1937.

NEW ZEALAND.

PUBLIC WORKS STATEMENT

(BY THE HON. R. SEMPLE, MINISTER OF PUBLIC WORKS).

MR. SPEAKER,—

As indicated in my Statement to Parliament last year, a policy of expansion of public works has been followed by the Government wherever it was possible to obtain sufficient economic value to justify the work undertaken.

It is the endeavour of the Department to carry out public works to a standard commensurate with their importance, and particularly is this so with works which have a substantial economic value, but from the very fact that certain works will only reach their full value in the future it is the policy of the Department to maintain the same high standard with these works.

I have travelled with and spoken to many visitors from overseas, including Ministers of the Crown from other British Dominions, and all have expressed their surprise at the advanced state of our roading-system in this country, and this can truthfully be said also of other works under the control of the Public Works Department.

I have made it my duty to visit all important works that were in progress during the year. I have spoken to the workmen wherever I have gone and impressed upon them the fact that the Government expects them to give a fair day's work for the wages they are receiving. I am prepared to admit that on many works the men are earning high wages, but I am satisfied that, wherever work is carried out on the co-operative contract system, the State is getting good value for its expenditure. The men on every class of construction have improved wonderfully in skill and in output of work during the year, and now they are an army of men the nation can be proud of.

I have not, however, contented myself with consideration only for the earnings of the men. I have also given a great deal of thought to the social side of their welfare. Social amenities in the way of entertainment-halls, libraries, canteens, &c., have been provided. Apart from the help I have received from the Department's engineers, I wish to place on record the great assistance I have received from the New Zealand Workers' Union and the Y.M.C.A. in these matters.

The agreement made with the New Zealand Workers' Union, to which I referred in my last year's Statement, has resulted in practically all disputes about work

and working conditions being settled locally. The comparatively few disputes referred to me have been settled expeditiously, with the co-operation of the union officials in Wellington, and the interests of the Government as well as the men have been equitably conserved. Where workmen have ceased work in an unconstitutional manner the matter has been promptly and effectively dealt with. It must be remembered, and I hope appreciated, that my Department was faced with the difficulty of organizing a team of workmen from the army of unemployed in this country. Many of them had had their capacity for work destroyed during the depression years, while hundreds of other younger men had never learnt to work. In spite of these difficulties wonderful progress has been made.

An instance showing how it was possible to train men to special work within a short time was the erection of the Mohaka Viaduct on the East Coast Main Trunk Railway in record time, and considerably below the estimated cost. The erectors on this work were young men trained on the job. They were paid high wages as an encouragement to work, and they more than earned the increased rate of pay. This is just an example of what is occurring all over the Dominion on public works.

Improved accommodation for workmen has now been provided everywhere: married men have well-built three-room accommodation, and all camps are well provided with adequate drainage schemes and water-supplies.

The Y.M.C.A. is providing recreation and amusement in all large camps. It is doing this work well, and is of great assistance to the Department's staff. In order to make living conditions more attractive in the isolated places where most of the camps are, I have arranged for the Y.M.C.A. to sell radio sets on very easy terms to the workmen. The Department takes no direct action in the matter, but allows the Y.M.C.A. to obtain quotations for the sets through the Radio Traders' Federation and sell to the workmen under a hire-purchase system.

As an appendix to this Statement, honourable members will find a copy of the agreement between the National Council of the Y.M.C.A. and myself covering the whole procedure.

I gave an indication in last year's Statement that the policy of the Department would be to a large extent to expedite and lessen the cost of public works by the use of machinery. This has been done, and a sum of approximately £500,000 has been spent on modern plant for our works. This expenditure appears large, but the Department had no equipment to start with. When I tell honourable members that the Department has nearly twelve hundred works in hand requiring some type of plant, the disadvantages under which it was working can be realized. I have not endeavoured to replace men by machinery where it cannot be shown that a substantial saving will result, but rather to preserve the balance between speed and economy. There are many classes of work which can be carried out almost as economically by manual labour, supplemented by a small amount of mechanical plant, as they can be entirely by machinery, and in order not to increase the number of unemployed at the present time I have adhered to the former procedure even though some sacrifice has been made to speed in completing the work.

In other classes of work again the use of manual labour would be distinctly uneconomical, and only machinery is justifiable if the work is to be done at all. An example of this class of work is the formation of flying-fields for aerodromes. As an instance, the estimate to form an aerodrome at Nelson under the old system of utilizing the unemployed on relief work was £172,000. By machinery the work was estimated to cost £36,000, and a contract was actually let for this amount.

Under the manual methods of work on the aerodromes completed within the last few years the cost has been something like £600,000, whereas by the use of modern excavating plant entirely they should have been completed for approximately £200,000.

There are practically no construction works, of course, that do not obtain some benefit from the use of mechanical plant, but many can be done quite economically with a small quantity of plant to supplement hand labour, and where this can be done the Department has been asked to follow this method in the meantime.

Many instances of considerable saving in cost of construction can be supplied to honourable members, and indications of some of these savings are given elsewhere in this Statement. As stated above, the Department has spent fairly large amounts in the purchase of machinery, but, notwithstanding this, it has been able to increase the number of men employed from 13,696 when the present Government took office to a maximum of 20,100 during last summer, and the number now employed is approximately 19,000.

In travelling about New Zealand it has been apparent to me that the Department's men are employed on works that will help to restore the country to a full measure of prosperity. It has also been apparent that there is room for extension in some directions. While I am convinced that we are catching up rapidly on our main-highway and railway systems, I feel sure that more could be done towards the metalling of our backblocks roads. I have asked the Engineer-in-Chief to prepare a five-year plan for metalling these roads, and an estimated cost of completely metalling all roads used for the transporting of our primary products.

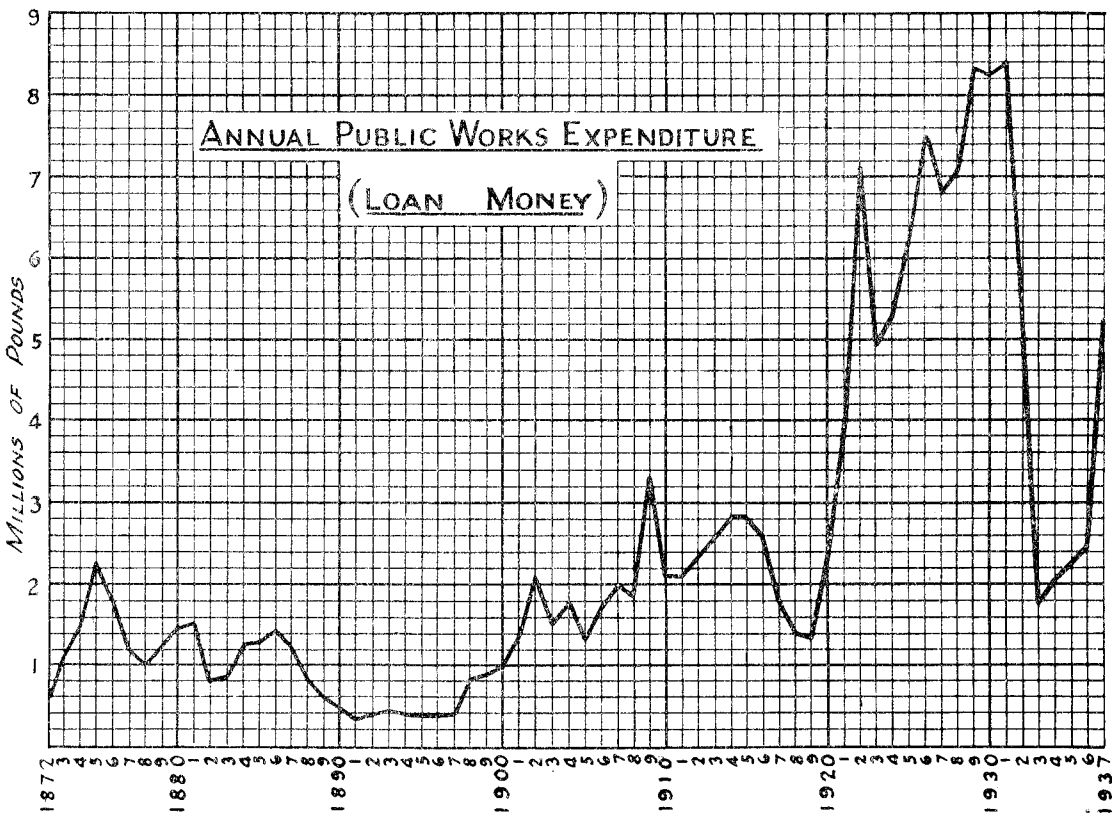
Side by side with this programme there must, of course, be a continued improvement in main highways to keep pace with the growing traffic from these country roads. For this reason, and because of the ever-increasing motor-vehicle traffic, and the apparent inability of local authorities to cope with it, 4,000 miles of highways were last year taken over by the Main Highways Board and made State Highways.

During the transition period arising from the foregoing circumstances, it became apparent that a small section of local-body opinion was still antagonistic towards the changes introduced. Complaints were made, in some cases publicly, that since the change-over the condition of State highways had noticeably deteriorated. In not a few instances anonymous criticism was directed against the Government's policy, but it was evident that this type of opposition was engendered in order to imply that conditions were quite different from the actual state of affairs. Investigations which were made in a number of particular cases showed that the complaints were exaggerated, and generally related to lengths of highway which were in process of reconstruction. It is usually recognized that while a road is being improved some inconvenience and delay must be expected, and this state of affairs is unavoidable because any disturbance of a road surface, necessitated by widening, regrading, realignment, or drainage operations, temporarily produces uncomfortable travelling-conditions, but this does not justify hasty criticism. Perhaps the most reliable judgment as to road conditions is to be found in the opinions expressed by bodies specially organized to watch the interests of the motoring public. These bodies have indicated that the general conditions of State highways are being materially improved, and have given their approbation to the change in policy. I am confident, however, that before very long, when the more extensive works now in hand are completed, and the departmental maintenance organizations are fully developed, the present unreasonable criticisms will totally disappear.

This year a sum of £1,150,000 will be provided from the Consolidated Fund for expenditure on maintenance of public works and services. The expenditure from Main Highways revenue will be £2,572,000; from the Electric Supply Account £745,000; whilst £567,500 will be made available from general revenue. Of the total expenditure under my control out of the Public Works Fund and other

accounts of £9,799,000, a sum of £3,884,500 will therefore be provided from revenue, representing approximately 40 per cent.

The diagram below gives the annual public-works expenditure from loan-money since 1872. It is interesting to note that for last year expenditure from this source does not reach the peak year of 1931, though the total expenditure from loan-money is returning to a normal and reasonable figure.



The proposed expenditure from loan-moneys on public works for 1937–38, as indicated in the Public Works estimates, is as follows :—

	£	£
(1) Construction and improvement of lines of communication—		
Railways—		
Construction of new lines ..	1,108,000	
Improvements and additions to opened lines ..	2,203,457	
		3,311,457
Highways and settlement roads—		
Construction and improvement of highways ..	1,906,000	
Construction and improvement of roads ..	966,000	
		2,872,000
Harbour-works and lighthouses ..	..	35,000
Telegraphs and telephones ..	..	750,000
		6,968,457
(2) Land-development—		
Land-improvement	156,500	
Irrigation	105,000	
Swamp-land drainage	23,000	
Settlement of unemployed workers	300,000	
Native land settlement ..	250,000	
Dairy industry loans	30,000	
		864,500

	£	£
(3) Development of electric power: Hydro-electric supply development		700,000
(4) Public buildings—		
Schools	550,000	
Postal buildings	365,000	
Mental Hospital buildings ..	160,000	
Air Defence buildings	210,000	
Other buildings (departmental, Justice, Police, Health, Agriculture, &c.)	404,000	
		1,689,000
(5) Development of tourist resorts		39,000
(6) Departmental supervision		180,000
		£10,440,957

The greatest item of expenditure this year will be on main highways. This is £4,165,200, of which £1,906,000 will be from loan-money.

It was desirable in the interests of the whole community that as many men as possible should be placed in full employment after long years of unemployment. Improvement of main highways to meet the demands and safety of increasing traffic offered a ready and justifiable means for the purpose of returning men to full-time useful employment. The undue loss of life and the number of personal injuries arising from road traffic made it necessary to render main highways safer for all classes of road-user. There is ample scope for activity in this direction, and my efforts to prevent daily tragic happenings on our public thoroughfares will not be relaxed until everything possible has been done to provide that standard of construction and maintenance on main highways which will ensure safety for everybody.

In my last Statement I referred to an extensive programme for the elimination of dangerous railway level-crossings, and to the desire of the Government to expedite this work. Notwithstanding the difficulties encountered in finding the best solutions to the problems arising from widely varying conditions, I am gratified to be able to say that very satisfactory progress, as indicated later in my Statement, has been made.

A large amount of money is being expended in many ways upon the improvement of main highways, but a tremendous amount of beneficial work is being done, and I feel sure that the results are being appreciated by the people as a whole.

I wish to take this opportunity of expressing my deep appreciation of the good work that is being done by the Main Highways Board, and the valuable assistance it is giving to the Government.

A vote of £1,108,000 is asked for this year for the prosecution of the Government's railway-construction programme. Particularly good progress has been made on railway works with the modern excavation plant now in use. A total of 2,800 men is now engaged on railway-construction.

The Napier–Putorino section of the East Coast Main Trunk Railway, which was damaged badly by the 1931 earthquake, has been completed and handed over to the Railways Department ahead of the anticipated time. Goods traffic is now running to Wairoa from Putorino over the section of line still retained by the Public Works Department. Owing to delays in delivery of steel and other materials the completion of this, as well as many other works, is being unduly delayed. The formation work on the line from Wairoa to Gisborne is well ahead, but the tunnels are the deciding factor in the completion of the line. There was some delay in obtaining plant for the tunnels owing to slow deliveries from England, but all plant is now installed. There are nearly four miles of tunnel to be constructed.

On the South Island Main Trunk and Westport–Inangahua Railways particularly good progress is being made. Tunnelling on the former railway is again the key to the rate of progress, but all this work is now well equipped with modern tunnelling plant.

A sum of £966,000 is proposed for expenditure on roads other than main highways for the current year. As I have said, I should like to extend a policy of completing metalled roads to all primary producers throughout the country. I have very definite ideas concerning the improvement of settlement roads, and I wish to make it clear that I do not intend these roads to be built to the standard of our main roads. The traffic they are asked to carry does not warrant this. I am decidedly of the opinion, however, that, before they are metalled, alignment and curvature should be laid out so that these roads can be progressively improved as the traffic increases. It is essential that once a road has been built to serve any district, it should be regularly and properly maintained. Too frequently a good road has been allowed to go back, and almost disappear through neglect. I look to local authorities to do their part in the upkeep of improved rural roads upon which the Government spends money.

It has not yet been found possible to make any very drastic alteration in the existing procedure in relation to hydro-electric development. During my visit to Australia, and at other times, I have given considerable attention to this important feature of the Government's activities, and as opportunity offers I hope to be able to effect improvements in the general organization of the electricity-supply business.

As indicated in my Statement of last year, work on a proposed development at Waikaremoana was stopped, and detailed investigations are being made on alternative proposals in this locality.

Following on the acquisition by the Government of the electrical works of the Southland Electric-power Board, arrangements have been made with other local authorities by which their local generating-works have either been taken over by the Government, or by which the local works have been closed down or retained merely as standby plants whilst the whole of the local power requirements are being supplied from the State system.

The various State hydro-electric schemes continue to show an improving financial position, and with increasing demands the position should still further improve. The revenue of the Electric Supply Account has grown to £1,216,468 this year, and a continued increase is anticipated.

Last year it was anticipated that a greatly accelerated programme of erection of public buildings would take place, but owing to scarcity of skilled labour and structural steel it has not been possible to maintain the rate of progress expected. These factors have already proved a source of considerable delay in the building programme. The Department is now in a position to call tenders for public buildings to the amount of £250,000, but is awaiting the investigation into the whole question of the order of precedence in building.

With the increase in commercial air services and the requirements of air defence, the Department has been exceedingly busy during the year on the construction of aerodromes and the preparation of plans for air defence. As will be seen under the section of this Statement headed "Aerodromes," there has been rapid progress in air services, and the building of a chain of emergency landing-grounds necessary to render these services safe has received particular attention during the year. The money for aerodrome-construction is now provided from the Consolidated Fund, with a considerable amount of assistance from Employment Relief Funds. It is hoped to make even more progress on aerodromes during the coming year, and a sum of £320,000 is being provided from revenue for this purpose.

Irrigation, which in the past has been mostly confined to the arid regions of Central Otago, is now making good progress on the plains of Canterbury. One scheme there is completed, and two others are in course of construction. Investigations into the possibilities of this class of public work are still being

exhaustively pursued. I am still convinced that this is one of the best classes of work from which the country will benefit.

Among the problems facing the Dominion is that of river-control and river-maintenance, and I have given a good deal of thought and attention to this. Major works of river-control and flood protection have to be largely justified on economic grounds. Works of this class have been carried out in the past by the State and also by local authorities, the provision of finance generally being adjusted to the needs of each case.

The matter of river-maintenance and the prevention of deterioration of stream-channels, and of destruction of valuable land, is a more difficult problem, in that existing legislation regards such work as largely a local responsibility.

The Department has had this matter under careful examination, and a comprehensive statement on the problem has been prepared. In my opinion, the time has arrived when the State should, to a much greater extent, assume the direction of this class of work. Work would be done in collaboration with a local authority, or with the settlers of the area affected, and finance would have to be arranged to suit each particular case. One difficulty in respect to this class of work is the large number of small local authorities in any particular area dealing with river and drainage matters, and the question of merging these is one that must receive the serious attention of the Government.

The whole question of river-control and river-maintenance policy is now under review by Cabinet. I can anticipate next year's Public Works Statement with the information that the Government has just authorized the immediate putting-in-hand of river-improvement and willow-removal works in the Waipa Basin of the Waikato River, and in the Hoteo Valley in Rodney County. Both these works are major ones, and the need for them has been apparent for some time.

The use of mechanical plant, modified as I have already stated by a consideration for employment of men, has been extended during the year. With the exception of that still needed for the new State highways and for renewals, most of the plant immediately required has now been purchased. Works of a special nature will, of course, still necessitate the use of suitably designed plant, and some provision for this will be made.

Since I presented my last Statement, more than sufficient time has elapsed to enable me to say with confidence that the Engineer-in-Chief of the Public Works Department and his staff have made wonderful progress with the Government's programme of public works.

Severely handicapped for want of trained staff, by lack of materials, by scarcity of up-to-date plant and skilled workmen, it is remarkable that in so short a time such an efficient organization as the Public Works Department now is should have been created, and as Minister in Charge I am proud of what has been done.

I am grateful to the Department's officers for the energy and willingness they have displayed in carrying out the Government's intentions with regard to public works.

FINANCE.

The payments and receipts for the year 1936–37, and accumulated totals, in connection with the Public Works Fund and other associated votes and accounts are shown in the tabulation below. The gross expenditure amounted to £12,261,215, of which £2,009,881 was expended by other Government Departments ; the recoveries in reduction of expenditure amounted to £2,288,639, of which £846,300 was recovered by other Departments ; the net expenditure totalled £9,972,576, of which £1,163,581 was expended by other Departments. In addition the Department collected £1,199,589 from sales of electricity and from other forms of revenue.

