days.

Moeraki.—Since my last report all the works have been completed under contract, the lantern and apparatus fixed, and the light exhibited on the 22nd April, 1878.

This is a third order fixed white light, visible 19 miles.

The site of this lighthouse is on the southern extremity of the Moeraki Peninsula, overlooking the Kartigi beach.

Timaru: Harbour Light.—As reported last year, tenders were called for this work, which consisted of the lighthouse tower and a dwelling for the keeper. A contract was entered into, which, after numerous delays and difficulties, was completed long after the contract time. The lantern and apparatus were then fixed, and the light will be exhibited on the 1st July, 1878.

The official description of the light is as follows: It is a fixed white light of the fifth order; it will be visible from N. 20° W. to S. 20° E. The tower is 30 feet in height. The light is elevated 85 feet above the sea, and will be seen in clear weather at a distance of 14½ miles.

Hokitika: Harbour Light.—The lantern and apparatus for this have been ordered from Home, but no advice of their shipment has been received.

Cape Maria.—A working party was sent to this place in August last, and I am now glad to be able to report that all the buildings at this station will be completed about the end of August, and ready for the reception of the lantern and light apparatus. The works here have gone on very steadily, and without hitch of any kind, although the landing-place at times offers serious difficulties in landing materials under certain states of the wind.

Akaroa.—As previously arranged, an overseer and working party were despatched to this place in April last, since which they have been engaged in preparing a landing-place and cutting a roadway, mostly in rock, from it to the site of the lighthouse.

Plans have been prepared for the tower and dwellings, and the material for their erection will be despatched as soon as the road and other works of excavation are complete.

Cape Saunders.—Surveys have been made of the new site with a view of acquiring the land, but the question of determining the best landing-place has delayed the completion of the plans. This, however, will be decided on the next southern trip of the "Stella," about the middle of July, and the plans will then be completed as speedily as possible.

Moko-Hinau: Hauraki Gulf.—It was hoped that the land required for a site for this lighthouse would have been acquired before this; but, as no reasonable terms can be arranged with the owner, it will be necessary to take it under "The Public Works Act, 1876," arrangements for doing which are now in hand.

During the year I have visited the following lighthouses, where works were in progress or contemplated:—

1877.

Sept. 13. Portland Island: to inspect progress of works.

Dec. 15. The same.

Dec. 25. Cape Maria: to inspect progress of works, and to arrange for erection of permanent tramway and preparation of landing-place, fixing of crane, &c.

1878.

Feb. 5. Cape Farewell: to inspect generally, but more particularly state of wood framing of the tower, which I found to be satisfactory.

Mar. 14. Moeraki: to inspect progress of works.

April 18. Hokitika: inspected site, and obtained general information.

I have &c.,

JOHN BLACKETT,

Marine Engineer.

The Officer in Charge, Marine Department.

APPENDIX M.

REPORT ON COAL EXPLORATIONS AND INSPECTION OF MINES,

Conducted by the Geological Survey Department, 1877–78.

Dr. HECTOR to the Hon. the COLONIAL SECRETARY.

SIR,— Wellington, 29th May, 1878.

I have the honor to forward, for the information of the Hon. the Minister for Public Works, an interim report on the present state of the coal mines of the colony by the Assistant Geologist, who was last year appointed Inspector of Mines, with the view of giving a tentative effect to the provisions of "The Regulation of Mines Act, 1874."

The total number of collieries in the colony at present is 32, of which 26 have been examined since the above appointment was made; and the record plans of all the mines have been brought up to date. These are as follows:—

	Date of Inspection.	Output for past Year in Tons.
Malvern Hills—		
1. Canterbury Colliery	1st November, 1877	1,000
2. Wallsend „	3rd February, 1878	1,462
3. Springfield „	26th October, 1877	1,435
4. Stevenson „	19th October, 1877	...
5. Homebush „	13th October, 1877	2,235
Oamaru District—		
6. St. Andrew's Colliery	10th November, 1877	50
7. Prince Alfred „	14th November, 1877	2,045
8. Awamoko „	16th November, 1877	400
Otago Coal Fields—		
9. Real Mackay Colliery	11th and 22nd January, 1878	306
10. Bruce „	11th and 19th January, 1878	1,583
11. No. 1 Kaitangata Colliery ...	10th December, 1877, and 9th January, 1878 ...	1,872
12. Kaitangata Coal Mining Company	5th December, 1877, and 9th January, 1878 ...	10,477
13. Shag Point Colliery	27th November, 1877	2,622
14. Otago „	June, 1877	2,941
15. Freeman's „	June, 1877, and 7th January, 1878	5,006
16. Walton Park „	June, 1877, and 7th January, 1878	16,000
17. Samson's „	June, 1877, and 7th January, 1878	8,000
18. Saddle Hill „	June, 1877, and 8th January, 1878	4,000
19. Lawrence „	3rd June, 1878	1,351
Greymouth District—		
20. Wallsend Colliery	25th February, 1878	440
21. Coal-Pit Heath Colliery ...	20th February, 1878	6,138
22. Brunner „	22nd February, 1878	21,974
Reefton District—		
23. Energetic Colliery	15th March, 1878	500
Buller District—		
24. Wellington Colliery	2nd March, 1878	948
Collingwood District—		
25. Parapara Colliery	31st March, 1878. Closed...	...
Auckland District—		
26. Miranda Colliery	January, 1877	600
27. Rahuipokeka „	February, 1877	...
28. Kupakupa „	February, 1877	5,200
29. Taupiri „	(Not yet visited)	600
Whangarei—		
30. Whauwhau Colliery	10th March, 1877 ... ... (estimate)	2,000
31. Kamo „	March, 1877	1,200
Bay of Islands—		
32. Kawakawa Colliery	April, 1877	36,599
Total Output for Colony		138,984

For the output of coal from mines which have not been inspected during the past year I am indebted to the directors and managers. The most notable feature in the development of the coal fields during the past year is the great increase in the consumption of the Kawakawa coal, owing mainly to the circumstance that the Union Shipping Company have adopted it for their coastal steamers, and report most favourably of its utility as a steam coal.

The total quantity of coal imported during the past year is, from the attached return—

	Tons.	
New South Wales	149,266	
Other sources	6,730	
		155,996

It thus appears that the total consumption of coal in the colony during the past year has been 294,980 tons, of which 138,984 tons are derived from our own mines at present.

A schedule of analyses of the coals from the various mines is appended.

I have, &c.,
JAMES HECTOR,
Director, Geological Surveys.

The Hon the Colonial Secretary, Wellington.

Enclosure No. 1 in Appendix M.

ANALYSES of COALS from the various Mines of New Zealand.

Name of Colliery.	Fixed Carbon.	Hydro-carbon.	Water.	Ash.	Evaporative power.
Bay of Islands—					
Kawakawa	57·20	36·0	4·60	2·20	7·4
Whangarei—					
Whauwhau	47·50	41·44	7·56	3·27	6·1
Kamo	50·58	36·52	9·25	3·65	5·5
Waikato—					
Kupakupa	44·40	35·30	18·90	1·40	5·7
Rahuipoheka					
Miranda					
Malvern—					
Springfield	59·9	26·6	9·4	4·1	7·7
"	47·8	27·8	18·2	6·2	6·1
Homebush	41·8	29·6	26·2	2·4	5·4
Wallsend	36·8	29·1	26·8	7·3	4·7
Canterbury	46·02	26·99	21·66	5·33	5·9
Stevenson	53·30	32·95	9·98	2·75	6·9
Oamaru—					
St. Andrew's	39·76	35·60	17·18	7·46	5·2
Prince Alfred					
Awamoko					
Green Island—					
Otago	41·23	36·97	18·07	3·49	5·3
Walton Park					
Samson's					
Freeman's					
Saddle Hill	42·39	41·04	14·22	2·29	5·5
Tokomairiro—					
Bruce	41·57	40·93	11·60	5·90	5·4
Real Mackay					
Kaitangata—					
Shores No. 1	...	...	...	...	...
Kaitangata Company	44·18	38·22	15·41	2·19	5·7
Greymouth—					
Brunner	53·50	41·28	1·41	3·81	6·9
Coal Pit Heath	59·38	34·48	1·05	4·09	7·7
Wallsend	53·08	41·95	·99	3·98	7·

Enclosure No. 2 in Appendix M.