Class of Work.	Expenditure, 1936–37. Gross.	Recoveries.	Net.	Total Net Expenditure to 31st March, 1937.
EXPENDITURE, PUBLIC WORKS FUND.				
Railways—	£	£	£	£
New construction	628,629	41,647	586,982	39,256,966
Improvements and additions to open lines	492,515	60,403	432,112	18,344,000
Roads	996,676	82,956	913,720	23,899,855*
Public buildings	734,550	19,609	714,941	12,781,988†
Lighthouses, harbour-works, and harbour defences	5,183	3,884	1,299	1,323,345
Tourist and health resorts	17,460	671	16,789	733,925
Telegraph extension	379,227	146,714	232,513	11,988,430
Departmental	346,612	208,843	137,769	3,211,990
Irrigation, water-supply, and drainage	186,717	175,655	11,062	1,314,241
Lands-improvement	232,072	169,399	62,673	980,343
Swamp land drainage	33,210	8,245	24,965	80,881
Settlement of unemployed workers	305,621	213,605	92,016	756,502
Native-land settlement	521,960	409,642	112,318	466,866
Dairy industry loans	30,510	..	30,510	41,260
Cost and discount, raising loans, &c.	..	..	..	3,828,307
Closed accounts (for more detail see Table 1)	..	..	..	8,134,458
Totals, General Purposes Account	4,910,942	1,541,273	3,369,669	127,143,357§
Electric Supply Account (previously Aid to Water-power Works Account)—				
Construction (expenditure as per accounts in Table 5)	2,031,477	..	2,031,477‡‡	15,143,961‡‡
Working-expenses (expenditure as per accounts in Table 5)	229,962	..	229,962	..
Waihou and Ohinemuri Rivers Improvement Account	..	..	..	709,740‖
Totals, Public Works Fund	7,172,381	1,541,273	5,631,108	142,997,058
EXPENDITURE, OTHER VOTES AND ACCOUNTS.				
Main Highways Account—				
Annual appropriation—				
Construction, reconstruction, and improvement	1,413,385	35,630	1,377,755¶	7,373,352**
Maintenance, repair, and renewal	1,054,890	45,687	1,009,203¶	..
Administration, plant, and miscellaneous expenditure	196,776	14,420	182,356¶	..
Interest, fees, and loan redemptions	250,868	..	250,868¶	..
Permanent appropriation (rate subsidies, interest on transfer from Public Works Fund, &c.)	484,052	..	484,052	..
Consolidated Fund—				
Maintenance, public buildings, roads, &c.††	210,144	20,164	189,980	..
Aerodromes and landing-grounds	218,686	9,567	209,119	..
Plant, material, and miscellaneous services	945,814	621,898	323,916	..
Closed accounts (for details see Public Works Statement, 1933)	..	..	..	18,955,387
Employment Promotion Fund (expenditure by Public Works Department): Amounts not included above	314,219	..	314,219	..
Totals, Other votes and accounts	5,088,834	747,366	4,341,468	26,328,739
Grand total of expenditure, Public Works Fund and other votes and accounts for the year ended 31st March, 1937	12,261,215	2,288,639	9,972,576	..
Capital expenditure to date	..	..	..	169,325,797

Class of Work.	Recoveries, 1936–37.
RECEIPTS§§, PUBLIC WORKS DEPARTMENT.	
Ordinary Revenue Account—	£
Irrigation (receipts for year)	19,683
Miscellaneous receipts for year	11,449
Electric Supply Account (sales of energy, miscellaneous receipts, &c.): Receipts for year	1,150,247
Main Highways Account (repayment of advances, &c., and interest): Receipts for year	18,210
Total receipts	1,199,589

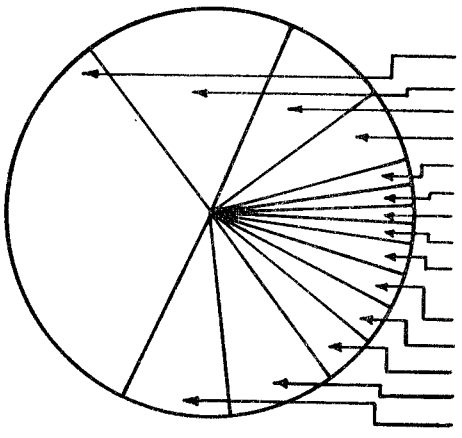
* Includes £4,500 expended under section 16, subsection (1), Native Land Amendment and Native Land Claims Adjustment Act, 1923. † Excludes expenditure on Workers' Dwellings totalling £319,918 transferred to State Advances Account; includes £60,032 expended under Reserves and other Lands Disposal Act, 1936, section 32. ‡ Includes £4,865 expended under Finance Act, 1932 (No. 2), section 6. § Does not include expenditure under Ellesmere Land Drainage Act, 1905, or £1,226,000 transferred to and included in Main Highways Construction Fund. ‖ Excludes interest and loan charges. ¶ For annual income and expenditure accounts, see Appendix E. ** As per accounts in Appendix E. †† Excludes transfers to Public Works Fund votes (£451,976). ‡‡ Includes £1,649,458 assets taken over from Southland Power Board. §§ Excludes motor-spirits tax, registration fees, &c., collected by other Departments.

Summary.

—	Public Works Department.	Other Departments.	Total.
	£	£	£
Gross expenditure	10,251,334	2,009,881	12,261,215
Recoveries and receipts	2,641,928	846,300	3,488,228

Of the net payments totalling £9,972,576 shown above, £6,778,901 may be regarded as expended from loan-moneys and £3,193,675 as expended from annual taxation.

In diagrammatic form the ratio which the various classes bear to the whole is shown below. It should be noted that the figures are gross—that is, before deducting recoveries, which include subsidies from the Employment Promotion Fund, contributions from the Consolidated Fund, and similar amounts which, if deducted, would detract from the true portrayal of activities.



	£	Per Cent.
Roads, including construction and maintenance of main highways	4,396,647	32·66
Hydro-electric (construction and working expenses) ..	2,261,439	16·80
Railway construction, improvements, and additions ..	1,121,144	8·33
Public buildings, including schools	734,550	5·46
Settlement of unemployed workers	305,621	2·27
Lands improvement	232,072	1·72
Irrigation	186,717	1·39
Public buildings, roads, &c. (maintenance) ..	210,144	1·56
Employment Promotion Fund (expenditure by Public Works Department)	314,219	2·33
Telegraph extension	379,227	2·82
Miscellaneous	432,975	3·22
Native-land Settlement	521,960	3·88
Plant, materials, services for other departments, &c.	1,164,500	8·65
Revenue (receipts)	1,199,589	8·91
Total revenue and gross expenditure for year ..	£13,460,804	100·00

In regard to the ways and means of the General Purposes Account of the Public Works Fund the position is as under :—

	£	£
Balance available, 1st April, 1936		1,902,651
Add funds received during the year—		
Finance Act, 1934 (No. 3), section 2	3,444,919	
Finance Act, 1931 (No. 4), section 2	4,710	
Miscellaneous	135,898	
		3,585,527
		5,488,178
Deduct expenditure during 1936–37—		
Under annual appropriations ..	3,309,637	
Under permanent appropriations ..	60,515	
		3,370,152
Balance available, 31st March, 1937 ..		£2,118,026

The estimated net expenditure under the General Purposes Account for the current financial year, 1937–38, is £7,834,957, and arrangements are being made with the Minister of Finance to provide the necessary funds. This is the amount shown on the Public Works estimates, which also show an estimated net expenditure of £1,370,000 from the Electric Supply Account and £4,478,000 from the Main Highways Account, a total for all these accounts of £13,682,957.

MAIN HIGHWAYS.

I have already mentioned the progress which is being made in the direction of improving the standard of main highways throughout the Dominion, and this applies not only to the actual reconstruction and realignment, but also to maintenance. The past financial year was a record year of activity since the main-highways system was introduced some thirteen years ago.

In my Statement last year I made reference to what I considered to be a disadvantage in the methods of administration, arising from the divided control of main arterial routes. Legislation was approved by the House which made provision for the principal trunk roads to be controlled by the national roading authority. Subsequently approximately 4,000 miles of State highways were placed under the direct control of the Main Highways Board. In anticipation of the introduction of this change, tentative arrangements had been made in certain directions, and it was possible for the Board to take over some arterial highways immediately after the end of October, 1936. However, owing to lack of plant for maintenance purposes, it was found necessary for some local authorities to continue operations until departmental equipment could be obtained.

During the financial year just past, the amount of traffic on main highways showed further increase. The consumption of motor-spirits was very much greater than for any previous year, and, in addition, the registrations of motor-vehicles reached peak figures since the advent of this form of transport. If any further justification for major improvements to our highways were needed, it is surely to be found in these factors, which are a true index of traffic densities.

The activities of the Main Highways Board for the period now under review are more particularly described in its annual report appended to this Statement. The report shows that the total receipts from revenue exceeded £2,300,000, which is a record to date, and that the total expenditure from the Main Highways Account for the year ended 31st March, 1937, on actual works as distinct from loan and special charges, amounted to £2,400,000, which is almost £800,000 more than was expended on similar works during the previous year. Nearly £1,400,000 was spent last year on reconstruction and improvements, including the elimination of level railway crossings, £900,000 on maintenance, and £106,000 on the replacement of bridges. In addition to the foregoing, interest and loan charges accounted for £307,516, while general rate subsidies, which are paid from the Main Highways Account, totalled £195,000.

The programme carried through last year involved the borrowing of £853,500 for main-highways purposes.

Since the amalgamation of the Revenue and Construction Funds under the Main Highways Account, true maintenance-costs have been recorded, and the expenditure during the past financial year amounted to an average of £90·5 per mile. It is not possible to compare this average with previous years by reason of the fact that expenditure under the Revenue Fund was not dissected to show maintenance-costs separately from other work charged to the same Fund. In future, however, the trend of maintenance-costs will be readily ascertainable.

In order to provide finance for the current year's activities, it is proposed to allocate approximately £1,200,000 for maintenance purposes and £2,600,000 for improvements and reconstruction. Of this latter sum, it is anticipated that £500,000 will be absorbed in the elimination of dangerous railway-level crossings.

A further sum of approximately £230,000 is being proposed for expenditure this year on the replacement of highway bridges.

This class of work is being carried out as expeditiously as circumstances permit, but progress is dependent on engineering investigations and designing. It is not practicable to standardize plans for the reason that each site presents singular physical and technical features and requires special consideration. During the year ended 31st March, 1937, 9,575 ft. of bridging was completed and a further 15,000 ft. is at present in process of construction.

As the arterial highways are reconstructed to modern width and curvature, it is the policy to pave those sections which are heavily trafficked. The last

paving-season was characterized by unfavourable conditions due to the prevailing wet weather, but, notwithstanding adverse circumstances, 254 miles of dustless surfacing were completed, as compared with 277 miles during the preceding year. At 31st March, 1937, the total length of paved highways was 2,127 miles, which is 17·6 per cent. of the whole main-highways system. Since the inauguration of the State highways system, the Board has concentrated on the arterial routes, and in the early future it is anticipated that a number of metalled sections will be paved, thereby providing continuous paving throughout substantial lengths.

Satisfactory progress has been made with the major programme initiated by the Government last year for the elimination of railway level-crossings, and, although completed projects number only fifteen, work is in progress and contracts have been already arranged for a further sixty-seven. Detailed proposals for an additional sixty-four schemes are completed or in hand preparatory to the commencement of work. Each locality has presented its peculiar technical problems, in some cases of a very complex nature, but the results to date are extremely gratifying. The removal of this source of danger from our highways will undoubtedly result in the prevention of many accidents which certainly would occur if open crossings on highways carrying a large volume of traffic were allowed to remain.

It must be borne in mind that a feature of railway-crossing accidents is the loss of life and every crossing eliminated means the removal of a potential death-trap.

The extent to which main-highways operations are financed by the State is shown by the fact that during the past year approximately 94 per cent. of the cost of improvements and renewals was paid from the Main Highways Account, compared with 6 per cent. contributed by local authorities. With regard to maintenance 82 per cent. was provided from public funds and 18 per cent. by local authorities.

It is reasonable to point out that the administration of a relatively small proportion of public moneys by local authorities warrants the Government exercising a measure of control over the work carried out on a basis more in keeping with the degree of financial responsibility which it assumes. The continued co-operation of local bodies will be welcomed, as it is appreciated that they can assist materially in the maintenance and development of the Dominion's roading-system by carrying out the functions entrusted to them.

Honourable members are aware of the special campaign which has been initiated for the promotion of safer travelling-conditions for all classes of road-user. In my efforts to reduce the undue loss of life and the alarming number of accidents resulting in severe personal injury, I have obtained the considered opinions and recommendations of representative citizens as to the most desirable and practical means of remedying unsatisfactory conditions. It became evident that, in the interests of public safety, there was a good deal of scope for improving main highways so as to minimize the risk of accident.

I am confident that, in certain directions, a higher average standard of driving can be obtained if suitable measures are provided for the warning and protection of motor-drivers. With this objective I have conferred with the Main Highways Board on matters arising from the suggestions made to me by the New Zealand Road Safety Council. Arrangements are in hand for the Board to devote particular attention to centre-line marking of pavements so as to conveniently divide traffic. The adequate super-elevation of curves is being carried out progressively, and already improvements have been made in this direction.

In order to indicate the existence of bends, especially to night drivers, warning-posts and white-painted fences are being provided, while bridges are also being painted in such a way as to readily arrest the attention of a driver. In many localities hilly country is traversed by tortuous roads, and a commencement has been made with the erection of protective fencing. This will not only serve to prevent mishaps, but will also afford a greater measure of security to those who are more or less unaccustomed to hilly conditions. I can say that the Main Highways Board is fully alive to the possibilities for making our main highways safer, and will continue improvement works in furtherance of the present policy.

RAILWAYS.

When last year's Statement was presented to the House a commencement had been made with the Government's programme of railway-construction, but preliminary work only had been done on the Napier–Gisborne line, the South Island Main Trunk, and the Westport–Inangahua connection in preparation of a vigorous programme. During the year excellent progress has been made on all these works.

Napier–Gisborne Railway.—On the Napier–Gisborne line a total of 1,300 men was employed. The damage done to the previously completed section of the line between Napier and Putorino by the Napier earthquake was restored. The Mohaka Viaduct was completed, thus enabling a rail connection to be made to Wairoa. The Railway Department now operates a service from Napier to Putorino, while the Public Works Department controls a train service from Putorino to Wairoa. Although the sections are separately controlled, goods are railed at through rates. This service is already providing a much-needed facility, and the extent to which it is being availed of indicates the need that existed for rail connection in that locality. North of Waikokopu, which is already linked with Wairoa by an existing line, work is proceeding expeditiously at all points on to Gisborne.

An excellent showing has been made on this work since construction was resumed last year, and operations have advanced to an interesting stage. The length to be constructed is 34 miles.

The general plan of construction aims at the earliest possible completion of the major tunnels and those bridges which would hold up progress if left until reached by the permanent rails. The large tunnels occur in the middle section of the route, while the bridges are mainly on the end sections.

Earthwork is not a deciding factor in the date of completion. Although uncommonly heavy in the middle section, and for a length of one mile along the Waikokopu Bluffs, work was opened up on a great number of faces when the tunnel service roads were completed in the early stages of construction. At only a few points are the individual cuttings and fillings of such dimensions as to need special methods to expedite progress, and in each case the job is being well handled by up-to-date Diesel-powered machinery, which reduces years to months in the construction schedule.

The construction of service roads under the general plan mentioned above made possible the prosecution of work along the whole length between Gisborne and Waikokopu. Shortly after resumption of activities 1,000 men were systematically placed throughout the whole length of the line. Owing to difficulty in obtaining delivery of tunnelling plant ordered from Britain there was some delay in getting the larger tunnels into full swing, but this is now mainly overcome, and the underground work is moving ahead in a convincing manner, with eight separate tunnelling parties working at different points.

The erection of camps has been completed for the whole line. They are situated so that very little moving will need to be done until construction enters its final stages of platelaying and ballasting. The great majority of the men are housed in eleven more or less concentrated camps. At nine of these camps well-equipped cookhouses have been provided. At the other two the work is reserved for married men provided with living-quarters for their wives and families. Three schools and eight Y.M.C.A. buildings have been provided. At each of the latter there is a resident Y.M.C.A. secretary, who, in addition to the usual Association activities, conducts a post-office and savings-bank if the locality has no such facilities. The latter is a particularly useful side of the Association's work. The names of the Y.M.C.A.-operated post-offices, commencing from the Gisborne end, are—Bartletts, Torries Road, Wharekakaho, Tikiwhata, Paritu, Kaingapipi, and Kopuawhara.

The electric-power line brought in to serve the tunnels was availed of to provide light and power to all the main camps. Electric energy is supplied to occupants of living-quarters at Power Board rates.

General particulars of work under various headings are as follows:—

Fencing: Thirty-two and a half per cent. of the total length of 56¾ miles has been completed. Much of the remainder is being left until the high batter slopes of cuttings and embankments have become consolidated.

Culverts: These vary in size from large reinforced-concrete ones of 80 square feet cross-sectional area down to 1-ft.-diameter pipes. The total length of all culverts installed is 4,044 ft., representing roughly 85 per cent. of the larger and more expensive types and about 55 per cent. of the smaller pipe culvert class. Most of the culverts remaining to be laid will not be needed until the work is further advanced. They can be installed more economically in the later stages of construction.

Water Drives: At a number of earth fillings the steep contours of the ground rendered ordinary culvert-construction impracticable and water drives were installed. These are small-bore tunnels in solid earth or rock through which the stream is diverted to a safe outfall away from the base of the filling. Nearly all of these are big enough to allow two or more persons of average height to walk through abreast in an upright position. They vary in size from 110 square feet to 24 square feet inside cross-sectional area, and run up to 200 yards in length. They have all been completed, the total length being 3,927 ft., or roughly three-quarters of a mile.

Earthwork: Of the total estimated quantity of 1,371,288 cubic yards, 944,588 cubic yards, or over 68 per cent., has been completed. A large proportion of this is hard sandstone or papa rock. With only 32 per cent. remaining, many of the cuttings and fillings are completed or approaching completion.

The most spectacular earthwork job is a short high bluff on the Waikokopu Cliffs, which is being benched back for safety purposes to a height of 180 ft. Also there are fillings of 102 ft., 92 ft., and 103 ft. depth respectively in the central hill section. The first of these fillings is practically completed. The other two are commencing to rise from their broad bases. To protect the low fillings along the Waikokopu Cliffs, sections of substantial concrete sea-wall have been found necessary. The total length required is 1,490 ft. Of this, 1,100 lineal feet, or 73·7 per cent., is completed.

Tunnels: The three major tunnels are named Waiau-Tikiwhata, Coast, and Waikoura. They are 3,278 yd., 1,016 yd., and 1,544 yd. long respectively. There are also ten small tunnels totalling 1,015 yd. in length.

The small tunnels present no outstanding problems as far as can be judged at present, and they should be completed under ordinary New Zealand methods well before the time the rails are due to be laid through them. Already one tunnel of 96¾ yd. has been fully excavated and concrete-lined, and five others, totalling 590 yd. in length, have been holed through with 10 ft. by 8 ft. bottom headings.

The Waiau-Tikiwhata and Waikoura tunnels were of such length as to be governing factors in the progress of the whole railway-works and special consideration had to be given to the question of expediting their rate of construction. Fortunately the sandstone at both ends of each tunnel was found to be sound enough to enable the adoption of a system new to railway tunnels in this country. This consists of the excavation of the full tunnel with the upper arched portion carried only a very short distance ahead as a working bench without any advance headings. It makes for considerably greater speed in good ground, as the tunnellers have much more room in which to work, and explosives can be employed to greater advantage. The timbering used in this system is cut in segments to fit the arch, and is much lighter to handle than the heavy bars used in the usual bottom-heading method. To obtain the maximum advantage of the full-tunnel-bench method it was decided to use electrically operated scrapers and slides for loading the spoil on to trucks, which will be hauled away by electric-battery locomotives.

Three of the four faces of these two tunnels have now been carried in under the new system for several chains, and work is proceeding so smoothly that very fast driving is indicated when the scraper units go into action in the

near future. The fourth face, at the south end of Waikoura tunnel, was delayed until a heavy approach cutting could be completed, but tunnelling is expected to start inside a few weeks.

A further gain in the rate of tunnelling is confidently expected as far as the concrete lining is concerned. Special pumps have been imported which will pump the concrete directly into place in the footings, walls, and arches at a very much faster rate than it could be placed by the old laborious hand-shovelling process, or even by the compressed-air-operated concrete-gun method employed in the Tawa Flat tunnels.

The 46 ch. Coast tunnel situated between the two longer ones passes through some weaker rock formations. For this reason, and also because all possible spoil is needed for a filling at one end, a 10 ft. by 8 ft. bottom heading is being driven right through. Already 16 ch. have been driven, and the whole tunnel should be completed by the more conservative method before schedule date.

All tunnels are well lit with electric light, ventilated by adequate power-driven fans, and provided with air-compressing plant and machine drills for rock-drilling.

Bridges: Altogether there are twenty-two bridges to be built. Work has been much impeded by the scarcity of steel. Only two are of more than medium dimensions. One is a crossing of the Kopuawhara Stream, 7 miles from Waikokopu, which is 500 ft. long and 125 ft. high. So uncertain is the position regarding steel-supplies that the adoption of a reinforced-concrete-arch design is being seriously considered in place of the original all-steel-viaduct proposal.

The other major structure is the Waipaoa River bridge 5 miles from Gisborne. This consists of steel spans on reinforced-concrete pile piers, the total length being 720 ft. Good progress has been made with the pier-construction, over 60 per cent. of the pile-driving being finished, as well as one-third of the piers.

Steel for the spans, however, is an uncertain factor here also, and it is possible that completion of the bridge structure will be held up pending its arrival.

A notable feature in connection with this bridge is the use for the first time in New Zealand of a tetrahedral concrete-block apron for protecting one of the river-banks from erosion. As far as can be judged from the moderate flood tests to which it has been subjected so far, it is giving highly successful results.

On four small bridges between this point and Gisborne pier construction has been finished, while construction of bridges south of the Waipaoa River has been commenced.

Platelaying: The laying of permanent rails has been commenced on a small scale from Gisborne in order to provide access to a storage-site for bulk materials at Matawhero Station Yard situated 3 miles out. Platelaying, however, will not be able to advance very far from Gisborne until completion of the Waipaoa River bridge in the early part of next year. Similarly at the Waikokopu end non-arrival of steel for bridges threatens eventually to delay platelaying, but this would not in any case be put in hand for about six months, pending completion and consolidation of earthwork on the Waikokopu Bluffs Section.

South Island Main Trunk Railway.—The average number of men employed on this work during the period was 900.

When work was closed down in October, 1931, the railheads were at Wharanui on the north end and Parnassus on the south end, and the length of the uncompleted section was 76 m. 28 ch. Formation work was in hand on the north end between Wharanui at 56 m. and the Ohau Bluff at approximately 85 m., and on the south end from Parnassus at 44 m. to Claverley at 59 m., a total distance for both ends of approximately 44 miles, while platelaying and

ballasting were partially completed for 14 miles of the easy country at the north end.

It should be explained, in order to make the chainages and distances mentioned understandable, that the original surveys were carried out from either end, and therefore the chainages carry on from Wharanui on the north end to the Kahautara River going south, while on the south end they run from Parnassus to the Kahautara River going north. Consequently, while the Kahautara River is at 103 m. 48 ch. on the northern chainage, it is also at 73 m. 40 ch. on the southern.

The work involved in the construction of this line at the date instructions were received to proceed was, therefore, the completion of formation, bridging, tunnelling, platelaying, and ballasting over a length of 30 miles which had practically only been scratched, and in addition the complete construction of 33 miles of line through heavy country in which the survey itself had not been finalized.

When I mention that there are twenty tunnels to pierce of an aggregate length of some 3 miles; that there are a large number of bridges to construct of all sizes and types, some of them over very large and turbulent rivers, such as the Hapuka and the Clarence; that owing to the location of the line along a rocky and precipitous coast it is necessary to provide in many places for extensive sea-walls and protective works; and that, in order to accommodate the railway and main highway on the narrow coastal strip, it has been necessary over a considerable length to completely relocate and deviate the main highway, it can be realized that this is a work of considerable magnitude.

Almost the whole of the accommodation which had been provided when work was previously in hand had been disposed of, and the plant and machinery had been sold or transferred to other works.

On account of the magnitude of the work it was decided to divide it into two sections, each under the control of an experienced construction engineer and staff.

Instructions were issued to resume work at the beginning of July, 1936, and within three months employment had been given to 700 men (which was considerably in excess of the total number employed when work was closed down in 1931), accommodation had been provided and plant and material were starting to arrive, an engineering staff had been built up, and the general organization was well in hand.

The natural configuration of the country and the location of the principal works resulted in the decision to make the Kahautara River the dividing-line between the northern and southern sections.

The housing of the men and their families presented a problem on account of the shortage of building-materials, but as far as the south end was concerned the accommodation lying unoccupied at the Waitaki Hydro-electric Power Station was available for transfer and filled a gap in the building programme, while timber and other supplies were being assembled. By the end of 1936 the main difficulties in regard to accommodation had been overcome.

At the north end large timber-supplies were ordered direct from the West Coast, and a large force of carpenters was employed at both ends, the building of accommodation being pushed on very vigorously.

In order to employ the maximum number of men at the earliest possible date all efforts were concentrated on providing single accommodation first of all, and when the works were fully manned married accommodation was erected.

There are now approximately 1,000 men employed, and these are distributed throughout twenty-three camps. Of these men, approximately 400 have been provided with married accommodation, and the remainder are in single quarters.

The various camps have been very completely equipped, roading, water-supplies, and sanitary services having been built, while a number of schools in accordance with the Education Department's standard have been erected and staffed.

At the principal camps Diesel-engined electric-generating equipment has been provided, and the camps wired for electric light and power.

The great majority of the camps are ideally situated along this very beautiful and picturesque coast, and the general surroundings and climatic conditions are excellent.

First-class facilities for recreation have also been provided, four large and several smaller Y.M.C.A. huts having been erected.

The large huts have reading-rooms, billiard-room, social hall, canteen, and picture equipment, and, judging by the enthusiasm shown by the men in the use of these places of recreation, their erection appears to be well justified and augers well for the future co-operative effort on this undertaking.

Headquarters were originally established at Wharanui and Parnassus respectively, but as the work progressed they have been shifted to Oaro in the south and Aniseed in the north; these two points are suitably situated to control southern and northern sections right up to completion.

At the beginning of the job a considerable amount of clearing up was necessary at both ends to put the original formation work in order after the lapse of six years, but by the end of October, 1936, most of the cuttings had been cleared out and excavation work commenced in earnest.

At the northern end on the Clarence Section, from 56 m. 6 ch. to 76 m. 5 ch. a great deal of marram-grass planting and sand reclamation has been carried out, and the formation, with the exception of the Blue Slip, has now been completed to the Clarence Bridge.

As soon as the work was authorized a start was made to clear up this section, the track and rails were uncovered, burnt sleepers replaced, culverts cleared, and washouts repaired. Temporary bridges were reconditioned to carry the rolling-stock, ballast-pits were reopened, service lines laid, and ballasting put in hand, and, rails and fastenings having arrived, the completion of platelaying is now in hand.

The bridge over the Clarence River constitutes one of the major structures on this end of the line, and its early completion is essential to enable platelaying and ballasting to proceed expeditiously south of it and keep in step with the remainder of the construction programme.

Plans of this bridge, which consists of twelve 120 ft. steel spans on concrete caissons were pushed on urgently, and a contract was let for the construction and sinking of the piers. The steel has been ordered for the superstructure, and arrangements have been made for its fabrication in the Railway Workshops.

The Woodside Creek Bridge, at 56 m. 50 ch., and Waimia Creek Bridge, at 59 m. 72 ch., are well in hand.

The Blue Slip, at 61 m., which is a moving hillside of pug over $\frac{1}{2}$ m. long and 10 ch. to 30 ch. wide, has always been considered a problem, but the excavation here is proceeding steadily, and although it is anticipated that between 250,000 and 500,000 cubic yards will require removal before the slip is stabilized there appears to be every prospect that the measures now being taken will be successful.

On the Kaikoura Section, from 76 m. 6 ch. to 103 m. 48 ch., formation is in hand over a length of 15 m., and 4 m. have been completed since construction recommenced. The majority of the work on this section is very heavy indeed, consisting of large rock cuttings and tunnels. Deviations of the Main South Road are numerous on this section; 66 ch. have been completed and a further $3\frac{1}{2}$ m. is well in hand.

Culverting is well in hand on the first 15 m. of this section, 1,000 lineal feet of culverts of various sizes having been completed since construction recommenced.

There are three tunnels on this section, but before they could be put in hand the necessary machines and equipment had to be obtained from overseas and erected.

A very complete and up-to-date set of plant and equipment has been provided for these tunnels. Power for the work is Diesel-generated, as no standard electric supply is available, and the necessary power-house with air-compressing plant, ventilating-fans, electric light, &c., has been provided.

All drilling is being carried out with machine drills, and the most modern type of scraper equipment for removing the spoil has been provided. Work is carried on by the top-heading or bench system, Canadian type of timbering being employed, and collapsible steel profiling is used for the concrete lining, the concrete itself being placed and conveyed pneumatically.

The haulage of spoil will be handled by a new type of Diesel-engined locomotive which is specially adapted for underground work.

Excavation work has only been commenced recently, but the following progress has been made:—

No. 1.—Okiwi Bay, at 82 m. 42 ch.: The top bench is being excavated.
No. 2.—Ohau, at 84 m. 40 ch.: The north portal and 6 ft. of lining have been completed, and driving for the next length has been commenced.
No. 3.—Half-moon Bay, at 85 m. 72 ch.: The south portal and 33 ft. of lining have been completed in the open, and driving of the first length underground has been commenced.

On the general formation work mechanical excavators are being largely used, and their use has resulted in the work being speeded up very considerably.

It was originally proposed to locate the Kaikoura Station some distance from the centre of the town in order to obtain the best alignment, and the shortest possible distance between the terminal points of the line, but it was later decided on account of traffic considerations that the Kaikoura Railway-station should be located near the centre of the Kaikoura Township, and this portion of the line has been resurveyed to give effect to this.

At the southern end work has been concentrated mainly on the section between Parnassus and the Oaro River, and the cuttings between 54 m. and 62 m. are now about 50 per cent. completed.

Road access has been opened from Oaro, at 67 m. 30 ch. to the north end of the Amuri Bluff tunnel at 62 m. 68 ch. by means of a track along the sea-coast.

The most spectacular work on this section has been the excavation of the Hawkswood Cutting at 48 m. 30 ch. A start was made dismantling and re-erecting the $1\frac{1}{2}$ cubic yards Ruston steam drag-line, which was put into operation digging a gullet 30 ft. deep and about 60 ft. to 70 ft. wide at the top in October, 1936, and an 8 cubic yard carryall and caterpillar tractor was provided to rehandle and spread the material clear of the final batter lines. Two $\frac{3}{4}$ cubic yard Diesel shovels were started at the south end on successive levels below the steam drag-line excavation from the south end, and a second steam drag-line was put into operation in February, 1937. The first steam drag-line having by this time excavated the gullet mentioned above over the whole length of the cutting, both machines were then started widening the upper level. A third $\frac{3}{4}$ cubic yard Diesel shovel was then started at the north end of the cutting, working south. Later the south end second lift shovel was converted to work as a drag-line, and, after digging a bench for the steam drag-line on the right batter to work from, was moved to pull the batters down for the north end shovel to load to the trucks. All machines were working three shifts, material being led to bank by trucks and steam locomotives, and rehandling of spoil from the steam drag-lines by the 8 yd. carryall and tractor and Angledozer and tractor. The best four-weekly output for all machines was 43,780 cubic yards. Of the 291,439 cubic yards left in the cuttings when the works closed in 1931, approximately 248,000 cubic yards had been excavated by the end of June, 1937.

At the same time as earthwork was proceeding and the formation work was advancing from Parnassus, the building of bridges to cross the gaps in this formation was also in hand. The two chief bridges in the first 10 m.—at Leader River, 44 m. 65 ch., and Conway River, 50 m. 50 ch.—are strangely of the same length, 724 ft., and each have sixteen spans of 45 ft., with plate girders on concrete piers founded on piles in the case of the Leader Bridge and on solid papa in the case of the Conway. At the Leader River the piers have been completed and a start has been made placing the girders. At the Conway River there are three piers yet to complete.

Construction of culverts and water drives was well advanced in 1931, but the work has been continued and the greater part of it has been completed. Three water drives, aggregating 300 ft. in length, six pipe culverts of a total length of 240 ft., and a 4 ft. arch culvert 72 ft. long make up the completed work.

Tunnelling is the controlling feature of the south end, as there are 2½ m. to pierce in fifteen tunnels. A certain amount of plant is on the job for the purpose, and a start has been made with the first tunnel, at 61 m. 26 ch., where 100 ft. of bottom heading has been driven, while at the Amuri Bluff tunnel, 62 m. 27 ch. to 62 m. 66 ch., which is the longest tunnel on the length, everything is in readiness for a start from the northern end. The driving of this tunnel controls the time for completion of this end of the railway, and everything has been done to expedite its commencement. Unfortunately, unlike all other tunnels on this section, it is a long way from a formed road, and before anything could be done access roads had to be formed to both ends. At the northern end this amounted to 2½ m. and at the southern end 1½ m. While the Amuri Bluff tunnel is being driven it is expected that all the other tunnels, together with bridge and culvert work on the whole length, can be completed.

Similar equipment is being provided for the tunnel work on this length, as previously described for the north end.

Sea protection forms quite a large part of the work along the coast from Oaro, 65 m., north to the Kahautara River, 73 m. 40 ch. There are numerous road deviations necessitated by the location of the railway, and in many of these places banks encroach on the sea a considerable distance. It is estimated that nearly 100,000 cubic yards of heavy stone up to about 6 tons and more in weight will be required for building the outside of or facing fillings. A start has been made quarrying stone at 67 m. 70 ch., and a steam crane, with two heavy-duty lorries, is engaged in getting out stone. At a later date, when the line is laid, it may be necessary to provide larger stone than 5 to 6 tons to protect the toes of the fillings in the more exposed positions, but in the meantime the stone now being quarried enables the banks to be pushed out with little chance of serious damage.

The extension of the rail-head from Parnassus has awaited the completion of the Leader River Bridge and the arrival of new permanent way. By the time rails are received we will be in a position to commence platelaying and progress for nearly 12 m. during the present year, bringing the rail-head to the Hundalee Station, 55 m. 60 ch., which is at the point where the main highway crosses the Conway River.

North of the Oaro, work has been concentrated on opening up approach cuttings to tunnel portals and six of these are in hand at present.

Westport–Inangahua Railway.—The maximum number of men employed on this work during the period was 400. Construction work is now in full swing. It was necessary firstly to concentrate on the provision of accommodation for the workmen, and, coincident with this, machinery and materials for the construction work were assembled.

The nature of the material in the tortuous Buller Gorge being largely solid rock, a number of latest-pattern air-compressors with their complementary rock-drills and air tools were imported and were placed in work as received.

Two excavators, usable either as power shovels or drag-lines, have been installed, and are doing excellent work in localities where large quantities of spoil are to be shifted. These give saving in cost of the work while speeding up completion of the early required lengths.

The machines are a smaller type than some used in other parts of the country, this being necessary because they have to be slung across the Buller River on wire-rope cableways.

A large quantity of material for construction purposes has to be transported by these same cableways, some of which are equipped with powerful transporter winches.

A feature of the job is the number of large bridges along the route, the largest of these being the Buller River Bridge close to Inangahua Junction.

This work involves sinking of concrete cylinders deep into the river-bed, and, to assist this, besides providing a means for the launching of the

long steel girders, a Duplex cableway plant is installed. This cableway was previously used most successfully for erecting some of the huge steel viaducts on the Napier–Wairoa Railway. Its use on the Buller River will minimize the risk of loss by floods, as far less staging will be required.

For cylinder-sinking the latest pattern electrically operated air-locks will be used.

For the other bridges it is proposed to embark on reinforced-concrete structures instead of the more commonly used concrete piers and steel girders.

This type of construction for high railway bridges is new to New Zealand and has required close investigation, but a saving in cost is anticipated, besides giving a structure on which maintenance is reduced to a minimum.

A feature of this construction will be the use of special vibrating equipment, which has been imported to enable high-strength concrete to be produced for these special structures.

The country through which this railway is being constructed is in the main stable, but there are one or two slip problems likely to present considerable difficulty.

The comfort of the workmen has not been overlooked. Neat camps for single and married men have been provided along the route.

The largest of these at Tiroroa has a large recreation-hall managed by the Y.M.C.A., while each camp and the hall at this point is supplied with electric light from the Department's own Diesel-driven generator. Hot and cold showers are installed at the camps. Other facilities for the men are being provided, particularly at Inangahua Junction, where the Buller Bridge works will be in progress for a considerable time.

RAILWAYS: IMPROVEMENTS AND ADDITIONS TO OPEN LINES.

The net expenditure out of the Public Works Fund under the above heading for the year ended 31st March, 1937, was £432,112. This amount was expended on the various works shown in the following statement—

	£
Wellington new station and yard	218,833
Wellington – Tawa Flat deviation	10,761
Wellington–Johnsonville electrification	27,264
Wellington–Paekakariki electrification	73,545
Christchurch new station	10,534
Papakura–Horotiu duplication	19,749
Plimmerton–Paekakariki duplication	6,677
Turakina–Okoia deviation	31,157
Grade easements	21,677
Rail-car sheds	10,312
Minor works	1,603
	£432,112

The Wellington new station building was nearing completion at the end of the financial year, and was officially opened on 19th June, 1937. Work on the Tawa Flat deviation was completed early in the financial year.

The work of electrifying the suburban sections at Wellington was proceeded with. On the Wellington–Paekakariki section good progress was made with bonding of rails and erection of overhead gear, the transmission-line was completed, and equipment was installed at the various sub-stations as it arrived. During the year work was commenced on the Wellington–Johnsonville section. The erection of poles was practically completed, and good progress made with bonding and overhead erection, while the work of equipping sub-stations was proceeding.

The amount shown against the Christchurch new station is the initial expenditure, and is for the purchase of land.

Work was commenced during the year on the duplication of the Papakura–Horotiu and Plimmerton–Paekakariki sections .of the main line. Work on the Turakina–Okoia deviation was commenced just prior to the 1936–37 financial year.

This deviation will shorten the existing line by 3½ m., and will provide improved grades and curvature. It leaves the existing railway at the northern end of the Turakina Station Yard, crosses the Turakina and Wangaehu Rivers and the Wangaehu Valley, and rejoins the existing line 1½ m. on the Fordell side of the Okoia Station. Camps have been erected, and carpenters', fitting, and blacksmiths' shops have been established at Fordell. Three wells to supply water to the various camps have been sunk, service roads to both portals of the Turakina and Fordell tunnels have been formed and metalled, together with access roads to the camps. A total of 3 m. of earthwork has been completed, and the approaches to the Fordell tunnel, a short tunnel at 5 m., and the southern end of the Turakina tunnel are well in hand. Five miles of permanent fencing have been completed and 518 lineal feet of culverts placed. An average number of 219 men was employed during the period.

HYDRO-ELECTRIC DEVELOPMENT.

Construction work in this branch of the Department's activities has been mainly concentrated on completion of the extension for two 21,000 kilowatt units at Arapuni, and on extensions of transmission-lines to North Auckland and to Westland.

As indicated in my report of last year, there has been considerable activity in gold-mining in Westland and the demand for power has increased enormously. The local supply authority, the Grey Electric-power Board, has found it impossible to meet all demands made upon it. To cope with this position the transmission-line from Lake Coleridge is being extended to the West Coast, but some difficulty is being experienced in maintaining deliveries of poles.

To meet the urgent demand, the Diesel generating-station of 5,760 kw. previously located in Lyttelton has been transferred to the West Coast, and is being installed at Dobson. The Government has also made arrangements to purchase the local hydro-generating plant belonging to the Grey Electric-power Board, and this will be taken over and operated under Government control when the Dobson Diesel plant is ready for operation, and the Government can assume responsibility for the whole supply of power in bulk to this area.

Another important event in the electrical section was the purchase of the whole of the generating-works and reticulation of the Southland Electric-power Board. I indicated in my previous report that negotiations to this end were in hand. Before deciding on this step a referendum of ratepayers in the Southland area was taken to see if the change of control from Board to Government was favoured locally. As the result was overwhelmingly in favour of acquisition by the Government, the works were taken over early in October, and have since been operated under Government control.

Until such time as this system can be connected to the general Government system by means of a transmission-line between Dunedin and Gore, it has not been possible to do a great deal to stimulate the business in the area, as it would not be possible to supply any great increase in power-demand. There is, however, already an indication that there will be a considerable increase as soon as extra power is available, and the whole organization and basis of charges is being reviewed with a view to generally increasing and improving the supply in the area.

In addition to the direct purchases of the works of the Southland and Grey Electric-power Boards mentioned above, arrangements have also been made during the year with Palmerston North, Taumarunui, and Whakatane by which local plants in those areas will be closed down so that additional power can be taken from the Government system.

Operating Results.

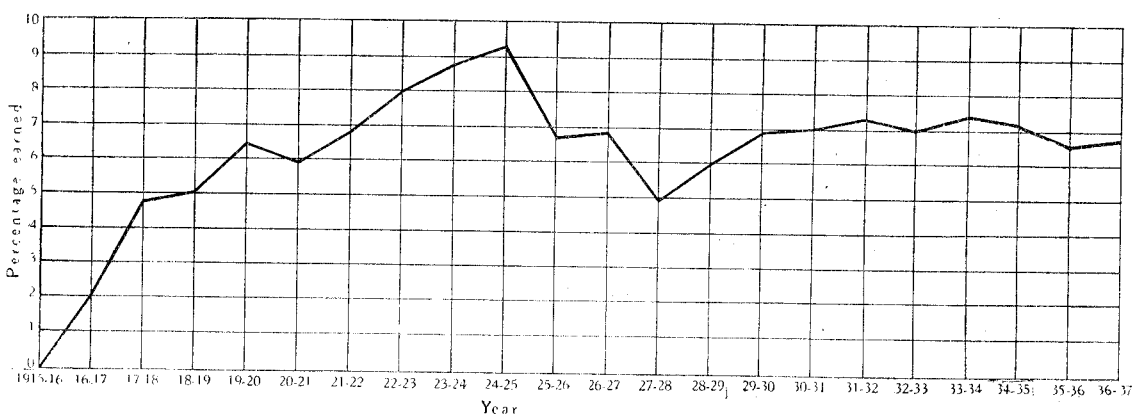
For the year just closed the number of units generated in the Government stations showed an increase over the previous year of 10·62 per cent. in the North Island and 11·56 per cent. in the South Island.

Financially the year has been a successful one, and the whole Electric Supply Account has been able to earn 6·78 per cent. on the operating-capital after paying net operating-expenses.

The position of the account is summarized in the following table, and the result since the State commenced operation in the electric-supply business is shown in the following graph :—

Percentage earned on Operating-capital after paying Working-expenses.

	Average Operating-capital.	Gross Revenue.	Working-expenses.	Net Balance.	Percentage of Net Balance to Operating-capital.
	£	£	£	£	Per Cent.
North Island system	8,489,741	887,410	144,315	743,095	8·750
South Island system	6,085,985	329,058	85,829	243,229	3·996
Totals ..	14,575,726	1,216,468	230,144	986,324	6·780



In the North Island the Depreciation Reserve required by the State Supply of Electrical Energy Act—viz., 12½ per cent. of the capital invested—has already been reached, and a considerably reduced amount is therefore chargeable to depreciation, with a consequential credit balance of £244,140 on the year's operations. This balance has been used to reduce the amount of deficiency which has been accumulated in earlier years and which now stands at £155,175. In the South Island, where in the past the Depreciation Reserve had reached the 12½-per-cent. limit mentioned above, the addition of a large amount of additional capital has necessitated the resumption of full payments into the Depreciation Reserve Fund, with the result that the year's operations show a loss of £108,106. This deficiency is greater than that shown for last year, and is accounted for by an operating-loss of £19,496 on the recently acquired Southland Electric Supply System, on which the full depreciation charge of 2 per cent. has been paid, and by a non-recurrent payment of £26,420 as the cost of raising loans during the year. To meet this loss the General Reserve has been drawn on, and has consequently been reduced to £67,703.