RETURN of the Quantity and Value of COAL Imported into and Exported from New Zealand for the Year ended 31st December, 1877.

COAL IMPORTED.

Countries from whence Imported.	Quantity.	Value.	Remarks.
	Tons.	£	
United Kingdom	6,345	9,978	
New South Wales	149,266	230,082	
Victoria	52	77	
Queensland	200	300	
Tasmania	133	201	
Total Imports	155,996	£240,638	

Enclosure No. 3 in Appendix M.

COAL EXPORTS.

Countries to which Exported.	Quantity.	Value.	Remarks.
	Tons.	£	
New South Wales	130	130	100 tons of this coal was obtained from Westport in December quarter; 137½ tons from Auckland; 2,421½ tons from Greymouth.
Victoria	2,521	1,930	
Norfolk Island	1¼	2	
Friendly Islands	6½	10	
Total Exports	2,658¾	£2,072	

30th May, 1878.

WILLIAM SEED,
Secretary and Inspector of Customs.

Enclosure No. 4 in Appendix M.

Mr. S. HERBERT COX to the DIRECTOR of GEOLOGICAL SURVEY.

Report on the Coal Mines of New Zealand inspected during the past Year.

SIR,— Geological Survey Office, Wellington, 27th May, 1878.

I have the honor to inform you that during the past year the whole of the coal mines of any importance in the South Island have been inspected, and that where no plans previously existed surveys have been made, and the plans are now in the possession of the Department.

In many cases the workings have not been found to be in a satisfactory state, the want of ventilation being, generally speaking, the greatest defect, although there are other points which require remedying at certain collieries, and these will be pointed out when each mine is reviewed in detail.

The following list of statistics has been compiled from notes furnished by Mr. Denniston, who has been engaged on the surveys of the various collieries; and it will be found to contain much valuable information in a form best suited for comparison.

[For Table of Statistics *see* p. 93.]

The Canterbury Colliery (Jebson's), Malvern, is the oldest working colliery in that district, and is situated close to the Sheffield Railway Station. It was visited 1st November, 1877.

The coal wrought here is as follows:—Coal, 2 feet; shale, 1 feet 6 inches; coal, 2 feet; the full thickness of which is worked out.

The workings are carried on upon no one system, but vary from post-and-stall to longwall. The coal has been entered upon by tunnels, and the one at present in use does not serve to drain the workings, the water finding vent through the old workings to dip, to an abandoned drive near water level.

The roadways are 6 feet by 6 feet, well driven, and supported by solid pillars 8 yards square on both sides, and are generally in fair working order. Where timbering is necessary it has been undertaken in a workmanlike manner, props 8 in. to 9 in. diameter being employed, with cap-pieces equally strong in proportion, the result being that in no case are these giving to the pressure upon them.

To the dip of the present workings all the coal has been stooped out from the boundary of the lease to near the present working tunnel.

The ventilation is satisfactory, the downcast air being taken by the tunnel along the working-faces in one body, and discharged by a small shaft placed to the rise of the workings.

A plan of the workings of this colliery exists, a tracing of which has been obtained.

This mine is not now in constant work, being only wrought to supply orders.

The Wallsend Colliery, Malvern, is situated about half a mile to the east of the South Malvern Township, and within two chains of the White Cliffs branch line of railway. When Mr. Denniston was engaged in examining the collieries in this district in October last, admission to this mine was refused him; but subsequently he received permission to inspect it, and in consequence paid another visit to the district, on the 3rd February, 1878.

This mine is worked by a shaft 6 feet by 4 feet, sunk through soft measures to a depth of 91 feet, where a seam of coal 6 feet thick has been struck. A bore hole has been carried down for a further depth of 41 feet without any other seams of coal being met with.

The workings are at present small, and are confined to the north side of the shaft, the system employed being ordinary pillar-work, or post-and-stall, with levels and headings each 9 feet by 6 feet, and pillars 8 yards by 6 yards. They at present consist of one level, driven 323 links, and 3 headings from 40 to 176 links in length, all of which are very irregularly driven.

The level, and likewise the furthest driven heading, extend about a chain under the railway, and at those points the timber has given to the superincumbent pressure, causing a slight settling of the measures, and, should further mining operations be continued, a settling of the railway would in all probability result, unless due precautions were taken to prevent this catastrophe.

The irregular method adopted of extending the drives, more especially the level, has necessitated a large amount of timbering, which, although strong enough in itself to meet all requirements, is yet so badly put in as to be quite inefficient. The props and cap-pieces have, in all instances, been put in without joggles, while no sole-plates have been used under foot, the result being that the props sink into the soft shale floor, thus rendering the workings insecure and dangerous.

No attention is paid to the ventilation, the downcast air being taken down the shaft in the space allotted to the cage, while the upcast air is discharged through the small area in which the pumps work—a most unsatisfactory arrangement, and one which could not be expected to work under the most favourable circumstances. No attention is paid to leading what small current of air may at times exist, to the working faces, and at most places it is barely strong enough for a candle to burn, and many of the workmen have been compelled to leave for the above reason.

To insure good air in this mine it would be necessary to sink a new shaft, and before the workings progress much further it will be absolutely necessary to undertake this work.

Many defects exist about the fittings around this colliery, one, which is particularly dangerous, being that the slides for the cage are placed at the ends of the cage instead of at the sides, causing it to hang in only one slide when resting upon the catches at the surface, and also at the bottom of the shaft. An accident is liable to result from this at any moment, owing to the stripping of the slides. The shaft is also very inefficient in itself, being lined with 1-inch boards only.

Since Mr. Denniston visited this mine, it has been placed under the charge of a new manager, who is taking steps to render the workings more secure, but is still working under considerable difficulties. A small air-shaft has been sunk, and the slides for the cage altered, and a new cage has also been constructed. When I visited this mine on the 7th June, it was watered out in consequence of the late heavy rain, and the pumping appliances were quite unequal to the emergency; so that all mining operations were suspended until new pumps could be obtained, when it was proposed to erect 6-inch pipes.

It is further proposed to work the upper seam of coal, which is 3 feet thick, but is supposed to be of somewhat better quality than the main seam, which has been heretofore worked.

Springfield Colliery, Malvern, has been at work for 15 months, and is situated about six miles west from the Canterbury Colliery, near the entrance to the Kowai Pass. The coal which is worked here is 4 feet 6 inches thick, being one of several thin seams. It is entered on by an engine plane, driven eastward from the face of the hill for a distance, on the 26th October, 1877, of 569 links. From this the workings are opened out upon an ordinary system of pillar-work, which is, however, somewhat irregular at times.