The general position to date is that the Electric Supply Account has been able to meet all operating and interest charges, has provided £1,265,796 towards the statutory requirements of £1,420,971 for depreciation, and, in addition, has provided £327,044 to sinking fund and £67,703 to General Reserve from profits made from time to time on Lake Coleridge system. In other words, the Electric Supply System as a whole has paid interest and operating charges and provided £1,660,543 in reserves, of which £313,614 has already been utilized by Treasury for the paying-off of loans which formed part of the original capital.

Electric-supply Operating Accounts.

(*a*) *North Island Electric-power Supply.*

The Arapuni-Mangahao-Waikaremoana plants have operated satisfactorily throughout the past year, and the revenue shows an increase of £92,019 over that of the previous year.

The result of the year's operations was as follows:—

	£	£
Capital investment at end of year	..	8,976,196
Revenue	887,410	
Operating-expenses	144,315	
Balance	£743,095	

The balance has been used in paying interest charges (£391,241) and £38,120 as the Department's share of the capital charges on the King's Wharf generating-plant of the Auckland Electric-power Board, also £10,464 to provide the full statutory contribution to depreciation, and £59,130 has been charged against cost of raising loans.

Accumulated losses to date amount to £155,175, but the Reserve Accounts established in connection with this system show that £949,888 has been credited to depreciation and £55,930 to sinking fund, which latter amount has been utilized in the redemption of loans.

(*b*) *South Island Electric-power Supply.*

The accounts under this heading formerly had reference to the interconnected Lake Coleridge and Waitaki systems, but this year have been amalgamated with those of the Southland system which was purchased from the Southland Electric-power Board last October. This latter portion of the system is, however, not yet actually interconnected with the Coleridge-Waitaki section. The respective plants have operated satisfactorily throughout the year.

The year's operations resulted as under:—

	£	£
Capital investment at end of year	..	6,149,224
Revenue	329,058	
Operating-expenses	85,829	
Balance	£243,229	

The balance has been used in payment of interest (£212,640); £112,275 has been paid to depreciation; and £26,420 has been charged against cost of raising loans. The deficiency of £108,106 has been provided from the General Reserve previously accumulated.

General.

The capital invested in the electric-supply systems operating throughout the Dominion totals £34,253,508, which includes £15,125,420 of Government expenditure, and the gross revenue received for the year was £5,124,220. After paying working-costs, interest, sinking fund, and depreciation charges, the net profit for the year under review was £570,131, as compared with £554,154 for 1936, which indicates that the electric-supply business as a whole is in a healthy condition. The average revenue received by the Government for each unit sold was 0·359d., compared with 0·346d. for last year. This increase is due to the revenue received from the retail side of the Department's business in Southland. Excluding the retail business, the average for this year is 0·344d. per unit. The average revenue per unit sold by all the retail supply authorities to consumers throughout the Dominion was 1·071d.

An analysis and summary of the operating-results and other statistics furnished by each electric-supply authority reveals the fact that there has been an increased consumption of electrical energy amounting in the aggregate to approximately 10·6 per cent. over that of 1936. This is due mainly to intensive load-building

campaigns on the part of many of the retail-supply authorities, a phenomenal increase being noticeable in the electric-cooking and electric-waterheating side of the business.

The statistics also indicate that during the past year 15,054 new consumers have been connected at an average rate of approximately 1,250 per month, and the completed figures for the year show that the ratio of number of consumers of electricity to the total population of the Dominion (1,577,109) is 23·5 per cent., or 25·4 per cent. of population in areas supplied with electricity.

The statistical data relative to each electric-supply authority will be found in the series of tables accompanying the report of the Chief Electrical Engineer.

SETTLEMENT AND OTHER ROADS.

The net expenditure from capital funds on work of this description during the last financial year amounted to £913,720, as compared with £444,377 for the previous period, an increase of £469,343. Although a considerable proportion of this expenditure has been incurred in the construction and bridging of what might be termed the uncompleted main connections in the Dominion's secondary roading-system, it has been possible to give greater attention than ever before to the improvement of settlement roads, particularly those in isolated areas.

In my Public Works Statement of last year I expressed the view that, while primary production had been developed intensively in districts served by good all-weather roads, it was practically impossible to expect similar progress, and least of all sustained progress, of areas yet without proper facilities for the transport of materials and produce.

My Department's operations on direct settlement roads during the year comprised the re-formation, or formation, of 465 miles of roads as against 336 miles for the previous period, and the metalling of 792 miles, compared with 645 miles for the previous year.

Although special attention is being given to improving roading development in country districts, it cannot be assumed that the individual circumstances of each settlement or each instance of clay-road access will justify national expenditure, but it is undoubtedly true that where further settlement or greater development is possible there is need of just such a measure of assistance as would encourage the further and more profitable use of these areas. Accordingly, it is my earnest desire to concentrate still further on the question of improving the road access to settlements wherever possible, not only in the knowledge that all-weather roads are necessary to the successful farming of our backblocks areas, but in the view that reasonable road access is indispensable to community well-being, involving such important interests as those of education, public health, and commerce.

Greater subsidies were made available towards the cost of bridging, which, without financial help of this description, would impose too great a burden on the local authorities and ratepayers. During the period under review my Department undertook expenditure, or assisted towards the expenditure, in respect of 166 bridges, totalling 10,890 ft. in length. Bridge-construction is a sphere where methods and practice have advanced greatly of recent years, with the result that it is now possible to design and build bridges in permanent materials at a reasonable cost. I have continually advocated the building of bridges of this description, and it is assuring to observe that local bodies throughout the Dominion are ready and anxious to adopt these modern designs, and so ensure to themselves and their ratepayers not only reduced maintenance costs, but also longer service from these bridges. The advice and guidance of the Department's engineers is gladly given, and many instances of severe flood damage to bridges have confirmed my view that local authorities should take every opportunity of conferring with the Department's representatives when considering the design of new structures.

The development of the tourist and scenic attractions of the Dominion has been furthered to a degree consistent with funds available, and at the same time in keeping with other aspects of the country's development, such as settlement of

the new country opened up. The Main South Road in Westland and the Haast Pass Road will give our own people and visitors from overseas the opportunity of travelling direct from the splendours of the West Coast across the divide into the Otago and Lakes Districts, and will also give a direct impetus to the agricultural and pastoral development of Westland as a whole, particularly those areas in South Westland where progress has been impossible owing to the absence of any form of road access.

As in previous years, local authorities have continued to approach the Department for assistance towards the cost of flood damage sustained in their respective districts. Fortunately there has been no widespread and substantial storm or flood damage such as resulted from the cyclonic storm of February, 1936, but there have been isolated instances throughout the Dominion where local authorities have found it necessary to approach the Government for financial aid towards the cost of restoration work. A careful investigation of the circumstances, including the capacity of the authorities to meet a reasonable share of the expenditure, has been made in each case, and where it was found that grants could be justified subsidies were given on the customary conditions,

The following is a brief general description of the progress made during the year on some of the major works referred to earlier, and which are at present in hand :—

The complete reconstruction, including the widening and metalling, of the Rotorua to Waikaremoana Road to a standard necessary to safely carry the greatly increased traffic which has resulted from the popularity of the modern motor-car. Work on the Waikaremoana end has been practically completed, and good progress has been made on the section being worked from Rotorua District.

Widening and extension of the Western Hutt Road has been continued as a standard work to provide an additional outlet from Wellington City and the Lower Hutt area generally to the Upper Hutt Valley and the Wairarapa. Not only will this route be of value as an alternative to the present road through the Taita Gorge, but it will also be greatly used by city motorists and transport interests as a by-pass to the congested traffic area of Lower Hutt Borough. The bridge which will connect the road with the present highway at Silverstream is now being erected under contract.

Good progress has been made with improvement work on the road between Haywards and Pahautanui. When completed this road will provide a very useful and quick route from the Hutt Valley to the West Coast both for commercial transport and the public generally. The reconstructed Western Hutt Road, together with the new bridge over the Hutt River at Silverstream, will bring this road within easy reach of either end of the Hutt Valley. An average of 200 men has been employed during the year.

Construction work on the Lewis Pass Road, which gives a direct connection between the Maruia district on the West Coast and North Canterbury, is now well advanced, and it will be only a few weeks before the route is opened to general traffic. Bridging of the smaller streams is receiving attention, but the temporary bridges over the larger rivers, the Hope and the Boyle, are capable of carrying all through traffic, and it is proposed to allow them to remain for some time before erecting permanent crossings.

Construction work on the Main South Road to South Westland has progressed vigorously during the year, both from Weheka southwards and from Bruce Bay northwards. The steel suspension bridge of 360 ft. span over the Fox River is nearing completion, while the erection of the Cook River Bridge, of 264 ft. span, is being advanced expeditiously. This road is to be extended to Jackson's Bay, and a wharf erected there. Two hundred and three men are employed on the road between Weheka and the Haast River, and an additional 150 can be placed on the section from Haast to Jackson's Bay as soon as the wharf is well in hand and supplies can be obtained regularly.

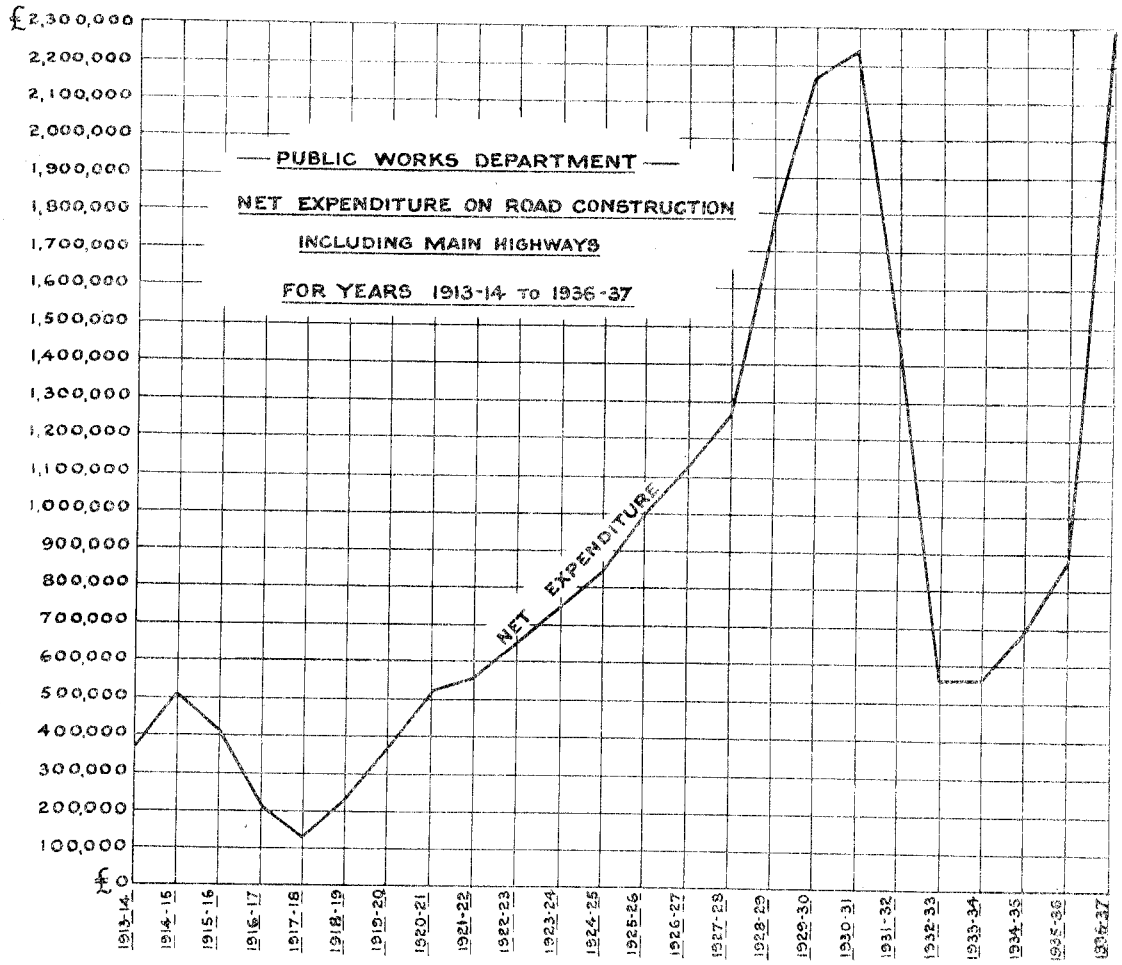
Despite extremely bad weather during the spring and early summer, good progress was made with the construction of the Haast Pass Road, where 141 men are employed. This road will connect with the Main South Road at the mouth of the Haast River in South Westland. During the period under review practically six miles of formation and three and a half miles of first gravelling were completed.

The Hollyford to Lake McKerrow Road, where 114 men are employed, is a section of a future connection between the Hollyford Valley on the new highway to Milford Sound and the road now being constructed into South Westland. The work was commenced in November, 1936, and satisfactory progress is being made. Eighty men are employed here.

Operations have been continued throughout the year on the Taumarunui to Tokaanu Road, which will give direct access from the King-country to Lake Taupo, as well as opening up large stands of timber and considerable areas of Native lands.

The new road known as Coronation Drive, on the Waitakere Ranges at Auckland, was commenced during the year, and work has been proceeding steadily.

The rise and fall of expenditure on roading generally over the last twenty-four years is illustrated by the graph hereunder.



IRRIGATION AND WATER-SUPPLY.

The construction of irrigation works is considered one of the most important developmental expenditures that can be undertaken in that it creates a permanent asset and one that has a cumulative effect on the prosperity of the country.

There are large areas of fertile land in Otago, Canterbury, and Marlborough where the deficient rainfall at present prevents full development of the intense production which the lands are capable of when the proper moisture is applied during the growing-season.

This uncertainty and lack of rainfall has considerably retarded the development of portions of these provinces, and the frequent droughts have caused large economic losses in past years.

Irrigation has been practised in Central Otago since 1919, and until 1934 the work was wholly confined to that province. However, the time has arrived when most of the available water-supplies in Central Otago have been utilized, and the remaining irrigable land can only be developed at a greater cost.

Except for the Maniototo Plain, where a gravitational water-supply is available, most of the future developments can only be done by pumping, which involves large initial outlay and heavy annual charges for power.

During the past four years extensive investigation work has been carried out in Canterbury and Marlborough, and the result of these investigations proves that very large areas of land can be developed at a much lower cost than the remaining land in Otago.

The main centre of activities in regard to irrigation development has therefore shifted to Canterbury.

The largest irrigation scheme remaining in Central Otago is the Maniototo Scheme with a gross area of 83,000 acres, and of this area the first development consists of 30,000 acres of the central portion which can be developed and still remain an integral portion of the major scheme. This area has been fully surveyed, but before the work can be put in hand the question of subdivision of the larger holdings must receive consideration of the Government.

The following is a brief description of the works in hand :—

The main races and laterals of the Omakau Scheme were completed last year, and enabled thirty-three irrigators to commence operations. During the year a further 11 miles of distributaries were completed, thus making the whole 13,400 acres available for next season. This area will shortly be increased by installing a pumping plant to raise the water to higher levels.

The Teviot Scheme was originally constructed by utilizing a large mining race and extensive renewal of old pipes taken over from the mining race became necessary. The work comprised the removal of 9,660 ft. of steel riveted pipe, and the replacement of 4,660 lineal feet of concrete-lined steel pipe, and 5,000 lineal feet of reinforced-concrete pipe.

On the Last Chance Scheme the concrete dam at Butchers Creek, containing 2,056 cubic yards of concrete, was completed, and the supply race, including 1,900 ft. of tunnelling, was also completed.

The work on the Fraser Dam which is to conserve additional water for Earnscleugh Flats has progressed, and will be completed in time for the current irrigation season. The dam is 102 ft. high, and contains 13,000 cubic yards of concrete.

On the Manuherikia Scheme a tunnel 5,148 ft. long is being constructed to eliminate a length of troublesome race in Chatto Creek Gorge, and the length completed to date is 3,714 ft.

A small scheme to irrigate 3,000 acres near the Dunstan Creek is now under construction, and 3 miles of the main race is completed to date.

In the Canterbury Province the Redcliff Scheme comprising 4,603 acres has been in operation during the season, and six of the farmers irrigated their land. The results obtained by them have demonstrated that the application of water can increase the productivity fivefold in some cases, and in all cases is sufficient to reward the users handsomely.

The Levels Scheme, comprising 12,800 acres, is now completed, and water was made available towards the middle of last season, but too late to enable any extensive use to be made that season.

In the Ashburton County an area of approximately 210,000 acres is to be irrigated, and the main supply will be diverted from the Rangitata River.

This diversion race, which has a designed capacity of 900 cusecs at the intake, will be the main supply race for this area.

The works already authorized and on which construction is proceeding are this main diversion race and the Ashburton-Lyndhurst section, comprising an area of 25,500 acres. Four other large sections have been projected, covering the remaining area, and will be put in hand from time to time as the works progress.

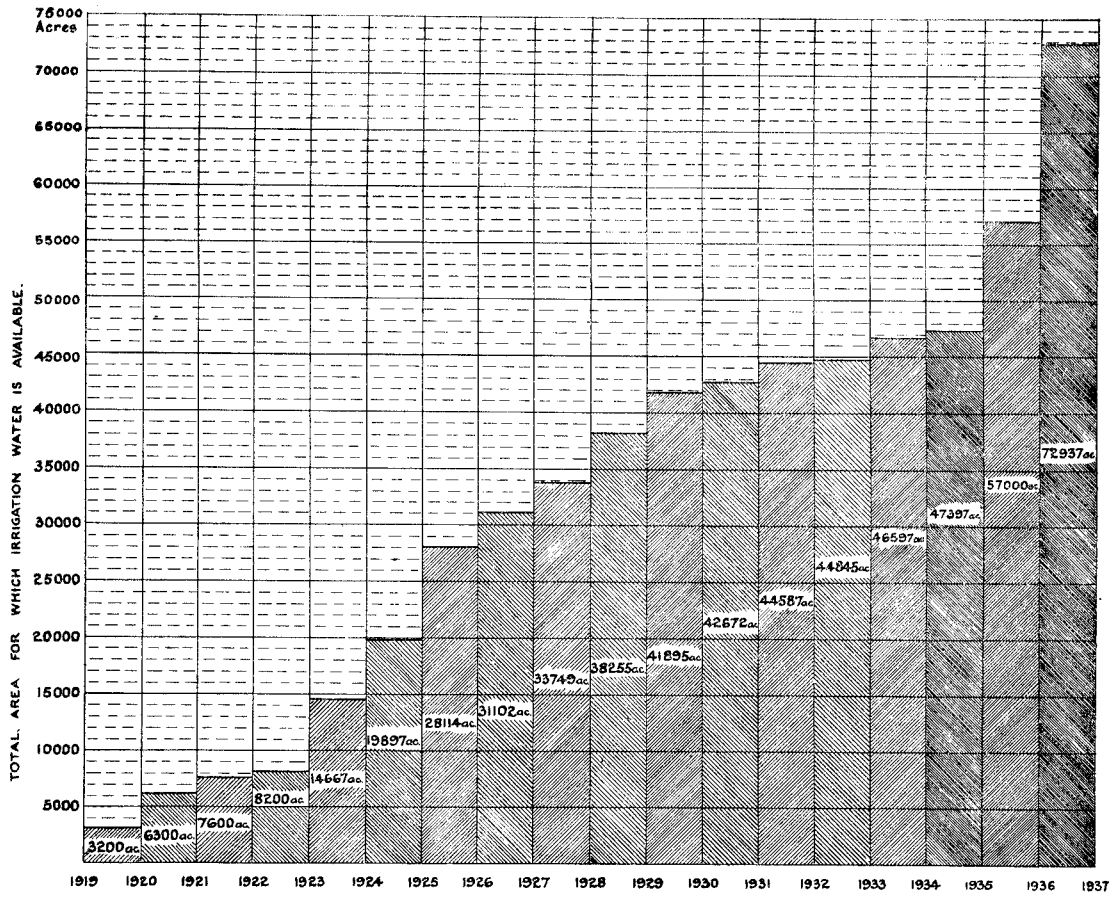
The construction of the Rangitata Race and the main supply races and laterals of the Canterbury Scheme involve several million cubic yards of earthwork excavation, and to enable this large amount of work to be carried out economically a number of modern earth-moving machines have been purchased and some are already in operation. The result of the use of the machines already in service shows that

the cost of the earthwork will be reduced by some 60 per cent., and the whole work carried out with greater expedition than would have been possible by hand methods.

The revenue last year was £23,963, and the working-expenses £27,234, which includes £6,390 for the renewal of pipes on the Teviot Scheme.

The revenue, which shows a slight increase on last season was not up to expectations due to the exceptionally wet season experienced in Central Otago last summer.

The following graph shows the growth of irrigation areas under Government schemes in the last eighteen years :—



During the year surveys have been made of the proposed Downs water-supply. This scheme, which can be economically justified, is designed to supply domestic and stock water to an area of 150,000 acres of closely settled downland country surrounding Timaru.

LANDS IMPROVEMENT.