The headings have been driven in places 9 feet by 4 feet 6 inches, and in others 5 feet by 4 feet 6 inches, the former having been undertaken with a view of obtaining cheap coal. It is, however, the intention of the company in the future to drive all these 5 feet by 4 feet 6 inches, and not endanger the safety of their workings. The timber which has been employed is amply strong, is well put in, and has not been in any way stinted where required.

The downcast air is led down the engine plane, thence along the working-faces, being discharged by a shaft 6 feet by 6 feet, and at the time of the survey was working satisfactorily, with a natural current. Provision is here made that, by a slight alteration of the stoppings, the ventilating current could be considerably increased if occasion required; but at present no change is necessary.

The air-courses are in satisfactory order, well secured, and free from fallen *débris*. A furnace is provided to assist the ventilation in close weather.

Prospecting shafts and bore-holes have been put down in this area, proving the coal to extend under the plains, but to be cut out to the westward by slates.

The Stevenson Colliery (Cordy's), Malvern, is small workings on the south bank of the Selwyn River wrought only for station requirements. The coal, which is 6 feet in thickness, is raised by a shaft 5 feet by 3 feet, and 130 feet deep, and is worked on the ordinary pillar system. The workings at present consist of one level driven 6 feet by 6 feet, and two headings each 4 feet by 6 feet, the main level having been extended at date of survey 472 links, and the further advanced heading 113 links, the total estimated output being 300 tons. Water-power is employed for winding and pumping, and when the colliery is working from 7 to 8 tons of coal per day can be raised.

The winding gear is in good order, a new flat 3-inch hemp rope being used. The cage is without a cover, a usual thing in the New Zealand mines; but this is not of so much importance, since it is only used for raising the mineral, a ladder being fixed in a small air-shaft to the rise for the use of the miners.

The pumps are $2\frac{1}{2}$-inch plunger, with 8-inch stroke, and are sufficiently powerful to cope with what water is at present in the mine.

The ventilation is somewhat imperfect, no care being taken to lead the air in to the face, and in the far ends of the workings it is at times very weak, although, while the workings are so small, and in the absence of fire-damp, no serious results are to be anticipated.

The roadways are in good order, with the exception of level No. 2, a few feet of which has fallen in. The timbering is principally done with black birch, and is in no way stinted, sets from 8 inches to 12 inches diameter being used, and well put in.

This mine, not being a sale pit, but only worked for station purposes, is necessarily only wrought from time to time; it is, however, in better general repair than most of the sale pits of the district which are regularly at work.

The Homebush Colliery, Malvern, is situated about 2 miles north-east of the Glentunnel Railway Station, on the White Cliffs branch line of railway, with which it is connected by tram.

The coal is entered upon by an adit drive of 5 feet x 4 feet, driven on the 13th October, 1877, for a distance of 676 links, with six headings breaking off from this from 236 links to 628 links in length.

The coal as it is driven on by these headings is worked upon a system of longwall, and, with the exception of a few minor pillars which are left, the whole body of the coal has been removed from the main adit drive to the present working face.

The walling up on each side of the roadways, which are left 4 feet wide, is in most instances done by tearing down the sandy shale which forms the roof, and building with it, while the remainder of the worked-out area is stowed firmly as gobbing or goaf.

Two seams of coal are at present worked, the sequence of the measures being as follows:—

	Ft.	in.	Ft.	in.
Surface ...	...			
Ironstone	1	0		
Sandy shale	3	0		
Coal	1	0		
Sandy shale	2	6		
Coal	1	8		
Sandy shale	4	0		
Coal	3	6		
			16	8

Dip, E. 10° S., 1 in 3.

while about 3 chains to the west a small prospecting drive is being put in, with a view of proving the existence of any lower seams of coal.

The workings are in fair order considering the system employed, but repairs to the roadway appear to be much neglected. Timber is too sparingly used, and where used is far too light, the props in most instances being only from 3 inches to 4 inches diameter; and, in all cases where pressure has been put on them, they appear to have given to the weight.

No attention is paid to leading the air along the working faces, the greater part of the intake air, for want of stoppings, being taken up the first heading to a small air-shaft near the mouth of the mine, while the air in the body of the workings, towards the face, is very foul, all but extinguishing the candle, while the air-course is choked with fallen debris owing to the timbering having given to the superincumbent pressure; and at the time of Mr. Denniston's visit (19th October, 1877,) Mr. Brown himself, the manager, considered it too unsafe to traverse. When I visited the mine on the 8th June, the ventilation appeared to be somewhat better; but the faulty timbers have not been replaced, and many of them are so crushed by the creep of the floor as to be entirely useless.

Hart's Coal Mine, on the banks of the Selwyn River, and near the Gorge, was formerly wrought by a tunnel, which has now fallen in. The coal here had been altered, probably by the dolerite flow, and is 2 feet thick. An approximate quantity of 8,000 tons has been obtained from it. At present an incline plane is being driven by a party of working miners, with a view of testing the existence of a lower seam. This has not yet been met with, but very little work had been expended up to the date of Mr. Denniston's visit, and when I visited the place the work was abandoned.

St. Andrew's Colliery, Oamaru, is a small colliery on the north side of the "Tables," facing the Waitaki River, and is worked by a tunnel, driven a distance of 885 links through conglomerate, cutting a seam of brown coal 10 feet thick.

The following is the sequence of the measures:—

	Ft.	in.	Ft.	in.
Fine quartz conglomerate ...	50	0		
Micaceous shale and impure fireclay...	25	0		
Coal	9	0		
Shale	2	0		
Coal	10	0		
			96	0

the lower seam being worked and the whole thickness won upon an irregular system of room and rance.

This colliery has been at work, off and on, for nine years, and has from time to time had to be abandoned in consequence of small portions of the workings catching fire, owing to the slack being heaped in the wrought-out area, and igniting spontaneously.

When visited, this colliery had just been re-opened, and the general repairs were being attended to, which, so far as proceeded with, appeared to be done in a workmanlike manner. A good current of air is obtained throughout these workings, the intake being led by the tunnel through the workings, at the extremity of which it is discharged by a small air-shaft.

Prince Alfred Colliery (Willett's), Oamaru, is situated about two miles to the eastward of the former. It is worked by an adit drive through conglomerate, similar beds being met with here to what are found at the St. Andrew's Colliery, but here the upper seam is worked, only the lower 6 feet being taken out, the remaining 3 feet being left as a support for the roof, which has been found to be very treacherous, the more so as the levels have been driven 10 feet wide and the stalls 15 feet—far too great a width for the safety of the workings when the character of the roof is considered. Already two falls have resulted from this wide driving, causing a subsidence of the measures, and necessitating a considerable amount of timbering, which has been well put in, and appears to be sufficiently strong to render the workings safe. No system of ventilation exists here at all, as there is no return air-course, and a few hours after commencing to work the mine has to be left, as the air becomes exhausted.

Awamoko Colliery, Oamaru, is situated on the banks of the Awamoko Creek, about 10 miles west of the two former collieries. The coal, which is 3 feet thick, is entered upon by a tunnel driven a distance of 2 chains, with one bord broken off and driven only a few feet. The workings are too small at present to merit any special remarks on the system employed, &c.

The Real Mackay Mine, Tokomairiro, is situated about 5 miles to the south-east of the Tokomairiro township, and is in the same seam of coal as that worked by the Bruce Coal-Mining Company, the face being about 12 chains south of the company's prospecting drives. The coal here is quarried on a face, and delivered into carts direct, as no underground workings exist, the coal being worked open cast.

The output from this mine, and also from the Bruce Colliery, is limited to local consumption, since their being situated 5 miles from any line of railway necessitates cartage for that distance, which can only be done at a moderate rate in the most favourable weather, and even then they can scarcely compete with the Kaitangata and other mines, who can bring coal to Tokomairiro at a cheaper rate than these companies can, which entirely precludes their sending their coal to other districts.

The coal appears to basin to the eastward of these mines towards Mount Misery, along the eastern slopes of which, towards Kaitangata, outcrops occur, as also along the banks of the Tokomairiro River. A coal field, therefore, exists here of considerable extent, a great part of which could be wrought level free.

Bruce Coal-Mining Company, Tokomairiro, is situated a few chains north of the last mentioned mine. The coal here is 10 feet thick, and is wrought by a tunnel which has been driven through a spur a distance of 12 chains 96 links. This tunnel, which serves the purpose of a main level and air way is along the base of a trough, the measures rising on each side of it, and the workings have been opened out on the north-east side upon an irregular system of room-and-rance. Five feet of the lower part of the seam only is won, leaving the remainder overhead to protect the roof, which, from its soft nature, requires some such support.

The roadways are at times very troublesome owing to creep, as the coal is taken out right to the floor, which is fireclay, and swells when it is exposed to the weather. To obviate this it will be necessary to leave at least 1 foot of coal under foot, as is done in the Green Island collieries, and I think this extra foot might be taken overhead without in any way endangering the safety of the workings.

The workings are generally in fair order, and the ventilation is all that can be desired.

The timber employed is in no way stinted, is well set up with props and cap-pieces, whilst the spaces are built up, thus taking much of the superincumbent pressure from the timbers, which are in no way giving.

The present workings cannot be expected to be of any great extent, as the coal is lapping on to a slate ridge to the north-east, at a distance of about 2 chains from the main level, and the coal generally poors in that direction. The coal undulates considerably here, but at a distance of 20 chains, south-east, and further south from there, three prospecting drives have been entered upon coal of good quality, 10 to 12 feet in thickness, and dipping steadily north-east. It is at this point that the future permanent workings may be looked for, the coal basining from the slate ridge to dip, or towards the Real Mackay outcrop.

No. 1, *Kaitangata Colliery (Shores').*—The coal which has been worked in this colliery is a higher one than that in the Kaitangata Company's workings, and is only 3 feet 9 inches thick, dipping east 1 in 3. It is entered upon by two tunnels, driven a little off the strike of the coal, with headings or V levels placed at a slight angle to the tunnels, an irregular post-and-stall workings being thus obtained. This system appears to give a safe working, the levels and headings being driven of a fair average width, being well timbered, with shale walls built in the intervening spaces, thus easing well the pressure off the stoops, which stand well, and show no indications of being weighted.

The coal has here been wrought out to the march, and the pillars are now being stooped back upon, and, as the conglomerate roof appears to stand well, the removal of the whole of the coal can be undertaken with safety.

The ventilation of this mine is satisfactory, the downcast air being led by a tunnel at a low level, in which it is confined until reaching the working faces, whence it is discharged along another tunnel, at a higher elevation.

A new shaft is being sunk, with a view of cutting the seam wrought in the Kaitangata Company's workings, which, at date of survey, 10th December, 1877, was sunk to a depth of 52 feet through conglomerate.

Kaitangata Coal-Mining Company.—This mine has been opened on a somewhat broken or irregular system of post-and-stall, the posts being cut at short distances, with a view of winning as large a proportion of coal as possible as the workings advance. These are generally sound and in good order, the conglomerate forming a safe, strong roof. The timber employed is of sufficient strength, and is well set up, in no instance giving to the pressure.

The ventilation here is perfectly satisfactory, the downcast air being led along the level until reaching the working-faces, along which it is allowed to spread, the return air being taken from the end of the main level through the waste, and being eventually discharged through a small air-shaft.

Numerous faults are being met with in these workings, which are now noted on the plans made by Mr. Denniston, the company not being in possession of any plan previously.

Lately a change has been made in the system of working this mine, viz.: in place of leaving from 8 feet to 10 feet of the lower part of the coal, the whole thickness is now taken out in the headings, the roof being found to stand equally well under this system as under that formerly adopted.

The Shag Point Colliery is wrought by an easy incline plane cutting the coal about 3 chains from the entrance, and continued on the coal, forming the main level of the mine. The coal is wrought upon an irregular system, which approaches nearest to post-and-stall. The workings were originally set out on a system of room-and-rance, which has not, however, been adhered to; but on the whole the system adopted gives a sound workings, to which both the roof and floor are all that could be desired.

A small extent of the wrought area has recently been on fire, having been ignited by the furnace which is used in the upcast air-shaft. This fire at one time threatened to destroy the whole mine, but at the time it was visited it had been well got under by building stoppings across the mouths of the rooms and headings round the ignited area, thus cutting it off from other portions of the mine.

The material used for these stoppings was shale, puddled with clay, a light material to resist any great pressure of black damp which might gather in the waste, and at the time of the survey the

manager, Mr. McIntosh, was making bricks for permanent stoppings; which, however, he does not appear to have used, as I hear that the fire has again broken out.

The system of ventilation adopted was that of leading the air in one body through the workings. The downcast air is taken by the incline plane, thence, spreading through the workings, it is taken to a small air-shaft placed to the rise of the measures, thus giving a natural current, which works fairly. At times, however, the air all but balances, owing to the quantity of black damp emitted from the area on fire fouling the main upcast air-course. This could be overcome by giving less spread to the air, and confining its course more to the working-faces.

Very little timbering has been found necessary in this mine, but what is used is amply strong, and is in no way stinted where necessary. The following is the sequence of the measures:—

	Ft. in.	Ft. in.
Surface	...	
Soft yellow sandstone	...	
Shale	1 0	
Coal	3 10	
Shale	4 0	
Coal	1 0	
Fireclay	0 6	
Coal	8 0	
	——	18 4

Dip, N.E., 1 in 3½.

As a general rule, 6 feet only of the lower part of the lower seam is worked, leaving a thickness of 1 foot to 2 feet overhead, but in some instances a greater thickness is won, the shale and fireclay being used for walling-up.

Since writing the above, I have visited the mine, and find that all the old workings have had to be closed, in consequence of the fire breaking out afresh, the shale stoppings having proved inefficient for their work. A dip drive has since been entered, and the coal struck, so that mining operations are again resumed; but great expense has been incurred and a considerable loss sustained by the company, in consequence of sufficient precautions not having been taken in the first instance to keep the fire under. A shaft is also being sunk to the dip, but at the time of my visit the coal had not been struck.

The Wallsend Colliery, Greymouth, has only been at work for two months, the output to date being 440 tons. The system adopted is that of ordinary square work, and at the date of survey, 25th February, 1878, the workings consisted of two levels breaking off north and south from the shaft, with two headings bearing east. The north level is driven about 200 links towards the river, while that to the south is driven a distance of 100 links, the headings being about 60 links in length.