The net capital expenditure from the Public Works Fund for the year was £62,672, as against a net capital expenditure last year of £37,909. The gross expenditure this year, however, was £232,070, as against £97,568 last year. The difference between the net capital expenditure and the gross expenditure—viz., £169,398—is represented by contributions obtained from local bodies interested in the works and by revenue expenditure. The work under this section of the Department's activities comprises the improvement and control of rivers, reclamation of tidal-flat areas, reclamation of sand-dune country, and drainage and clearing of farm lands. Some of the main works in hand are the Taupiri drainage scheme in the Waikato, the Te Kawa drainage scheme, Waitoa River clearing, Mokau River clearing, Ahuriri Lagoon reclamation, Hutt River reclamation, Karamea flood-control works, and sand-dune reclamation along the western coast of the Manawatu and Auckland Districts. A considerable

amount of work has been done in the way of farm-land development, the funds for this having been provided by interested settlers and from unemployment moneys.

The Ashley River control work is one of the largest jobs in hand under this section of the Department's activities. The work consists of a system of stop-banks and groynes extending from the junction of the Okuku to the sea, which is a distance of 12 m. It will afford protection to a large area of rich agricultural land. The works were designed to cope with what was considered the largest flood likely to be encountered, but in February, 1936, during the progress of construction, a record flood was experienced, which made it appear advisable to construct the stop-banks and groynes to higher levels. The work is now nearing completion.

An extensive survey and report was recently completed dealing with the Ashburton River, and a similar one is in hand for the Hinds River. The one pertaining to the Ashburton River has been made available to the Ashburton County Council.

PUBLIC BUILDINGS.

The net expenditure for last year in the various classes of buildings was:—

	£
General Government buildings	58,565
Courthouses	2,655
Prison buildings and works	4,621
Police-stations	7,149
Postal and Telegraph buildings	158,005
Mental Hospital buildings	142,109
Health and Hospital institutions	12,921
	£386,025

New Departmental Buildings.

Buildings were erected at Alexandra, and at Wellington the excavations for the foundations of a new departmental building have proceeded satisfactorily, although they were stopped for a considerable time pending the purchase and demolition of the adjacent premises required for further building space.

The final Government contribution of £36,969 was made towards the erection of the National Art Gallery and Dominion Museum Building, the total subsidy paid to date amounting to £100,000.

A new Ministerial residence was erected in Tinakori Road; a new store for housing plant was built near the Public Works Workshops; additions were made to the Meteorological Office at Kelburn; at Lincoln College a new plant-research laboratory was erected; at Mamaku a new farm residence was erected for the Manager; a new wharf was erected at Taupo for the Internal Affairs Department; magazines were erected at Greymouth and Wingatui; at Greymouth a new residence was erected for the District Engineer; and at Rotorua the Public Works garage was extended and new plant installed.

Courthouses.

The intended programme for courthouse additions has not been advanced to the stage which was hoped for twelve months ago. The new Courthouse at Ashburton has been completed. At Auckland the new library additions have been completed and are in occupation. A new site has been acquired for the new courthouse at Invercargill, and working plans for the building are now complete. The present building, which is over half a century old, is entirely unsuitable and inadequate for present needs. At Kaeo a new courthouse has been completed.

The need for more adequate Court accommodation in a number of centres is still pressing, as inadequate provision had been made over the past twenty-five years to meet normal growing requirements. At Wellington, Christchurch, and Dunedin the accommodation is insufficient, and necessary extensions or replacements

are now under consideration. At Auckland the need has been eased temporarily by recent additions and alterations at the Supreme Court, but more accommodation is required at the Magistrates' Court.

At secondary centres—Nelson, New Plymouth, and Thames—courthouses are due for replacement, and at Napier improvement of existing facilities is required. Estimates and plans for these works are at present under consideration. At Blenheim a new courthouse is in course of construction, and at Whangarei a site has been acquired and plans drawn up to provide a new courthouse in place of the existing leased building, which is inadequate now that the Supreme Court has been established.

Considerable attention has been given to the improvement of heating facilities and acoustics at a number of courthouses in the past two years. It is difficult to provide proper ventilated heating in all places, particularly in high-ceiling court-rooms, but improvements effected during the last year are steadily overtaking the need for reasonable comfort. The Auckland, Hamilton, and Masterton Courts have been treated with acoustic tiles with marked improvement, and the Timaru Court is at present under consideration.

Prison Buildings and Works.

No capital expenditure has been involved during the year on the erection of prisons. The decrease in the number of prisoners has necessitated the mechanization of certain industries.

Police-stations.

New police-stations to replace buildings which have become unserviceable were erected at Waitotara and Woodville, new office and lock-up at Wairoa, and offices at Patea and Waikouaiti. Extensive additions to the police-station at Invercargill were carried out to provide much needed office accommodation. A house and land were purchased for a police-station at Maori Hill, and a site for police purposes was acquired at Port Chalmers. Many of the police-stations throughout the Dominion are old places, are getting beyond repair, and are quite inadequate to meet present requirements. It will be necessary to replace them at an early date, and provision in this direction is being made on this year's estimates.

Post and Telegraph Buildings and Land.

The erection of new post-office buildings at Albury, Charleston, Porangahau, Rangiora, and Thornbury was completed during the year. An additional story was built on the newer portion of the General Post Office building, Wellington, and a substantial addition was made to the Cambridge Post-office building.

Other buildings completed during the year were residences for the Postmaster at Pahiatua, and the caretaker at Wellington-Radio; a large garage at Auckland; garage-store-line buildings at Dargaville, Hawera, Kaikoura, Takapuna, and Wyndham; also a building for carrier-current equipment at Kaikoura.

Minor additions and alterations were effected at a number of offices. Several buildings and sites no longer required were disposed of, while a number of sites for future buildings were acquired. The former post-office building at Rangiora was demolished to make way for the new building.

At the end of the financial year, the following buildings were in course of erection: Awarua-Radio (residence for Superintendent), Belfast (post-office and quarters), Dunedin (chief post-office), Greymouth (power and battery building), Hamilton (automatic telephone exchange, addition), Maungaturoto (post-office), Mayfield (post-office and quarters), Napier (automatic telephone exchange), New Plymouth (garage, store, line, and workshop buildings), Omakau (post-office and residence), Oturehua (residences (2)), Pahiatua (post-office), Rotorua (garage, store, and line building, battery and power building, &c.), Te Awamutu (garage, store, and line building), Thames (chief post-office), Waikari (post-office and residence), Waimana (post-office and quarters), Wakefield (garage and line building), Wellington (Lyall Bay, cable-repeater building).

Large additions are being made to the Hamilton automatic telephone exchange building and the Te Awamutu Post-office building; smaller additions are being provided at the Epsom, Mount Eden, and Kingsland Post-office buildings (Auckland), and the Kilbirnie building (Wellington), and extensive alterations are being made to the Moray Place Post-office building at Dunedin.

Plans are in preparation for new chief post-office buildings at Christchurch, Hamilton, Invercargill, New Plymouth, and Wanganui; for post-office buildings at Avondale, Grey Lynn, Kamo, Kerikeri Central, Kumeu, Little River, Mangaweka, Linwood, Milton, Otorohanga, Owaka, Queenstown, St. Albans, Sumner, Taupo, Tauranga, and Te Kuiti; for major additions to the chief post-office buildings at Auckland, Oamaru, and Palmerston North; and for a large line depot and office building at Wellington.

The building programme for 1937–38 includes a number of residences for postmasters, a reflection of the general housing shortage.

Mental Hospitals.

Avondale.—Renovations and repairs were attended to.

Kingseat.—The erection of Villas 4, 5, 6, 19, and 21 and the store building was completed. New boiler-house, butchery and bakery, laundry, and fuel-store are approaching completion.

Tokanui.—A new residence for the Medical Superintendent, also Villas 2 and 3, were completed. Alterations were made to old wards to transpose the male and female sections. Alterations and additions were made to the laundry-sorting room and annexe bathroom. A camp stable was in course of erection.

Porirua.—Large store is approaching completion; good progress was made with the new boiler-house. The towers have been strengthened and roofs over wards renewed. Repairs and renovations were made to five villas and other buildings.

Ngawhatu.—A new villa, No. 6, was erected. Repairs and renovations generally were attended to.

Sunnyside.—A new vegetable-house was completed, and a new bakehouse is in course of erection. Extensive additions to the female dining-room were carried out.

Templeton.—Villas Nos. 3 and 4 were completed, and a commencement was made with the erection of a new laundry.

Seacliff.—Repairs and renovations were attended to.

Hokitika.—A new villa was completed and a new house and garage were built for the clerk.

Extensive alterations were made to Aorangi and Sefton wards. General maintenance and repairs were dealt with.

Health and Hospital Institutions.

The sum of £12,500 was paid over during the year on account of the Government's contribution towards the erection of the Obstetric Hospital at Dunedin and provision is made for a further contribution in the current year's estimates. Provision is also made for the purchase of additional land and for the erection of a new fifty-bed hospital to replace the present St. Helens Hospital at Christchurch. A new Nurses' Home for St. Helens Hospital at Auckland is also contemplated.

A start will be made with the erection of a new hospital for male patients at Queen Mary Hospital at Hanmer Springs, and improvements to the water-supply are being attended to.

The erection of a new dental clinic on the old Te Aro School site will be proceeded with this year. This building will be a four-storied structure, and will serve both as a training clinic for dental nurses and as a treatment centre for school-children of Wellington. The contract has been let.

Education Buildings.

The net expenditure of capital funds on the erection of school buildings, additions, and teachers' residences and the purchase of sites amounted to £281,895 for the year. This sum includes £13,012 provided by the Consolidated Fund to meet the cost of works under £200.

The following table shows for the last four years the capital expenditure on new school buildings, additions, sites, and teachers' residences :—

	1933–34.	1934–35.	1935–36.	1936–37.
	£	£	£	£
Public schools	57,664	35,105	87,908	162,894
Secondary schools	2,568	14,679	23,516	24,092
Technical schools	1,504	12,851	59,350	77,836
Training colleges	..	..	610	6,729
Native schools	2,698	5,419	8,399	12,172
Child-welfare institutions	..	..	221	2,473
University Colleges	..	..	..	525
Massey College	..	..	..	3,022
Gross total	64,434	68,054	180,004	289,743
Less credits-in-aid	7,778	10,894	48,547	7,848
	£56,656	£57,160	£131,457	£281,895

ESTABLISHMENT OF AERODROMES.

During the year activities in this side of my Department's operations have increased considerably, and its scope has been widened to carry out or advise on all matters pertaining to aerodrome facilities and ground organization for air transport.

In consequence of the success of the initial air transport services a greater demand for such services has arisen, and development of facilities to serve the Main Trunk Services has been energetically proceeded with. During the year there has been a considerable increase in passenger and air-mail traffic.

East Coast Airways, whose service between Napier and Gisborne was suspended during improvements to the Gisborne Aerodrome, returned to operation with considerably improved terminal facilities. Cook Strait Airways has extended its services from Nelson to Hokitika to connect with the existing South Westland service. Union Airways daily express passenger and mail service between Auckland and Wellington via New Plymouth has been commenced recently. All services have maintained their schedules with very commendable regularity and the maximum of safety.

To illustrate the growth of regular air services the following is a tabulation of passengers, mails, and freight carried for three-monthly periods from 1st January, 1936, to 30th June, 1937 :—

Quarter ended	Number of Passengers.	Passenger-miles.	Freight.	Freight Ton-miles.	Mail.	Mail Ton-miles.
			lb.		lb.	
31st March, 1936 ..	5,460	560,000	7,200	360	6,400	350
30th June, 1936 ..	5,080	550,000	8,400	370	20,000	1,600
30th September, 1936 ..	4,750	540,000	8,700	450	25,000	2,250
31st December, 1936 ..	6,150	700,000	13,700	630	33,000	2,880
31st March, 1937 ..	8,200	870,000	13,200	595	32,200	2,530
30th June, 1937 ..	7,400	770,000	16,500	Not available.	36,800	Not available.

During the coming year even greater increases in all classes of traffic are to be expected, while extensions to the Main Trunk routes are contemplated. These extensions, as well as the development of feeder services, will follow the establishment of the relative aerodromes and facilities and a planned programme is being pursued to this end.

The development of aerodromes and emergency-landing grounds has been concentrated primarily to serve the Main Trunk routes, and a commencement made with those for the feeder services. There are now forty-nine aerodromes licensed for regular operation, on twelve of which enlargement or improvement work is proceeding, while fifteen additional fields were under development during the year.

A major undertaking has been the investigation and planning of new Royal New Zealand Air Force stations and the improvement of the two existing stations

at Hobsonville and Wigram in line with the projected expansion of the Royal New Zealand Air Force. Much preliminary work has been carried out and major improvements to the flying-fields and to technical and living accommodation at Hobsonville and Wigram Stations have been proceeded with.

During the early part of the year development work was proceeded with on the old basis, utilizing unemployed labour, but in July, 1936, a change-over to regular public-works conditions and procedure greatly accelerated the progress of the work. On most of the important works and all the more remote fields modern construction plant has been introduced, and some works are being undertaken by contractors, after calling public tenders. Much greater value for the money expended is now being received than has been the case in the past.

A total of £143,000 was expended on aerodrome construction from the employment-relief funds during the year, almost all of this expenditure being incurred during the early portion of the year. From the Consolidated Fund a sum of £218,000 was expended, of which £23,000 was spent in the development of the flying-fields on Royal New Zealand Air Force stations and £5,000 was forthcoming from the Civil Aviation vote. In addition, the Department designed, carried out, and supervised the construction of buildings, services, and facilities on the two existing Royal New Zealand Air Force stations, the funds for which were made available from the Defence votes.

TELEGRAPH EXTENSION.

The expenditure by the Post and Telegraph Department for the financial year in respect of the extension of telephone, telegraph, and radio facilities throughout the Dominion amounted to £232,512, as against £195,379 for the year ended the 31st March, 1936.

Further improvements in the long-distance toll service were effected during the year by the installation of a three-channel carrier-telephone system between Seddon and Christchurch and the provision of an extra telephone channel across Cook Strait over the No. 4 Lyall Bay – White's Bay single-core telegraph cable, the special equipment required for this additional cable circuit being made up locally. The provision of these additional channels has enabled the Post and Telegraph Department to rearrange its Inter-Island toll facilities to better advantage, and there are now four direct circuits between Wellington and Christchurch and two between Wellington and Blenheim.

Consequent on the installation of the three-channel carrier system between Seddon and Christchurch, a single-channel system was released from service, and this was reinstalled immediately between Nelson and Greymouth, thus providing a high-grade direct circuit between Nelson and the West Coast of the South Island.

With a view to facilitating a general rearrangement of toll facilities on the Auckland–Wellsford–Whangarei section in order to provide suitable outlets for the newly-established departmental exchanges at Paparoa and Kaiwaka and the enlarged exchange at Maungaturoto, one of the single-channel carrier systems previously in use between Wellington and Palmerston North was installed for use between Auckland and Whangarei.

The removal of the National Broadcasting Station 2YA to the new site at Titahi Bay necessitated the provision of two high-grade metallic circuits between the studio in Wellington and the new transmitting-station, and the Post and Telegraph Department's own requirements made it imperative to provide extra circuits over the same section of the main north route. As the pole-line over the main highway between Wellington and Porirua was already loaded to its full capacity and the reconstruction of this section to provide for the new circuits would have proved extremely difficult and uneconomic, a new pole-line carrying eight pairs of wires was erected over an alternative route between Melling and Pahautanui. This enabled certain of the traffic circuits to be diverted to the new pole-line and brought into Wellington via Lower Hutt. In addition to the circuits required by the National Broadcasting Service, much needed relief for departmental services was provided as well as a valuable alternative outlet from Wellington in the event of disruption of the main pole-line.

Consequent on the electrification of the new railway route between Wellington and Paekakariki, it was necessary to divert the toll and telegraph pole-line in certain places between Porirua and Paekakariki in order to avoid inductive interference caused by the paralleling of the toll and telegraph circuits and the new railway power circuits.

During the year teleprinter equipment for the dispatch of telegraph traffic was installed at Stratford, Hawera, Marton, and Dannevirke, and these offices are now provided with machine-printing channels to Wellington direct. In addition, the telegraph-offices at Ashburton and Gore were equipped with teleprinter apparatus, resulting in the provision of machine-printing channels between Christchurch and Ashburton and between Dunedin and Gore. An extra teleprinter outlet was also provided between Christchurch and Greymouth, and a teleprinter circuit was established between Christchurch and Dunedin.

The improvement referred to last year in the number of telephone installations has continued throughout the year, and the net gain in subscribers totalled 8,938, as against 5,255 for the previous year. It is gratifying to record that the peak number of subscribers reached in 1930 has now been exceeded, and that the grand total of telephone installations in the Dominion on the 31st March stands at the high figure of 178,599, which is 12,034 in excess of the previous year's figure and approximately 12,234 in excess of the number recorded in 1930.

As a result of the reticulation by the North Auckland Electric-power Board of the North Auckland district for electric-power purposes, a considerable number of settlers who previously were served telephonically by private telephone-exchange systems decided to connect up with the departmental exchange system, and this has necessitated the construction of departmental telephone exchanges at Paparoa (also including Mareretu) and Kaiwaka and the extension of the departmental exchange at Maungaturoto. The Paparoa exchange was opened on the 7th December, 1936, with 178 main stations and the Kaiwaka exchange seven days later with eighty-two main stations. The work of extending the Maungaturoto exchange is proceeding, and it is expected that at least 150 additional subscribers will be connected to this exchange when the work is completed during the current year. In other areas also a considerable amount of construction work has been necessitated by the electric-power reticulation operations of various Electric-power Boards.

To provide for growth in the Dunedin exchange area, the switching-equipment at the Dunedin Central automatic exchange was extended by 200 individual lines during the year, and at the Lower Hutt automatic exchange an additional 700 lines were made available for unrestricted service to Wellington. Increased switchboard accommodation was provided also at a number of other exchanges, including Cambridge and Waimate, where branching multiple switchboards were installed. Automatic switching equipment for the new automatic telephone exchange to be installed at Napier was ordered during the year, and is due to arrive in the Dominion in July, 1937, by which date it is expected that the building now in course of erection will be completed. It is also proposed to provide automatic telephone equipment for installation at Gisborne and New Plymouth, and attention is now being given to the technical requirements of the equipment.

The following is a brief summary of the more important operations in regard to the development of telephone-exchange systems in the Dominion :—

The laying of 33 miles of underground cable ducts.

The laying or erecting of 53 miles of lead-covered cable containing 14,528 miles of wire for subscribers' circuits.

The installation of forty-five public-call offices and four pay-stations.

The opening of new magneto-telephone exchanges at Paparoa and Kaiwaka.

The extension of the automatic switching equipment at the Dunedin Central automatic telephone exchange by 200 individual lines.

The rearrangement of the equipment at the Lower Hutt automatic telephone exchange to provide an additional 700 lines for unrestricted service to Wellington.

The installation of branching multiple switchboard equipment at the Cambridge and Waimate telephone exchanges.

The provision of increased switchboard accommodation at the Paihia, Rotorua, Tauranga, Te Awamutu, Nelson, Upper Moutere, Sefton, Timaru, Alexandra, Roxburgh, Kaitangata, Kelso, Winton, Thornbury, and Bluff telephone exchanges.

The replacement of existing switchboards at the Kohukohu, Huntly, Waipiro Bay, Awakino, Woodville, and Kumara telephone exchanges.

The closing of the Ohinewai and Crookston telephone exchanges and the connection of the subscribers to the Huntly and Heriot exchanges, respectively.

The reconstruction or partial reconstruction of open aerial systems at a large number of telephone exchanges.

The replacement at a number of exchanges of marline hangars for aerial telephone cable with galvanized steel cable rings.

The installation of machine-ringing apparatus at Alexandra, Balclutha, Heriot, Otautau, Mataura, and Bluff, and additional ringing machines at Tauranga and Waimate.

The installation of timing devices in a large number of public-call offices at automatic telephone exchanges.

With a view to obtaining improved operation and more economical maintenance, a complete new modulating assembly has been installed at Wellington-Radio for use in connection with the short-wave radio-telephone transmitter used on the overseas radio-telephone service. The provision of this modern equipment has resulted in considerable economies in power consumption and in the cost of replacement parts required from time to time.

Two new aerial systems have been erected at the Mount Crawford receiving station with beneficial results in the reception of radio-telephone speech from overseas; and consideration is now being given to proposals for the rearrangement of the aerial systems with a view to relieving the present tower on the Tinakori Hills site of a portion of its load and, at the same time providing more efficient aerials for the several short-wave and long-wave services that now devolve upon this station.

TOURIST AND HEALTH RESORTS.

The expenditure for the year ending the 31st March was £16,789, as against £13,683 for the previous year.

Major works completed during the year were the erection of comfortable staff quarters at the Chateau Tongariro, extensions to the Rotorua electrical system, extensions to the lounge and the installation of private bathrooms at the Hotel Waitomo, and improvements to the accommodation at Lake House, Waikaremoana.

During this financial year it is proposed to complete the road to Salt Hut, Tongariro National Park, and to proceed with additions and improvements to the tourist resorts controlled by the Government.

SETTLEMENT OF UNEMPLOYED WORKERS.