The levels and headings are driven of a uniform height of 8 feet in the upper part of the coal, but are working down at a slight angle with the coal, in order to gain the floor as the workings advance, which would then be kept, all drives being of a uniform height of 8 feet, and the bords or stalls 8 yards, wide, the total thickness of 16 feet being taken out. These would be large bords to remove, but, in view of the good roof and the dimensions of the pillars, 10 yards x 20 yards, it is not probable that the safety of the mine will be impaired by this, if good substantial shaft-pillars be left. The shaft is circular, 11 feet diameter, lined with brick laid in cement for a depth of 28 feet from the surface, and is bratticed off in three divisions, as follows:—

	Ft. in.
Winding space for two cages	7 6
Space for pumps	2 6

these two divisions being used jointly for the downcast air-current, the remaining space being used as an upcast air-course, connecting, at a depth of 16 feet from the surface, with a small shaft from the surface, at the mouth of which is erected a 15-feet fan, and which it is proposed to drive with a small portable engine. The coal being found to emit a large proportion of gas, it has been found necessary to erect this fan in order to procure the necessary ventilation, and by this means a good current should be obtained so soon as the first bord is broken through; in the meantime the air is led to the working faces by means of temporary screens along the centres of the drives. The foulness of the air has, up to the present time, necessitated the exclusive use of safety-lamps, but when a reliable ventilating current is obtained in the manner just mentioned it will in all probability be found to be perfectly safe to work with naked lights.

Pumps are necessarily used here, 10-inch pipes being employed, the height of the column being 670 feet, consisting of a lower lift of 270 feet to lodgment, worked by a bucket-lift, the upper lift of 400 feet being worked by plunger-pumps.

The winding-gear consists of 2 cages hung on a new 3½-inch Newall's steel wire rope, the power employed being a 40 horse-power horizontal engine used for pumping and winding.

No timber has as yet been required for these underground workings.

The general condition and repairs of the colliery appear to be in every way satisfactory, and the workmanship is in all cases of the best, due attention being paid both to the strength and quality of the material.

The Coal Pit Heath Mine.—This colliery has only been at work for 10 months; the levels, headings and bords are, however, well driven and well broken off. The full thickness of the coal is wrought out in the bords, while in the headings and levels 10 feet of the upper part of the seam only is worked. The mine has recently been handed over to a new manager, who has begun to take up the bottom coal in the headings and levels, leaving from 1 to 2 feet of coal under foot. The air in the workings is somewhat defective, but when the erection of a few screens, which is about to be undertaken, is completed a good current should be led in to the face. The downcast air is taken by the working shaft and allowed to spread through the workings, the upcast air being discharged by a 6 feet diameter circular

shaft, placed near the boundary of this company's and the Brunner Mine's leases. The natural current thus obtained is generally relied upon for ventilation, but in close weather a fire-bucket is hung near the mouth of the air-shaft.

The timbering generally used throughout these workings consists of props, with small cap-pieces, (soldiers) varying from 6 inches to 8 inches in diameter, which generally stand well, and, in view of the excellent roof, are probably of sufficient strength in most instances for the requirements of the colliery.

The winding-gear used consists of two cages, with covers, hung on a new flat 6-inch hempen rope coiling on a drum driven by 30 horse-power engine, which is used for both pumping and winding, disconnecting as required.

The pumping-gear consists of a 250-feet column of 10-inch pipes, worked by a bucket-lift with 4-feet stroke. The water not having as yet proved troublesome in this mine, two hours pumping during the day has been found sufficient to keep it back.

With the general condition and repairs no fault can be found, and if, as the workings extend, they be kept in as good order as heretofore, the greater portion of the pillars, and consequently a large proportionate tonnage, will be won from the mine.

The Brunner Coal Mine.—This coal is wrought level free, being entered upon by tunnel in the face of the coal at the Brunner Gorge of the Grey River. The system of working is that of post-and-stall, leaving pillars 58 feet by 100 yards. In the early days of the mine, the workings appear to have been somewhat irregular, no attention having been paid to straight driving. The full thickness of coal has also been taken out, leaving a fireclay-floor, which, experience shows, is apt to swell, to the detriment of the roadways, also necessarily reducing the strength of the pillars; yet, still, these old roadways appear to have been kept in comparatively good order, although in some instances the pillars are giving to the pressure, but not as yet to a sufficient extent to endanger the safety of the workings. When, however, the stooping back on the pillars commences, some of these will probably be lost where the whole thickness of the coal has been taken out.

This mine has recently undergone a change of management, and now, under the charge of Mr. Elliott, a better system of work is being undertaken, due attention being paid to the straight driving of roadways where practicable, although at times the undulations of the floor render bends in the roadways necessary in order to obtain a high working.

In most instances the full thickness is not wrought out, about 2 feet of coal being left in, to form the roadways, and also to strengthen the pillars. This also lessens the necessity of timbering, upon which at times very little reliance can be placed, when set upon the fireclay.

In these recent workings everything is being done to obtain a safe and good workings, and at the same time to win as large a proportionate tonnage as possible from the mine, as the works progress, without ultimately endangering the safety of the workings.

The air is found to work well, an ample volume constantly passing, and in all instances reaching the working-faces. The downcast air is taken by the lowest tunnel (No. 1 plan) being confined in its course by stoppings set in the cross roadways and bords; and upon reaching the working-faces, it is split into two divisions, and, spreading through the workings, is discharged by tunnels Nos. 2 and 3.

The fact that this mine is wrought by tunnels which face up the Brunner Gorge renders an imperfect ventilation, even under the most careless management, all but impossible, owing to the constant high winds, but at the time this mine was visited the weather was very hot, and the natural heat of the mine was 1° less than the temperature outside; notwithstanding which a good current was found to be passing along the workings.

The system of timbering employed is exclusively by the use of soldiers, which, when the thin floor of coal is left, answer all requirements; but when the whole thickness of coal is taken out the swelling of the fireclay or shale underfoot has in many cases broken the timbers, and in others rendered them quite unserviceable.

Attention has of late been directed to the proving the great fault which crosses to the north side of the workings. Two drives have been entered along the strike of the fault, bearing about N. 15 E., in the lower of which coal has been cut, standing on edge and bruised; the continuation of this drive will shortly determine what course should be taken to gain the sound measures, but this object would also be somewhat sooner gained if the drive were kept a little off the hade of the fault.

The Energetic Colliery, Reefton, is situated on the Murray Creek, about a mile from the Energetic Quartz Mine, and is wrought by a tunnel entered upon the coal on the north side of the creek. The workings undertaken are upon no system, and at present are of small extent. They consist of a tunnel driven for about half a chain, from which the coal is opened out on a wide face, leaving soldiers or props closely set for the support of the roof, and hewing out the whole thickness of the coal.

The full extent of the workings at present, from the mouth of the tunnel to the working-face, will not exceed one chain, but the soft nature of the roof (soft, loose, quartz sands) does not warrant the wide mode of working which has been adopted, and the loose method of timbering may at any time be attended with an accident, which would probably result in loss of life. No supervision appears to be exercised over the workmen employed here: the mine is let to two men at a price per ton, and they are allowed to hew the coal in any way which may be easiest to themselves.

The ventilation of the mine is imperfect, indeed no system of ventilation exists, the mode of working giving no free current of air and allowing of no return, and when the mine was visited it was with difficulty that a candle could be got to burn.

The Wellington Colliery, Buller District, when visited, on the 2nd March, had been worked by the company for about ten months. The prospecting drive, which had originally been entered by Sims and party, striking soft coal, has now been continued for a distance of 1,240 links eastward under the spur,

showing at the face coal of the same crushed and bruised character as at the entrance, with a steady dip N.W. from 1 in 1 to 1 in 2.

The coal is 18 feet thick, with an irregular and broken roof, which has necessitated close timbering with props and caps, and close lathing overhead and at the sides, the dimensions of the main drive being 6 feet by 7 feet in the centre of the coal. From this drive eleven short headings have been driven, 6 feet by 6 feet, connecting with an upper level 6 feet by 7 feet, leaving pillars 40 feet by 30 feet to 50 feet, the workings being set off on an ordinary system of square work. This upper level is driven about the same distance as the main level, and still shows soft coal in the face.

The intake-air is led by the main drive to the face, being confined by screens placed across the headings, the return air being discharged by what is known as Hector's tunnel, a little to the rise of the main working tunnel.

The natural temperature of the mine when visited was 66°, the same as the outside atmosphere, the day being close, and thus no ventilating current was obtained. Even under these circumstances, however, no foul air was found in the workings, and under ordinary circumstances there ought to be a good current of air.

In the main drive sets of timber are used, consisting of uprights and cap-pieces 4 feet 6 inches apart, close lathed overhead and at the sides, whilst in the headings soldiers only are used in a few places, and in the upper level but very slight timbering is undertaken. In no case does the use of timber appear to be stinted where requisite, and what is used is sufficiently strong for the requirements of the mine.

The coal at present worked is found to be too soft to stand transit, and has necessarily not proved a marketable commodity, in consequence of which six coke ovens have been erected, and coke of a superior quality is now being made.

The Parapara Colliery, Collingwood.—This mine is situated about 800 feet above sea level, and is entered upon by a tunnel driven westward across the measures for a distance of 588 feet, cutting in its course four thin seams of coal, mixed with shale, the general dip being W. 1 in 4 to 1 in 5.

Three of these seams have been opened upon, upon a system of longwall, with levels driven north and south, the full thickness of the coal being taken out, as well as from 2 feet to 3 feet of the roof, thus allowing roadways from 5 feet to 6 feet in height, the coal being wrought to the rise (eastward). The roof is a hard, compact rock, and in all instances where required, has been used for walling.

The system of working adopted suits admirably the requirements of the mine, the worked-out area standing well, with the use of very little timber.

The cost of working this coal has been from 8s. to 9s. per ton for hewing, and if any other system of work had been adopted this cost would probably have been doubled.

The ventilation of this mine is perfect, the downcast air being taken by the lower drive, led along the working-faces in one division, and discharged through some old upper workings with which connection has been made by a shaft, thus giving a good current of air at all times. No timbering has yet been required, the compact nature of the roof rendering it a simple matter to tear down sufficient stone to build walls, when occasion requires, along the line of roadway.

For the past two years these workings have been stopped, mainly in consequence of the cost of hewing the coal, the company being unable to compete with other districts, but also on account of the bands of blaze which occur with the coal, and have been found, from their hard partings, to be very difficult to separate, necessarily depreciating its market value.

The Green Island Collieries were fully reported on last year by Mr. Denniston (Geological Reports, 1876–77, pages 143 to 153); but I have since visited them myself, and Mr. Denniston is now engaged on the extended surveys of these mines.

The Otago Colliery, where the ventilation was reported last year as being very defective, has been closed for seven months during the past year in consequence of the workings taking fire. The fire is now, to all appearance, nearly out, the ignited area having been built off with stoppings puddled with clay, and mining operations have been recommenced, the workings now being confined to the south side of the shaft, the main heading being extended to the rise for a distance of 50 feet beyond what had been reached when the survey of the mine was made last year. It is not considered safe as yet to break into the old workings, and it will be well to make quite sure that the fire is out and the temperature reduced before this is done, as any extension of the fire now would be as disastrous here as at Shag Point, and would entail a great expense to get it under.

The Saddlehill Colliery.—Little has been done during the past year towards extending the workings to rise, the principal work which has been undertaken being the sinking of a new shaft (about 6 chains from shaft No. 1) to the dip, coal being cut at a depth of 120 feet. Roadways have been commenced from the bottom of this shaft to the rise, and it is proposed to work the coal upon the same system as heretofore adopted, viz., room-and-rance.

The Walton Park Colliery.—Nothing new of any importance has been done underground since this mine was surveyed by Mr. Denniston last year. At the shaft the bords running parallel with the north level have been worked continuously, no coal having been wrought from those south of the shaft, and at the tunnel or dip drive, the bords running parallel with the south level have been worked continuously.

A new shaft has been sunk near the loading stage to a depth of 90 feet, the engine in use being a 25 horse-power single-cylinder horizontal engine, with suitable winding-gear, both built on strong foundations of brick and cement. The pithead frame is of Oregon pine, 45 feet high. The stroke of pumps is 4 feet 6 inches, and size of pipes 10½ inches.

Samson's Colliery.—During the past year the work in this mine has been devoted to the extension of the south level about 4 chains, three headings having been broken off the rise, with bords or rooms at the proper distances apart, in a similar manner to those shown on the plans of last year. The wrought area, which was noted as extending below the railway, has not been in any way interfered with during the past year.

Freeman's Colliery.—During the past year the incline plane has been extended about 70 feet further to the dip, four new bords or rooms being broken off, and driven north and south respectively along the plane of the coal, whilst those rooms which were commenced before the survey was made last year have been further wrought during the past year. Mr. Denniston drew attention last year to the fact that some of these rooms were being driven from 16 feet to 18 feet in width, with a comparatively small thickness of wall between each room (Geological Reports, 1876-77, page 145), and pointed out that waste was likely to result from this.

During the past year four rooms have been lost by the roof giving way, fortunately without injuring any of the men employed. and the proprietor, Mr. Freeman, has determined in future to drive all his rooms 14 feet in width, which, if the rances be in proportion, will secure a safer and more lasting workings.

The Lawrence Colliery, Otago.—This colliery is situated in the Township of Lawrence, on a reserve of fifty acres leased from the Otago Waste Lands Board. In the early days of this mine the coal was wrought open cast in the bed of a small creek along the west side of the area. This system, which necessitated surface stripping, soon proved too costly, besides which the water became troublesome, and the proprietors, Messrs. Gunn and Spence, then placed a small shaft, 11 feet by 4 feet, about three chains to the dip of the crop-workings, the strata passed through being loose shingle, with 12 feet of shale overlying the coal, which was struck at a depth of 95 feet.

This shaft has been successfully employed for the past 16 months, working out, as a room-and-rance workings, 7 feet of the lower part of the seam, until, in April last, the workings were lost by the falling-in of the shaft, which happening when no men were in the workings did not result in either loss of life or accident to any of the miners. The circumstances to which the accident is attributable appear to be that the water which had accumulated in the crop-workings, gradually draining through the shingle and shale, weakened and undermined the shaft, which eventually fell in. It was impossible to gain access to the workings when this mine was visited on the 1st June.

The proprietors are at present engaged in sinking a new shaft, 9 feet by 4 feet, about four chains to the dip of shaft No. 1, and on the 1st June a depth of 84 feet had been reached, the strata passed through being the same as in the former shaft. The depth of the coal is estimated at 150 feet.

The timbers now being used are 9 inches by 4 inches, black pine, against 9 inches by 2 inches in No. 1 shaft, which will allow of stronger lining, and, if puddled well from the shale to the roof of the coal, should form a substantial piece of work; but even then the soft nature of the overlying beds will render the workings of the mine unsafe and at any time liable to be flooded out, if some means be not devised to drain the water from the original crop-workings, and also those around the old shaft. If this is not attended to an accident will occur sooner or later, very probably resulting in loss of life, and certainly in considerable destruction of property.

I have, &c.,
S. Herbert Cox, F.G.S.,
Inspector of Coal Mines.

The Director of the Geological Survey.

(Enclosure.)

STATISTICS OF WORKINGS IN COAL AND IRON MINES.