The development of a number of blocks for small-farms purposes has progressed satisfactorily under the control of the Public Works Department, acting on behalf of the Small Farms Board. Work has been practically completed in many instances, and the camps have been closed, further work being found elsewhere, in most cases, for the men. On an average, 1,067 men have been employed throughout the year.

The total number of buildings erected was:—

Number of cottages, 36; total cost, £12,846; average cost, £356.
Number of farm buildings, 153; total cost, £5,202; average cost, £34.

The gross total expenditure out of vote Settlement of Unemployed Workers was £305,621, but this figure included wages, part of which was recovered from subsidies provided by the Employment Promotion and Consolidated Funds. The capital expenditure on development work was £199,003 gross.

The following are the results of the small-farms scheme as at 31st March, 1937 :—

	No.	Acres.
Individual holdings established	365	24,522
Sections included in blocks under development	594	53,799
Area under development but not sectionized ..	..	5,761
Total area under development	..	59,560
Sharemilker's cottage loans approved ..	66	..

PLANT AND MECHANICAL EQUIPMENT.

I find at the conclusion of the year now under review that the Government's policy of equipping all suitable works with modern construction plant has proved an unqualified success, both in the manner of performance and the speed and economy with which the major undertakings are advancing to successful completion.

At the commencement the Government realized fully that only by the use of the most economic and up-to-date methods could the success of the large public-works programme, for the economic employment of many thousands of men on the construction of valuable capital works, be assured.

The expenditure on modern plant for construction works approximates £500,000 for the year, and comprises over 1,000 items, of which typical examples are Diesel-powered mobile shovels and drag-lines, Diesel locomotives, large Diesel stationary engine units, Diesel-powered tractors and road-building equipment, Diesel-driven air-compressors, and Diesel-driven winches.

Each item purchased was obtained on best quotation from the principal firms not only in New Zealand but abroad, and the equipment was selected after a thorough investigation into its efficiency and ability to operate under New Zealand conditions.

The bulk of this plant ordered is now in operation on all classes of work, and, as an actual demonstration of the value of the Government's policy in the purchase of this modern machinery, I would quote typical examples of comparative cost. On road and highway formation Diesel tractor road-building combinations showed savings from 21·9 per cent. to 90·5 per cent. against the cost of manual methods for the same works.

On drainage schemes Diesel crawler-type excavators and drag-lines were responsible for savings from 16·7 per cent. to 85·7 per cent. as against the employment of hand labour.

On the construction of aerodromes Diesel tractor special scoops performed work at 15·16 per cent. to 91·7 per cent. saving of the cost of similar works by manual labour.

On railway-construction work similar comparative savings in cost were attained in using Diesel-powered plant, the percentage in some cases being as high as 74·3.

In all cases the saving in time was a considerable factor, and in one instance it is estimated that a machine will complete the work in one-fifth of the time required for the same job by manual labour, and at the same time show a comparative saving in cost of 57·1 per cent.

It is also of interest to quote the following costs : On a large drainage scheme the construction of a narrow drain holding over 2 ft. of water was excavated by a machine to the required depth, where, owing to the conditions, it would have been a most arduous and trying task to take out the bottom with manual methods. The machine costs show a saving of 60·8 per cent. against the estimated cost of manual labour for improperly completed work.

In the construction of an airport landing-ground the excavation of a large drain was necessary, involving the removal of heavy pug from under water. This job could not have been done by hand labour without the construction of an expensive coffer-dam and the use of pumps, whereas the machine, a Diesel crawler-type excavator, carried out the job expeditiously at a very low cost.

The employment of this large amount of machinery has not in any way displaced men on Public Works construction works, as the Government, for no additional cost, is now enabled to undertake considerably more works, which absorb the men available. In comparison with the methods of the past the cost of work to-day is such that several jobs employing a similar number of men as before can be completed for what was previously the cost of one undertaking.

During the year I visited many of the works being carried out by the Department, and I was impressed with the manner in which the various machines are performing, and the resourcefulness of the Department in overcoming difficulties that arose in obtaining skilled operators for this new plant. Very few trained men were then available in New Zealand, and to rectify the position new operators were successfully trained by the Department. These men are now reaching a high stage of operating efficiency.

As it appeared to me that honourable members, without actually seeing all the works in progress and the machinery now operating throughout New Zealand, could not visualize the efficiency of this plant in dealing with the construction programme of the Department, I have arranged for the Publicity Department to produce a motion-picture record covering the varied and unique phases of the work. This pictorial record will shortly be ready for exhibition, and I shall be glad to extend an invitation to honourable members accordingly.

HARBOUR WORKS.

During the year the harbours at Westport and Little Wanganui continued to be maintained by the Government. At Waikokopu the harbour operations were carried out by the Wairoa Harbour Board on behalf of the Public Works Department. At Elmslie Bay, French Pass, a new wharf has been completed, together with storage-shed and wharf-steps.

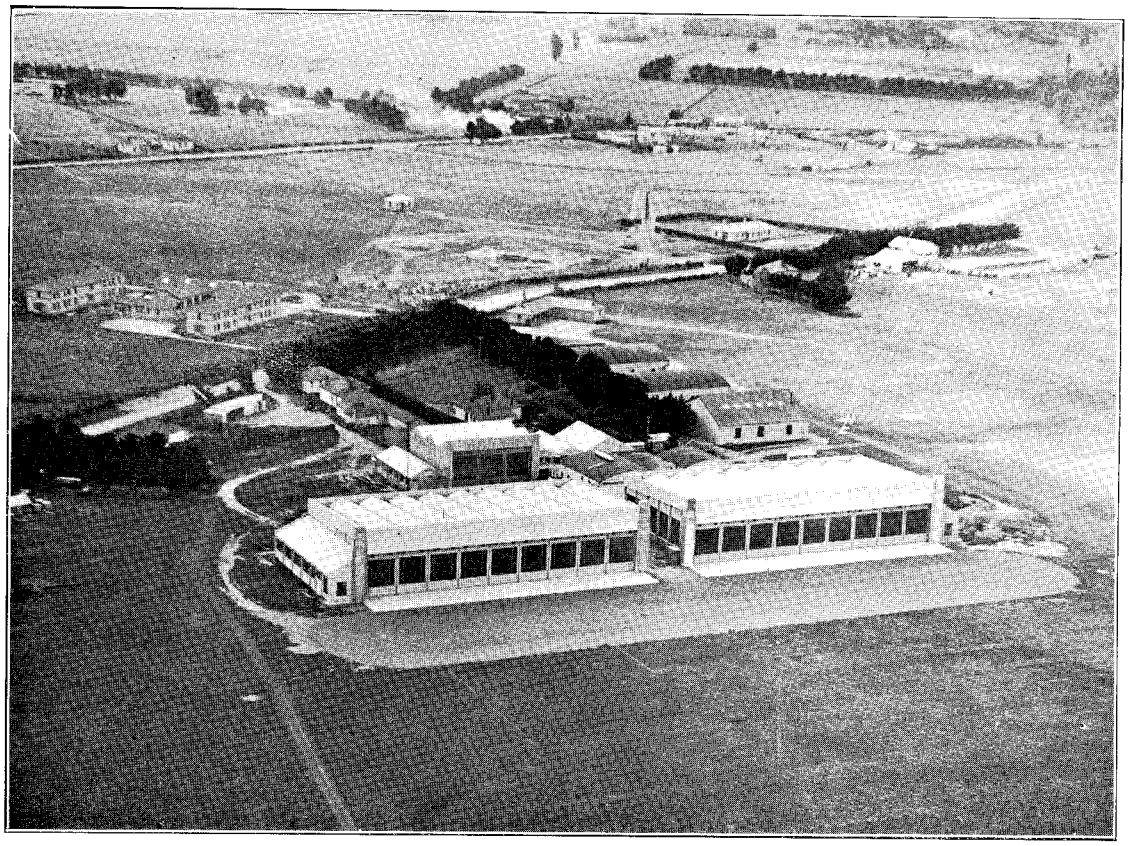
During the year a survey of the harbour-site was carried out at Jackson's Bay, South Westland, and a contour-plan of the bottom prepared for the purpose of locating a wharf-site.

Plans have been approved and a contract let for a wharf at Whangaparapara, Great Barrier Island.

LIGHTHOUSES.

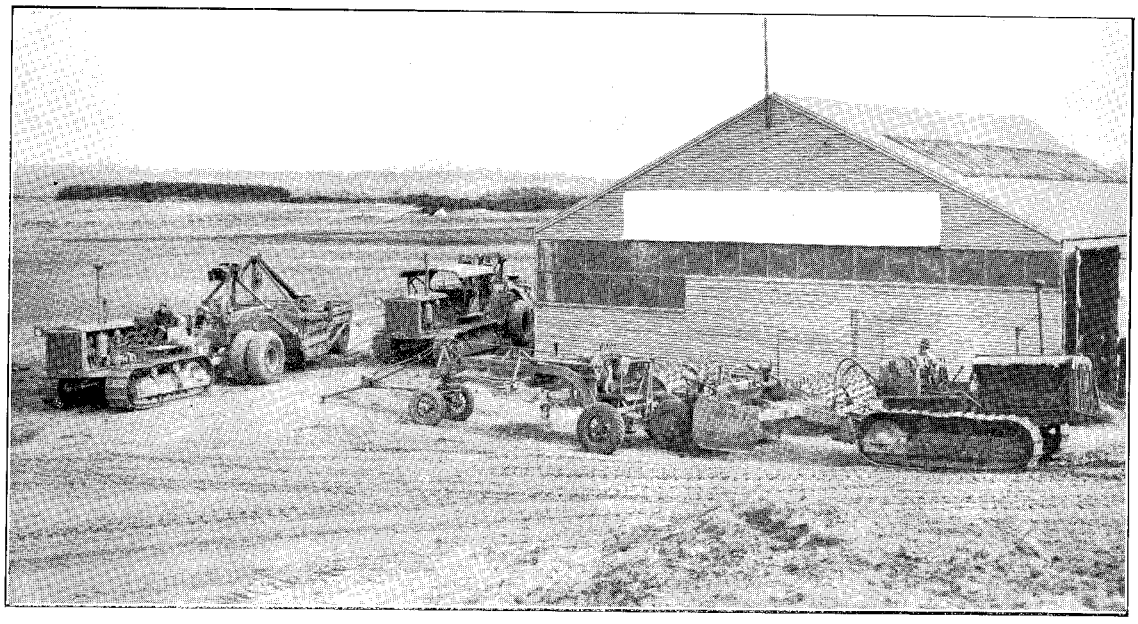
A new reinforced-concrete lighthouse has been erected at Anne Point, Milford Sound, and a new flashing light has been erected on a steel tower at Pearl Island, Port Pegassus, Stewart Island.

During the year the Assistant Under-Secretary to the Department, Mr. C. E. Bennett, retired after forty years' service, and I would like to place on record my appreciation of his services to the Government.



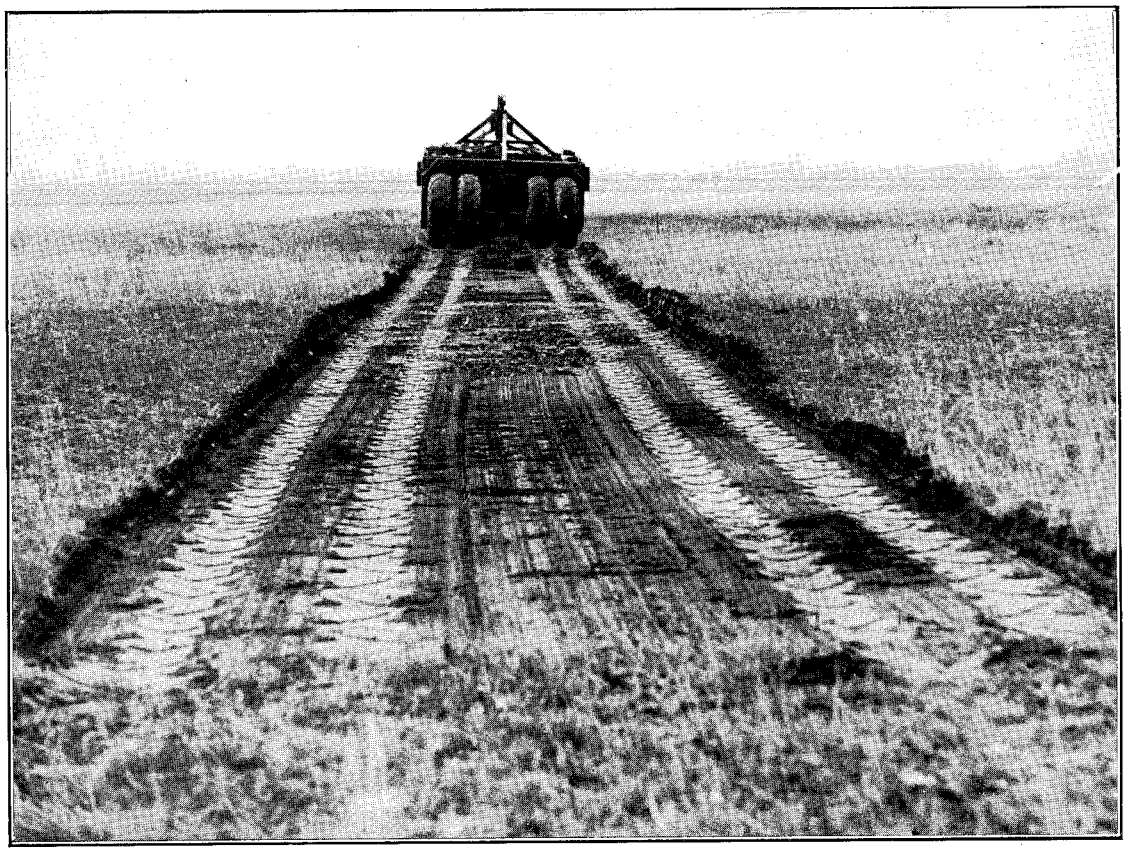
Aerial View, showing Progress of Building.

R.N.Z.A.F. FLYING TRAINING SCHOOL, WIGRAM AERODROME.

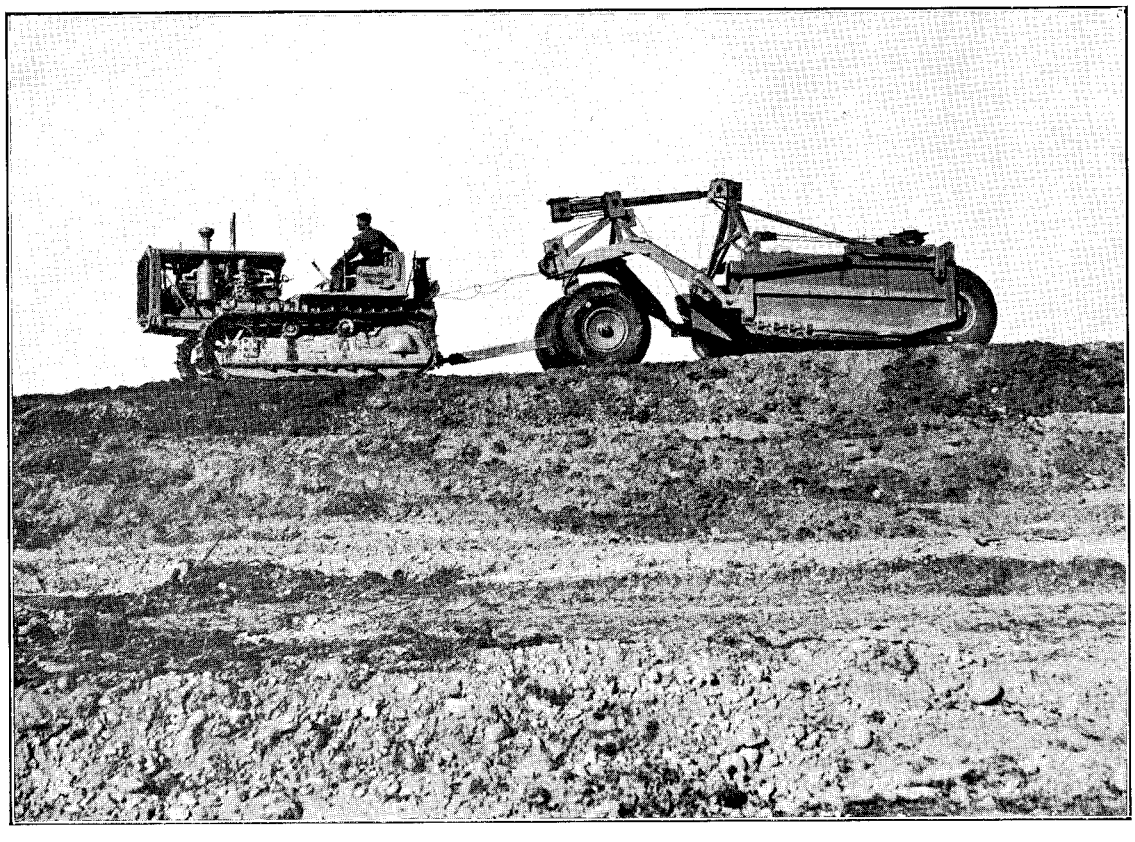


Typical Plant used in Construction.

NELSON AERODROME.

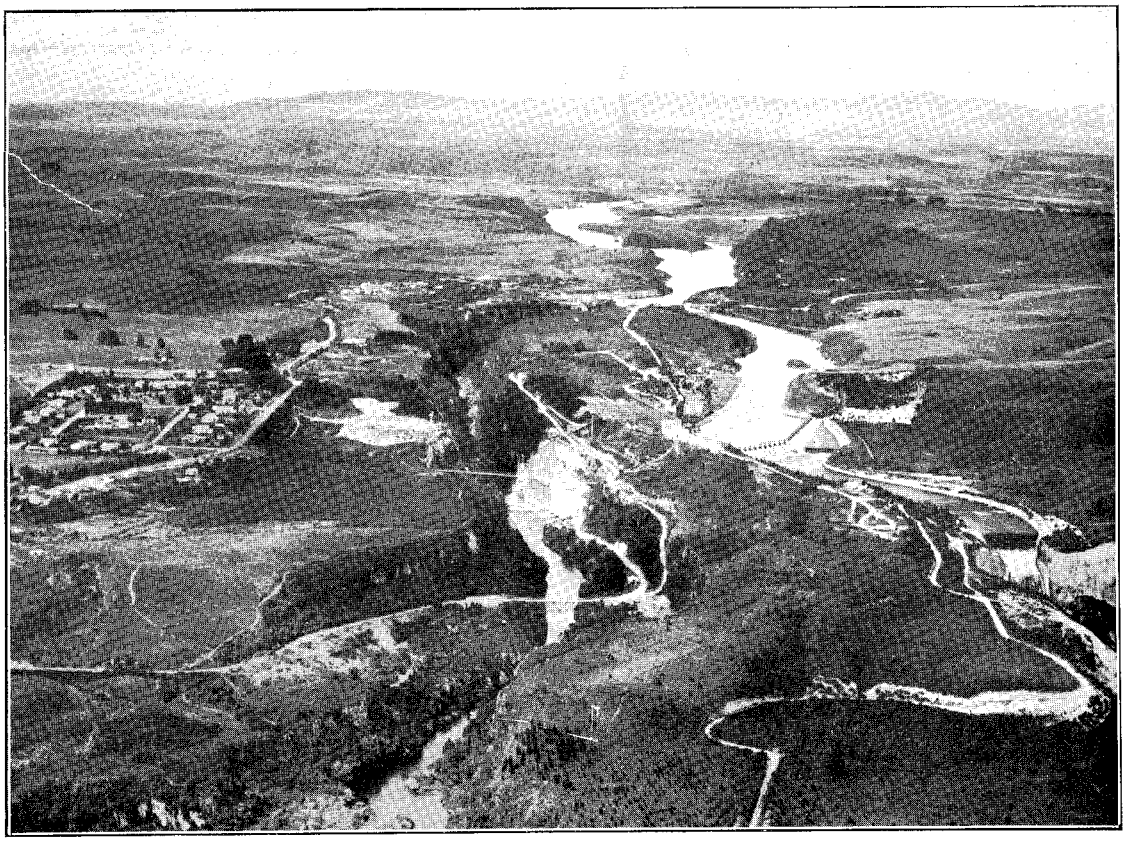


CARRY-ALL SCRAPER IN OPERATION. REAR VIEW AND TRACK.

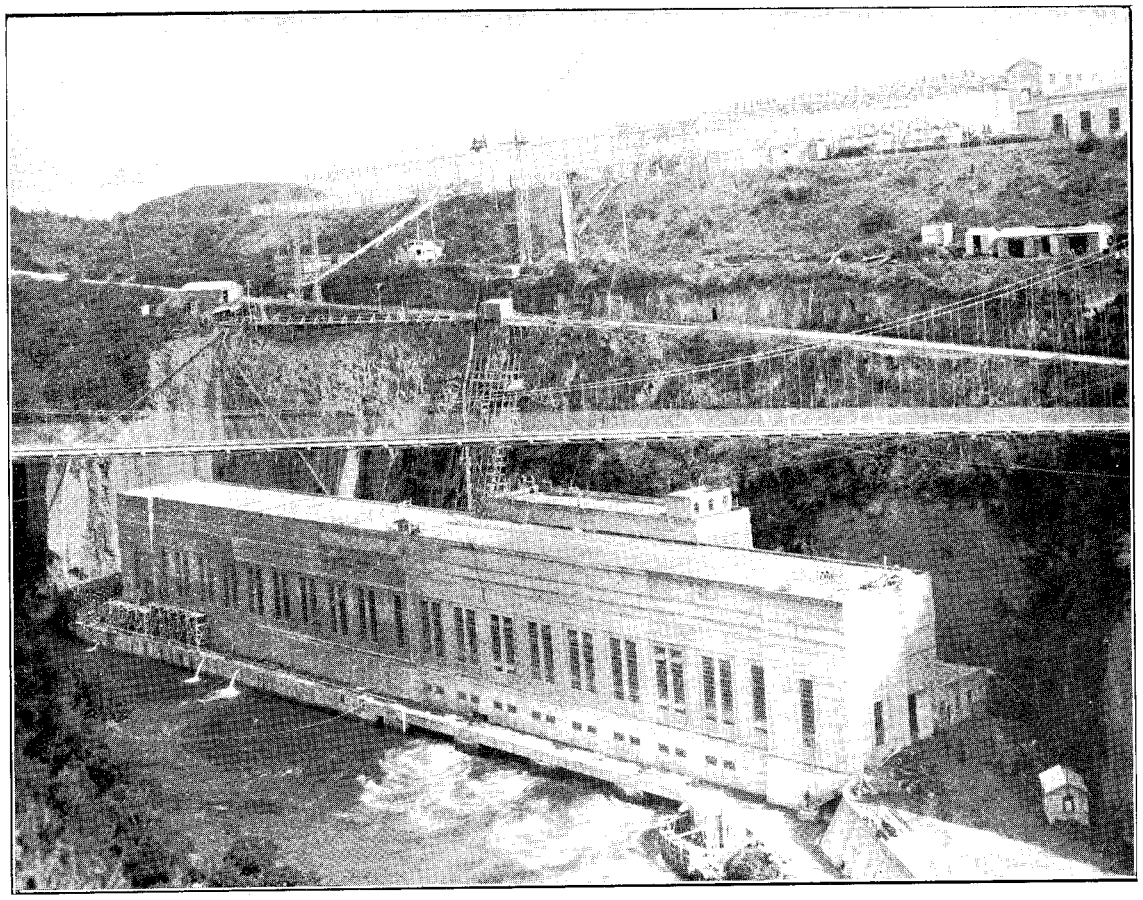


CARRY-ALL SCRAPER DRAWN BY DIESEL TRACTOR.

HAREWOOD AERODROME.

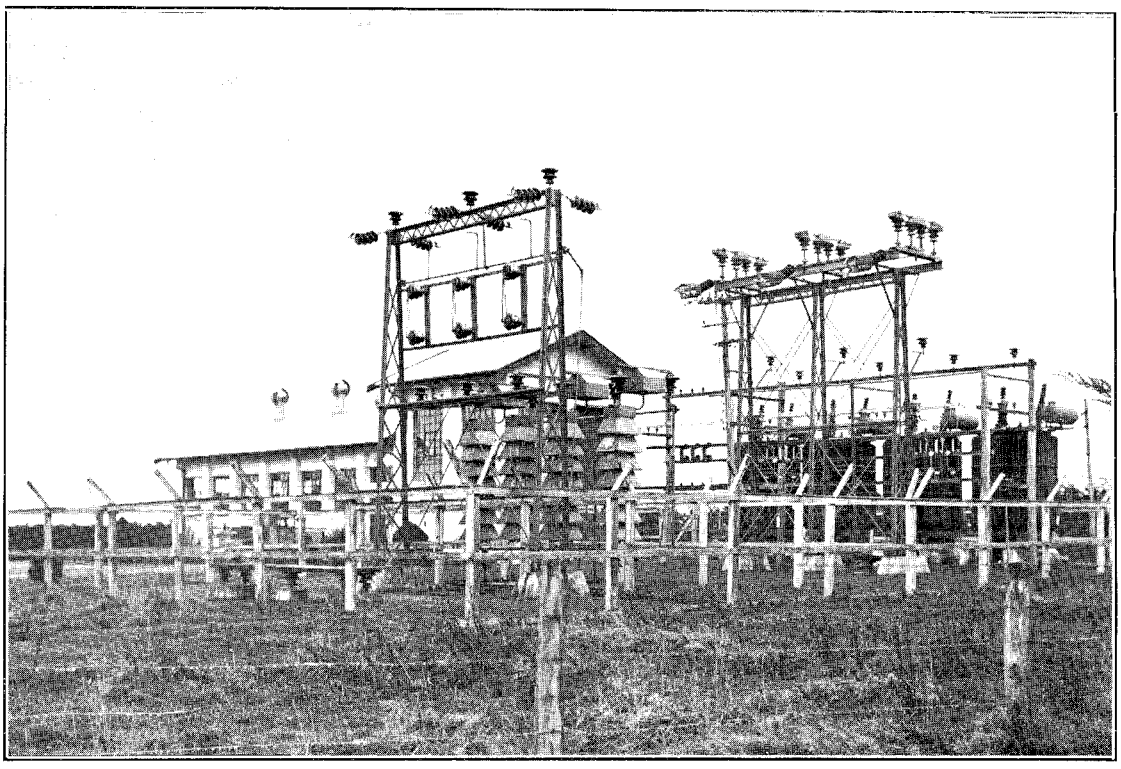


Aerial View of Arapuni Hydro-electric Station.

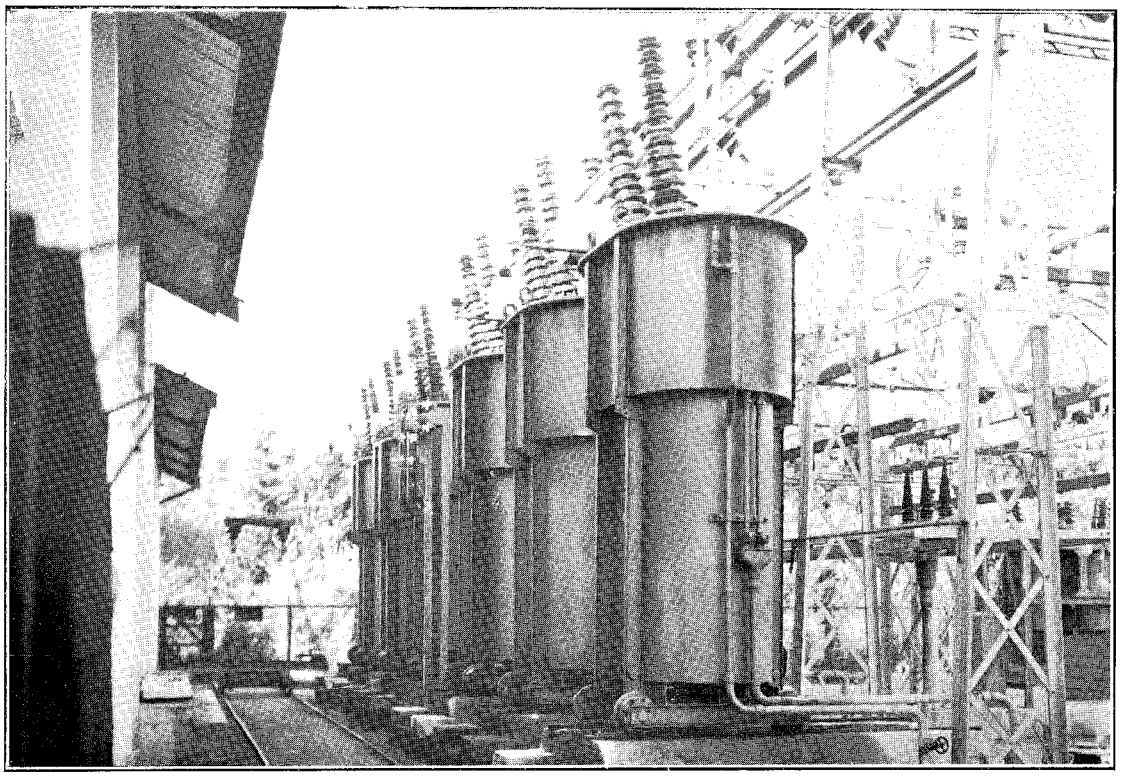


Extension of Power-house at Arapuni.

NORTH ISLAND ELECTRIC-POWER SYSTEM.

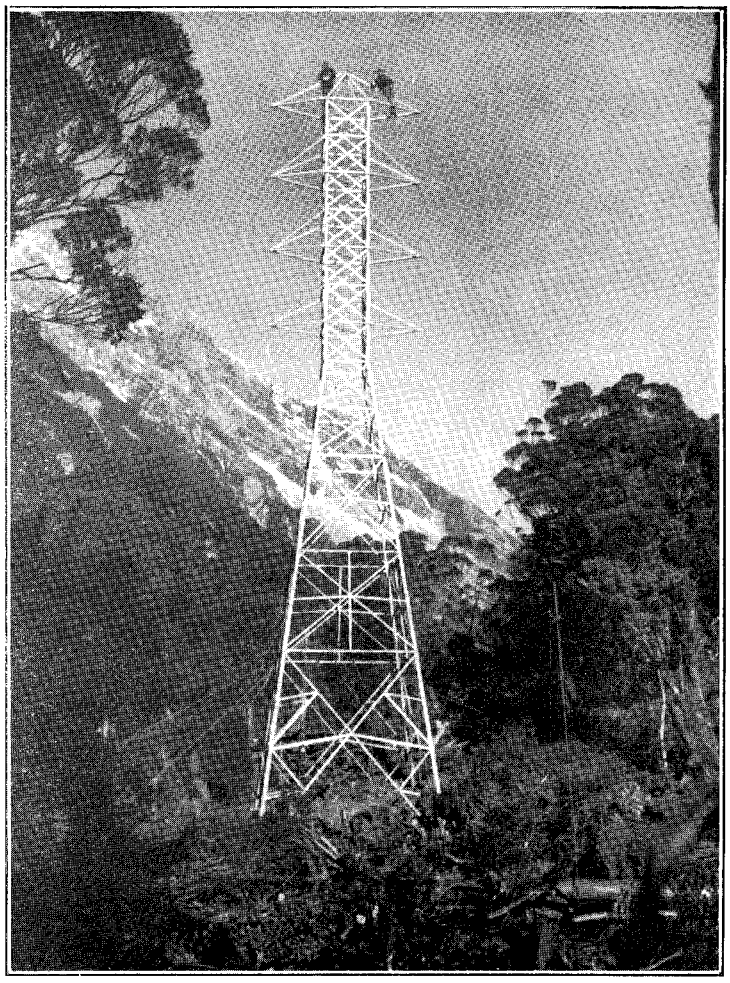


Invercargill Substation.



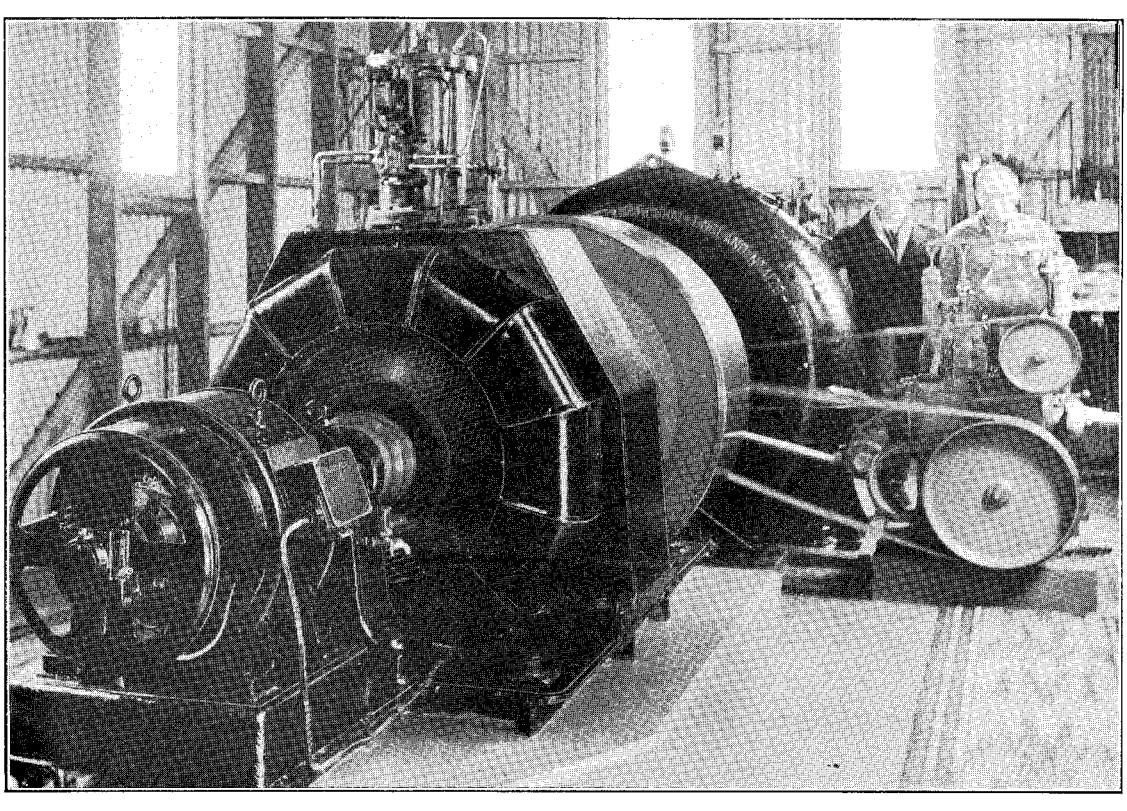
66 kV. Transformer Bank, Monowai.

SOUTHLAND ELECTRIC-SUPPLY SYSTEM.



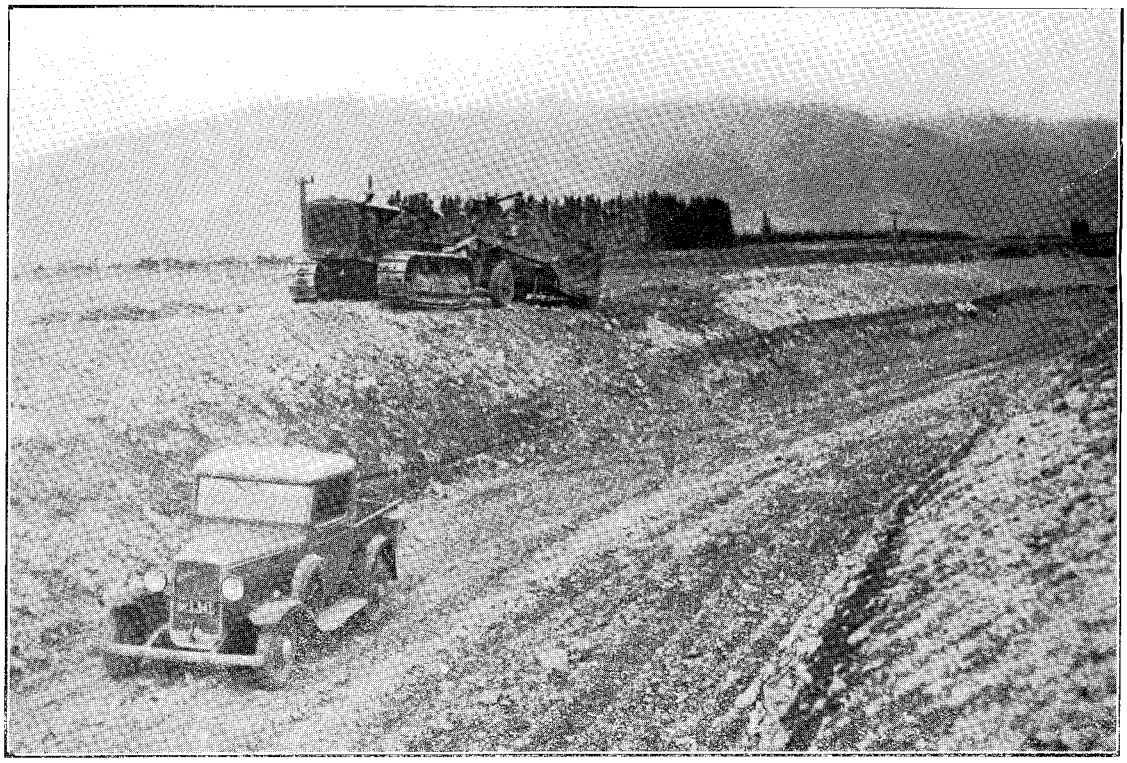
First Tower on Otira–Arthurs Pass Section of 66 kV. Line connecting Canterbury with Westland.

SOUTH ISLAND ELECTRIC-POWER SYSTEM.

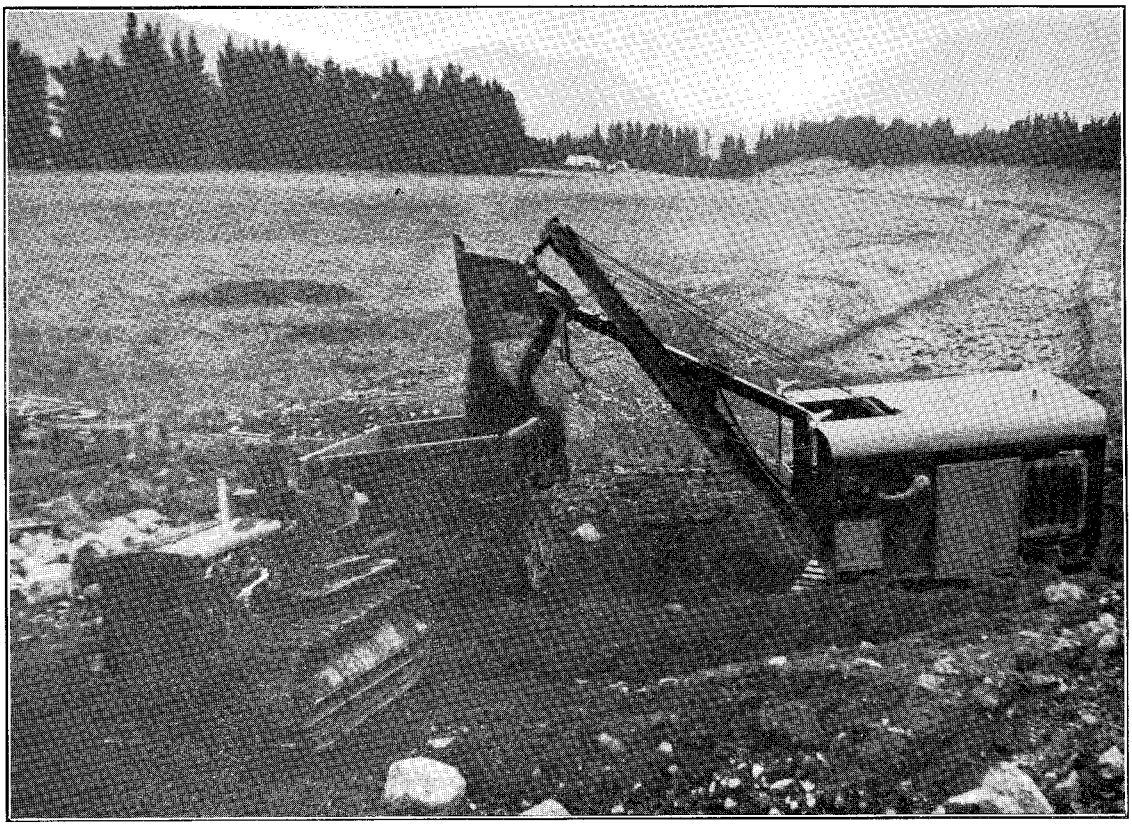


250 kW. Generator and Turbine, Hollyford Power-house.

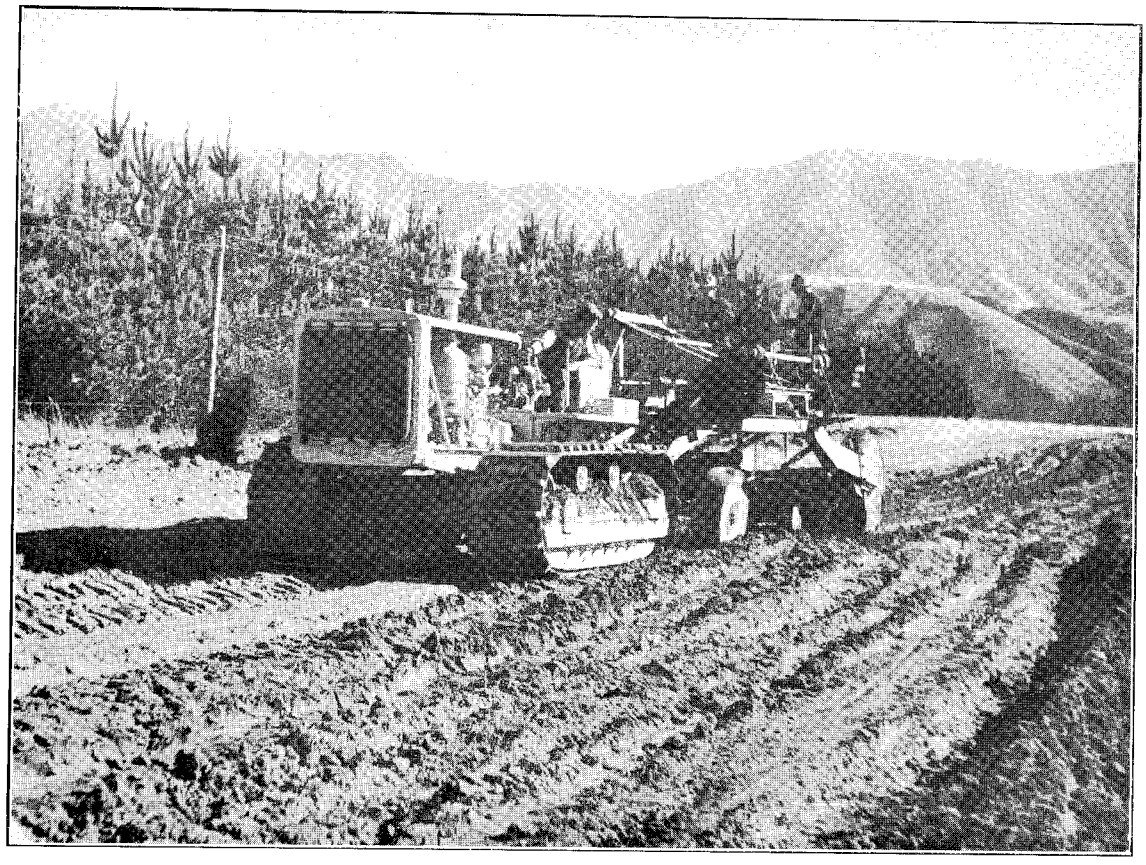
TE ANAU–MILFORD SOUND ROAD.