Name of District.	Name of Colliery.	No. of Years working.	Quality of Coal.	Number and Thickness of Seams.	Dip of Seam.	Thickness worked.	System of Underground Workings.	Number and Dimensions of Shafts.	Output delivered by	Total Output from Mine.	Output for past Year.	Number of Men employed.	Average Quantity Won, per Man per Day.	Price paid for Hewing. 1.	2.	3.	Dimensions of Levels.	Headings.	Bords or Stalls.	Pillars.	Power used for drawing Minerals.	Stroke of Pumps.	Size of Pipes.	Height of Column	System of Ventilation.	Temperature. 1. Downcast.	2. Nat. Heat of Mine.	3. Ventilating Current.	Remarks.
										Tons.	Tons.		Tons.													Deg.	Deg.		
Malvern ...	Canterbury Colliery (Jebson's)	15	brown	2 seams, 2 ft. each	SE, 1 in 3	full thickness	post-and-stall (irregular)	1 upcast 3 ft. x 4 ft., 18 ft. deep	tunnel	15,000	1,000 coal 100 fireclay	4 underground 2 surface	2	4/6 delivered into shoots	per liver	ton ed	6 ft. x 6 ft.	5 ft. x 6 ft.	none	8 yds. square	trucked by miners from face to shoot	none	none	none	natural current, furnace in close weather	66	67	1	This colliery is in possession of a plan of their workings.
	Wallsend Colliery ...	¾	„	1 seam, 7 ft.	E 10° S, 1 in 3	7 ft. ...	ordinary pillar-work	1 shaft, 6 ft. x 4 ft., 91 ft. deep	shaft	1,462	1,462	9	2	...	5/6	...	9 ft. x 6 ft. 6 in.	9 ft. x 6 ft. 6 in.	9 ft. x 6 ft. 6 in.	8 yds. x 6 yds.	engine, 12 h.p.	1 ft. 3 in.	4 in.	91 ft.	natural current	58	59	1	
	Springfield Colliery	1¼	„	1 seam, 4 ft. 6 in.	SE, 1 in 6	4½ ft. ...	„	upcast air-shaft, 6 ft. x 6 ft.	engine-plane, 569 lks. long	1,991	1,435	9 underground 4 surface	2	...	4/–	...	5 ft. x 4 ft. 6 in.	5 ft. x 4 ft. 6 in.	9 ft. x 4 ft. 6 in.	10 yds. square	engine, 10 h.p.	1 ft. 6 in.	3 in.	...	natural current, and furnace in close weather	52	62	10	
	Stevenson Colliery (Cordy's)	3	„	1 seam, 6 ft.	E 10° S, 1 in 3	6 ft. ...	„	downcast, 5 ft. 5 in. x 3 ft.; air-shaft, 3 ft. 2 in. x 2 ft. 4 in.	shaft	300	not known	none when visited	1½	6/–	nil	nil	6 ft. x 6 ft.	4 ft. x 6 ft.	none	...	water-power	8 in.	2½ in.	130 ft.	natural current	47	51	4	
	Homebush Colliery	6	„	2 seams, upper, 1′ 8″ lower, 3′ 6″	E 10° S, 1 in 3	full thickness	longwall (irregular)	air-shaft, 5 ft. x 5 ft., 18 ft. deep	tunnel	4,695	2,235	10 underground 1 surface	1½	6/–	„	„	5 ft. x 4 ft.	4 ft. x 4 ft.	„	none	horse ...	none	none	none	„	49	53	4	
Oamaru, Awamoko District	St. Andrew's Colliery (Smith's)	9	„	2 seams, 10 ft. each	E to NE 1 in 4	full thickness, lower seam	room-and-rance (irregular)	air-shaft, 4 ft. 6 in. x 2 ft. 6 in.	„	4,500	50	1	2	...	5/–	...	10 ft. x 6 ft.	5 ft. x 4 ft.	rooms, 12 ft. x 6 ft.	8 ft. x 8 ft.	„ ...	„	„	„	„	56	72	16	This colliery has only been worked for three months during past year.
	Prince Alfred Colliery (Willett's)	1	„	2 seams, 9 ft. each	E 25° S, 1 in 5	6 ft. lower pt. of upper seam	post-and-stall (irregular)	air-shaft ...	„	2,045	2,045	4 underground 1 surface	1½	10/– per 3/– at p	per day, per m	man or ton outh	10 ft. x 6 ft.	4 ft. x 6 ft.	15 ft. x 6 ft.	...	trucked by miners to tunnel mouth	„	„	„	„	54	60	6	
	Awamoko Colliery...	1⅓	„	1 seam, 3 ft.	S to SW, 1 in 10	3 ft. ...	post-and-stall	none ...	„	420	400	3	1½	5/– 2/– to	... truc	... king face	6 ft. x 3 ft.	none yet	10 ft. x 3 ft.	6 ft. square	trucked by miners to surface	„	„	„	„	62	66	4	
Otago ...	Real Mackay ...	10	pitch	1 seam, 25 ft.	NE to E, 1 in 8	25 ft. ...	quarried in face	„ ...	...	6,373	306	4 or 5 at intervals	2 to 2½	...	4/–	...	none	none	none	none	delivered into carts at face	„	„	„	none	...	...	none	
	Bruce Coal Company	4	„	1 seam, 10 ft.	NE, 1 in 8	5 ft. to 6 ft., lower part	room-and-rance (irregular)	„ ...	tunnel	2,600	1,583	4	2½	... 2/–	4/– truc	... king	7 ft. x 5 ft.	12 ft. x 5 ft.	12 ft. x 5 ft.	12 yds. square	trucked by miners to surface	„	„	„	natural current	50	52	2	
	No. 1 Kaitangata Colliery (Shore's)	6	„	3 ft. 9 in....	W, 1 in 3	3 ft. 9 in.	post-and-stall (irregular)	„ ...	„	...	1,872	4	2¼	4/6 4/– st	in le dra oops	vel wing	3 ft. 9 in. x 8 ft.	none	none	10 ft. wide	trucked by miners to surface	„	„	„	„	58	65	7	
	Kaitangata Coal-Mining Company	2	„	27 ft. ...	W to NW 1 in 6	8 ft.; in places 20 ft.	„	air-shaft, 6 ft. x 4 ft., 52 ft. deep	„	14,077	10,477	20	2½	3/9	nil	–/8	10 ft. x 7 ft.	12 ft. x 7 ft.	„	7 yds. square	horse ...	„	„	„	„	56	61	5	
	Shag Point Colliery	15	brown	8 ft. to 10 ft.	NE, 16°	6 ft. to 10 ft.	„	air-shaft, 5 ft. x 3 ft.	tunnel, incline-plane	26,340	2,622	20	2¾	...	4/–	...	6 ft. x 6 ft.	6 ft. x 6 ft.	16 ft. x 8 ft.	12 ft. thick, varying lengths	„ ...	12 in.	5 in.	21 ft.	natural current, and small furnace in close weather	62	64	2	
Green Island, Otago	Otago Colliery ...	4	„	16 ft. ...	E, 1 in 10	6 ft. ...	room-and-rance (irregular)	1 shaft, 12 ft. x 4½ ft.	shaft	8,605	2,941	10	2 to 2½	4/6	3/10	...	6 ft. x 6 ft.	6 ft. x 6 ft.	rooms, 14 ft. x 6 ft.	4 yds. square	engine ...	none	none	none	natural current, fire-bucket in close weather	62	66	4	Water raised by tanks placed below the two cages.
	Freeman's Colliery	2½	„	16 ft. ...	E, 1 in 10	7 ft. ...	room-and-rance	none ...	incline-plane	10,521	5,006	11 underground 4 surface	2 to 2½	4/6	...	...	dip-drive, 6 ft. x 7 ft.	none	rooms, 14 ft. x 7 ft.	irregular	horse ...	„	„	„	natural current	62	78	16	
	Saddle Hill Colliery	4	„	19½ ft. ...	E, 1 in 10	10 ft. ...	„	3 shafts, 2 8 ft. x 4 ft., 1 4 ft. x 4 ft.	shaft	15,500	4,000	8	2½	...	3/8	...	12 ft. x 10 ft.	6 ft. x 10 ft.	15 ft. x 10 ft.	10 ft. x	„ ...	„	„	„	natural current, furnace in close weather	48	60	12	Water drawn by tubs.
	Walton Park Colliery	15	„	16 ft. ...	1 in 10	8 ft. ...	„	1 shaft in use, 12 ft. x 4 ft. 6 in., 175 ft. deep	tunnel	125,000	16,000	30 underground 7 surface	2½	4/6	3/10	...	8 ft. x 6 ft. 6 in.	5 ft. x 6 ft. 6 in.	14 ft. x 6 ft. 6 in.	12 ft. thick	engine at shaft, 8 h.p., horses at dip-drive	„	„	„	furnace ...	60	78	18	The prices paid for hewing include trucking coal to pit bottom.
	Samson's Colliery ...	5	„	14 ft. ...	1 in 10	7 ft. ...	„	2 shafts, 4 ft. x 4 ft., 5½ ft. x 4 ft.	shaft	35,000	8,000	25	2	4/6	3/6	1/6	9 ft. x 7 ft.	6 ft. x 7 ft.	14 ft. x 7 ft.	60 ft. x 14 ft.	engine, 15 h.p.	3 ft.	6 in.	130 ft.	natural current	62	66	4	
Greymouth ...	Wallsend Colliery ...	2/12	bituminous	16 ft. ...	SW, 2¾ in 12	8 ft. upper part	ordinary pillar-work	2 shafts, No. 2 11 ft. dia., 651 ft. deep	„	5,240	440 in 2 mos.	18 underground 2 surface	2½	2/10 bo	to ttom	pit	9 ft. x 8 ft.	6 ft. x 6 ft.	24 ft. x 16 ft.	10 yds. x 20 yds.	engine, 40 h.p.	5 ft.; can work to 6 ft.	10 in.	270 ft.	15 ft. fan	...	...	...	No. 1 shaft has been abandoned.
	Coal Pit Heath ...	10/12	„	16 ft. to 18 ft.	SW, 2¾ in 12	full thickness	„	main-shaft, 10 ft. x 6 ft., 280 ft. deep; upcast, 6 ft. dia.	„	6,138	...	20 underground 8 surface	4	3/6 –/6	... truc	... king	11 ft. x 10 ft.	8 ft. x 10 ft.	18 ft. x 18 ft.	14 yds. x 20 yds.	engine, 30 h.p.	4 ft.	10 in.	250 ft.	natural current, and fire-bucket in close weather	close not	day taken		
	Brunner Coal Mine	13	„	12 ft. to 16 ft.	SW, 1 in 4	„	post-and-stall (irregular)	none ...	tunnel	...	21,974	30 underground 10 surface	3	3/– 1/1½	... truc	... king	10 ft. x 8 ft. 6 in.	10 ft. x 9 ft.	18-20 ft. x 16 ft.	58 ft. x 100 yds.	self-acting incline	none	none	none	natural current	62	60	2	
Reefton ...	Energetic Coal Mine	4	pitch	8 ft. ...	SE, 30°	„	none ...	„ ...	„	1,442	...	2	2	8/6	...	...	8 ft. x 5 ft.	none	none	none	trucked by miners into paddock	„	„	„	„	62	68	6	
Buller ...	Wellington Colliery	1	bituminous (soft)	18 ft. ...	NW, 1 in 2 to 1 in 1	6 ft. centre of seam	ordinary pillar-work	„ ...	„	948	948	3 underground 5 surface	2½	6/6	...	...	6 ft. x 7 ft.	6 ft. x 6 ft.	„	40 ft. x 30 ft. to 50 ft.	horse ...	„	„	„	„	66	66	0	Day-close.
Collingwood...	Parapara Colliery ...	3	bituminous	3 ft. to 4 ft.	W, 1 in 4½	full thickness	longwall ...	„ ...	„	4,900	none	none at present	1½	8/–	to	9/–	All the coal taken out, walls built forming roadways, space filled in as goaf.				...	...	...	...	„	64	70	6	

APPENDIX N.

RETURN OF NATIVE COALS USED ON NEW ZEALAND RAILWAYS, FROM 1ST JULY, 1877, TO 30TH JUNE, 1878.

Section.	Trains run, exclusive of Ballast and Specials.	Total Mileage.	Total Weight carried.	Description of Coal used.	Quantity used.	Cost per ton.	Cost per Mile run.	Results as to Consumption and Cost compared with Newcastle Coal, New South Wales.
			Tons.		Tons.	s. d.	d.	
Auckland–Waikato	26 daily; 10 engines are daily in steam for this service	206479	37178	Brown (Waikato)	1980	8 4½	·96	Consumption of Waikato coal is as 115 is to 100 of New South Wales coal. The latter, however, costs 35s. per ton, equal to 3·50d. per mile run as compared with ·96d.; hence in using native coal there has been a saving of £2115 during the year. The Waikato coal has since been lowered from 8s. 4½d. to 6s. per ton.
Christchurch ...	...	11480	...	Brown (Springfield)	114·15	7 3	1·91	Average consumption of New South Wales coal per engine mile, 17·20 lb., cost, 2·61d.; same of native coal 22·39 lb., cost, 1·91d.; saving, ·70d.
Greymouth ...	...	...	...	Coke (Brunner)	156·15 lb.	...	1·57	
	Trials.	M. Ch.	1 Mile.					
Dunedin ...	5	62 10	7513·	Brown (Walton Park)	3,770	11 6	3·75	Average cost of New South Wales coal per engine mile, 4·50d.; same of three kinds of Otago brown coals, 3·67d.; saving, ·83d.
Dunedin ...	5	62 10	8462·5	Brown (Kaitangata)	2,948	12 0	3·	
Dunedin ...	5	62 10	7888·	Brown (Green Island)	4,033	12 6	4·34	

REMARKS.

Auckland–Waikato.—The only alterations required in the engines are three:—1. Closer fire-bars. 2. A pipe to discharge water on the hot ashes in the ashpan to cause evaporation, and thereby keep the bars cool, otherwise they would melt from the intense heat of the brown coal. 3. A spark-catcher on chimney. Total cost, £28.—A. V. MACDONALD, General Manager.

Christchurch.—The fire-boxes of the engines are modified to suit the native coal.—ALLISON D. SMITH, Locomotive Engineer.

Dunedin.—The engine with which the trials were made was an ordinary 10½-inch cylinder, 6 wheels coupled, Class F. The fire-bars were raised nearly level; air space about ¼ of an inch; the engine was also fitted with a spark-catching chimney. All the coal tried made plenty of steam, and, with a larger fire-box and increased bunker room, there would be little difficulty in using any of these coals. The Kaitangata clinkers badly, but this might be overcome by using a rocking-grate. Some inconvenience would also be experienced by passengers from the quantity of sulphur thrown off the Green Island and Walton Park coals. This would be especially felt when going through a long tunnel.—ALEXR. ARMSTRONG, Resident and Locomotive Engineer.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1878.

Price 5s.]