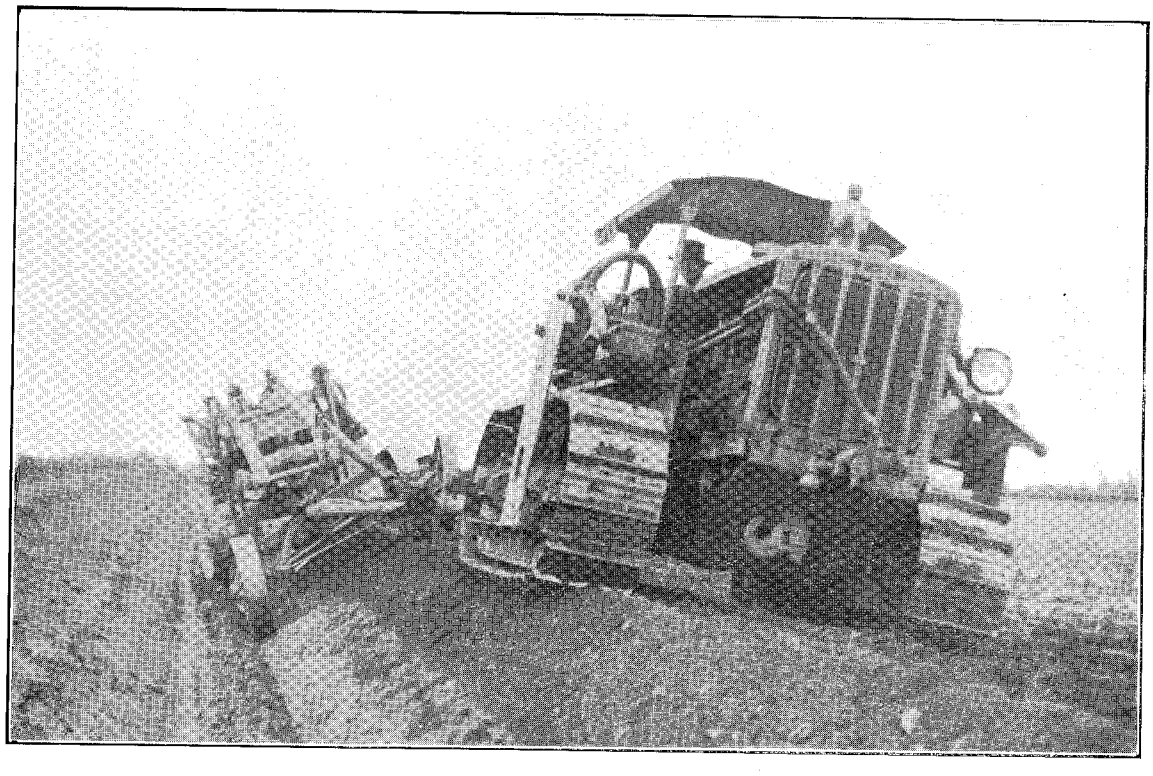
Rangitata Diversion Race. Banks being built by Tractor-drawn Carry-all Scraper.



Rangitata Diversion Race. High-speed Shovel loading 10-cub.-yd. Truck.

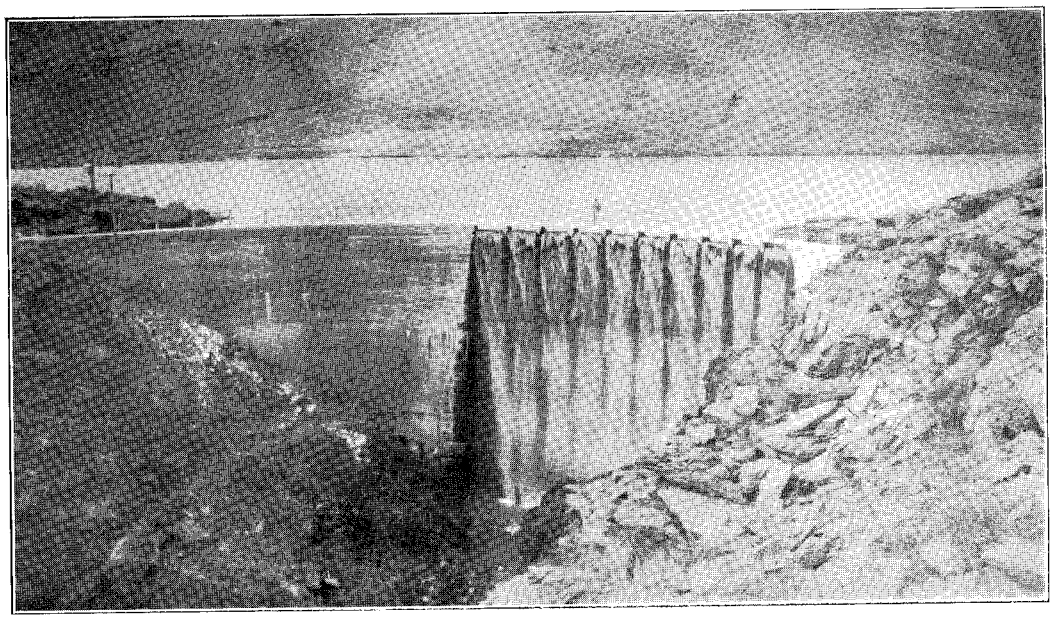


Rangitata Diversion Race. Tractor-drawn Elevating-grader in Operation.

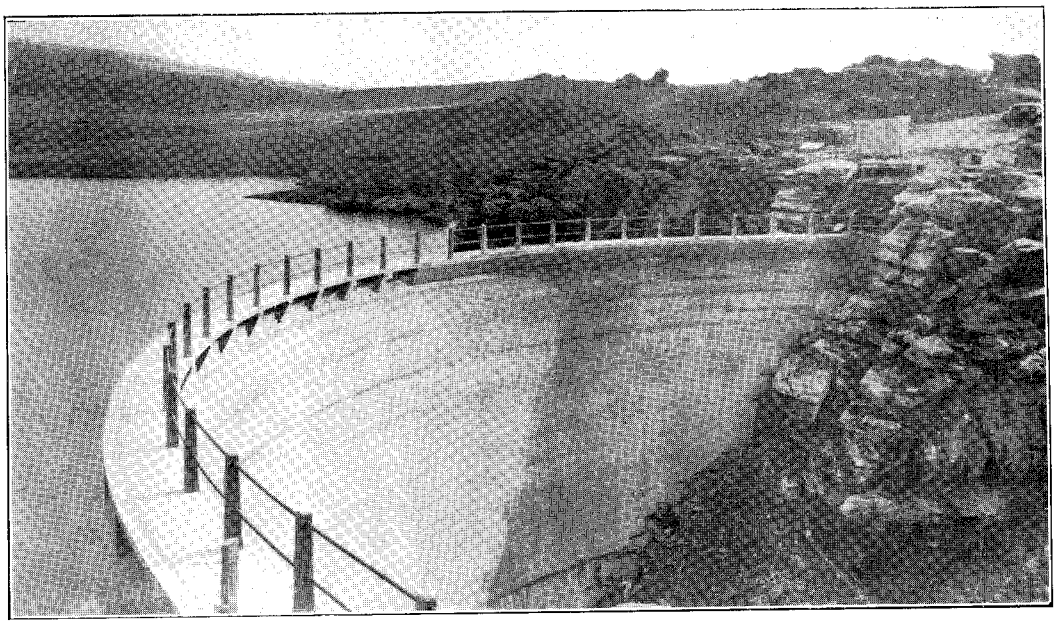


Tractor and Grader forming Distributary Race.

ASHBURTON–LYNDHURST IRRIGATION SCHEME.

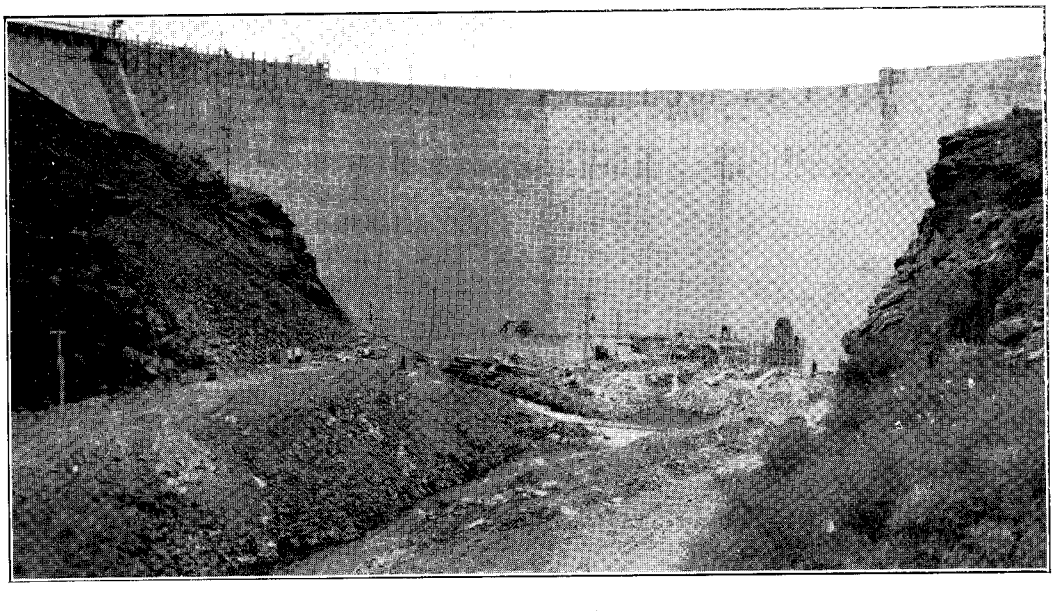


Conroy's Gully Dam.



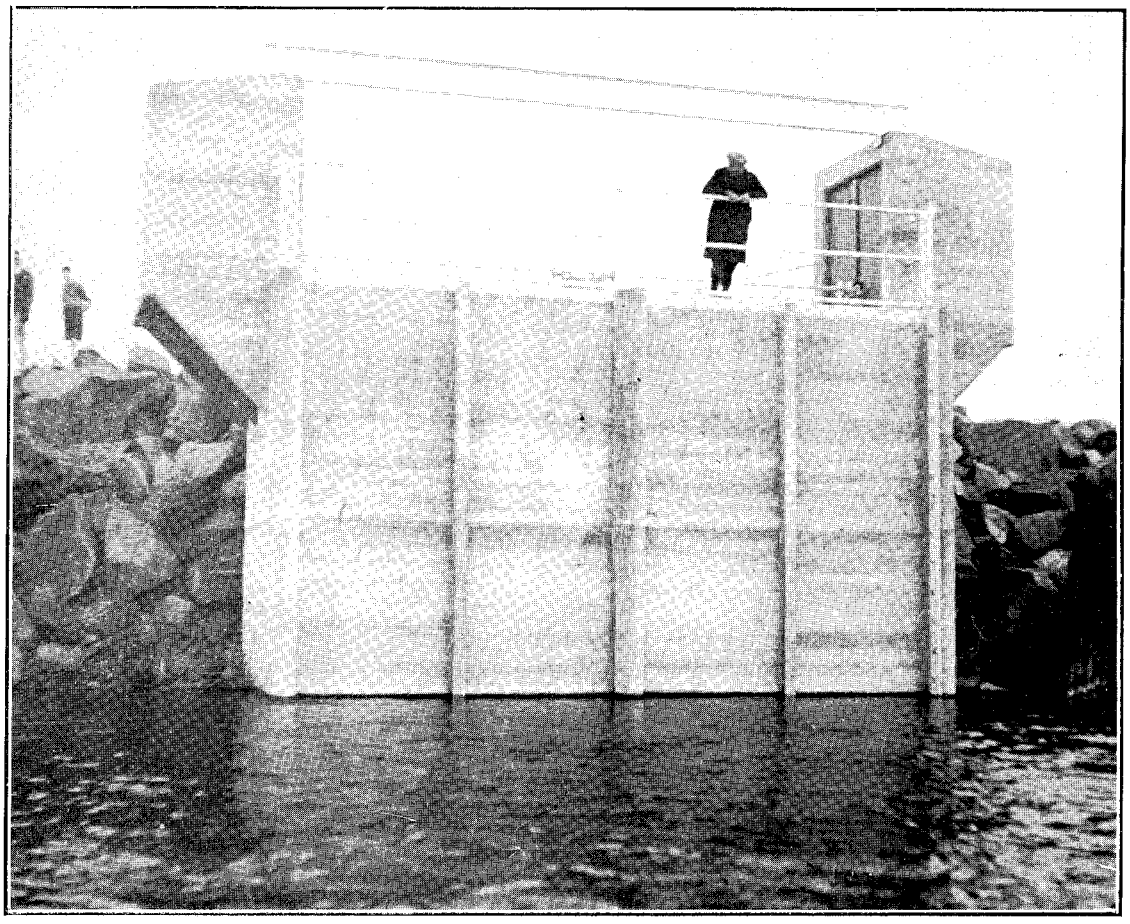
Butcher's Creek Dam.

LAST CHANCE IRRIGATION SCHEME.



Fraser River Dam.

EARNSCLEUGH IRRIGATION SCHEME.

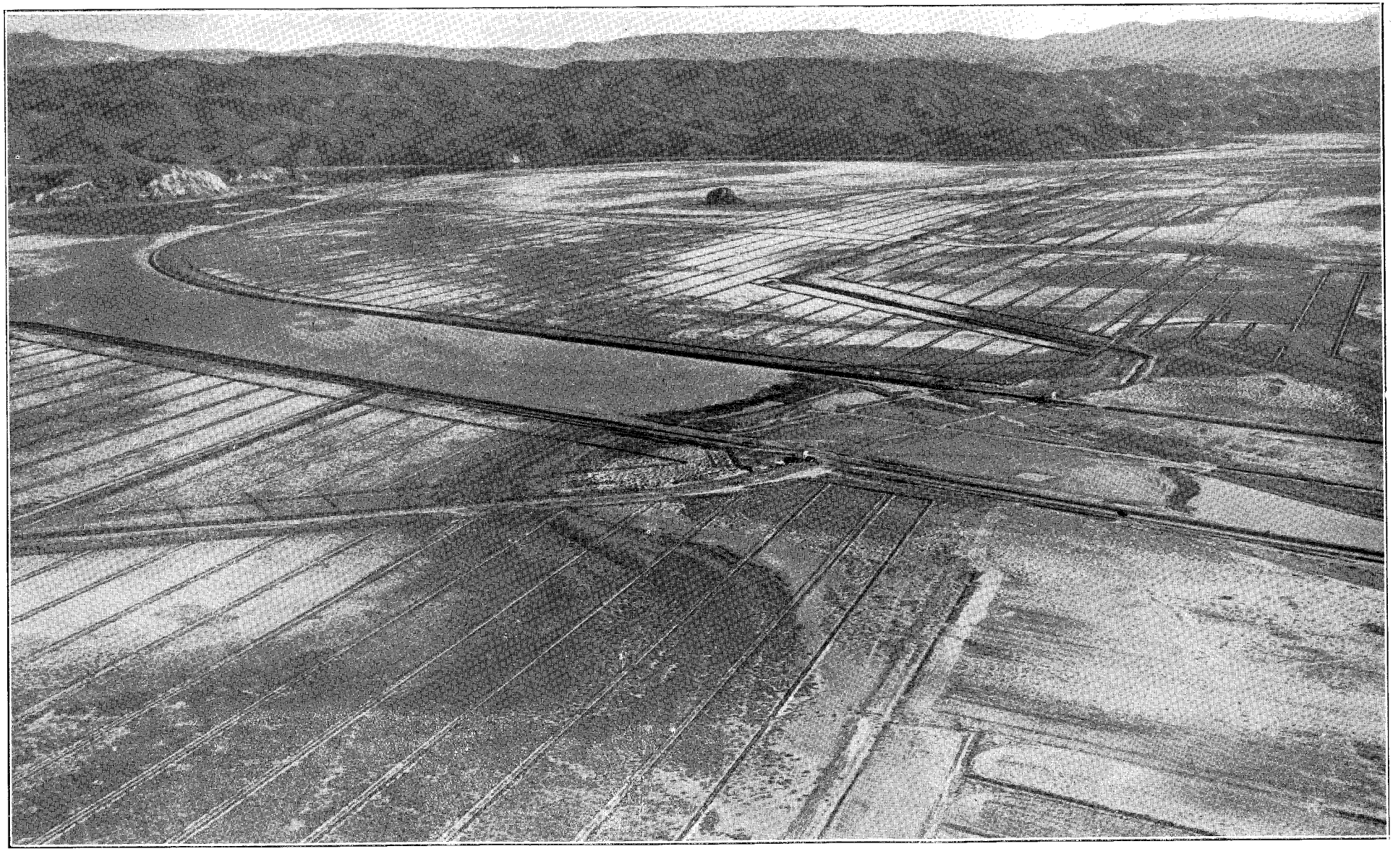


Intake Structure.

LEVELS PLAIN IRRIGATION SCHEME.

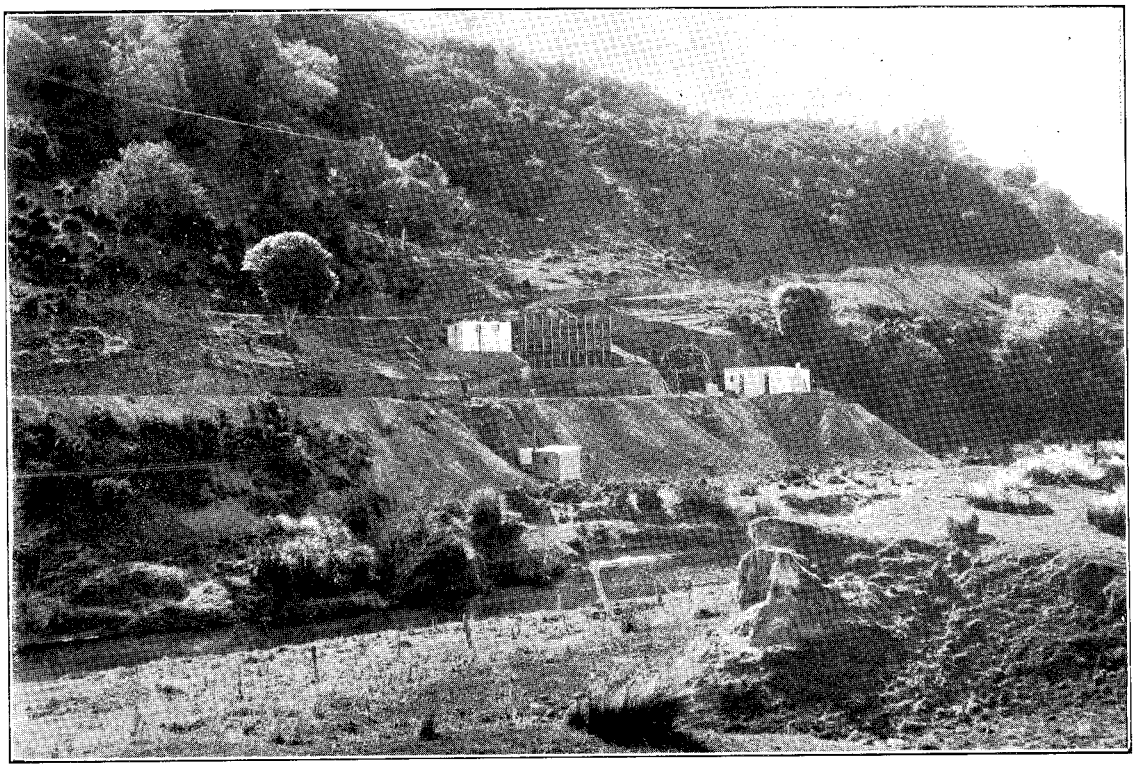
View showing Area in Process of Reclamation.

HUTT RIVER ESTUARY.



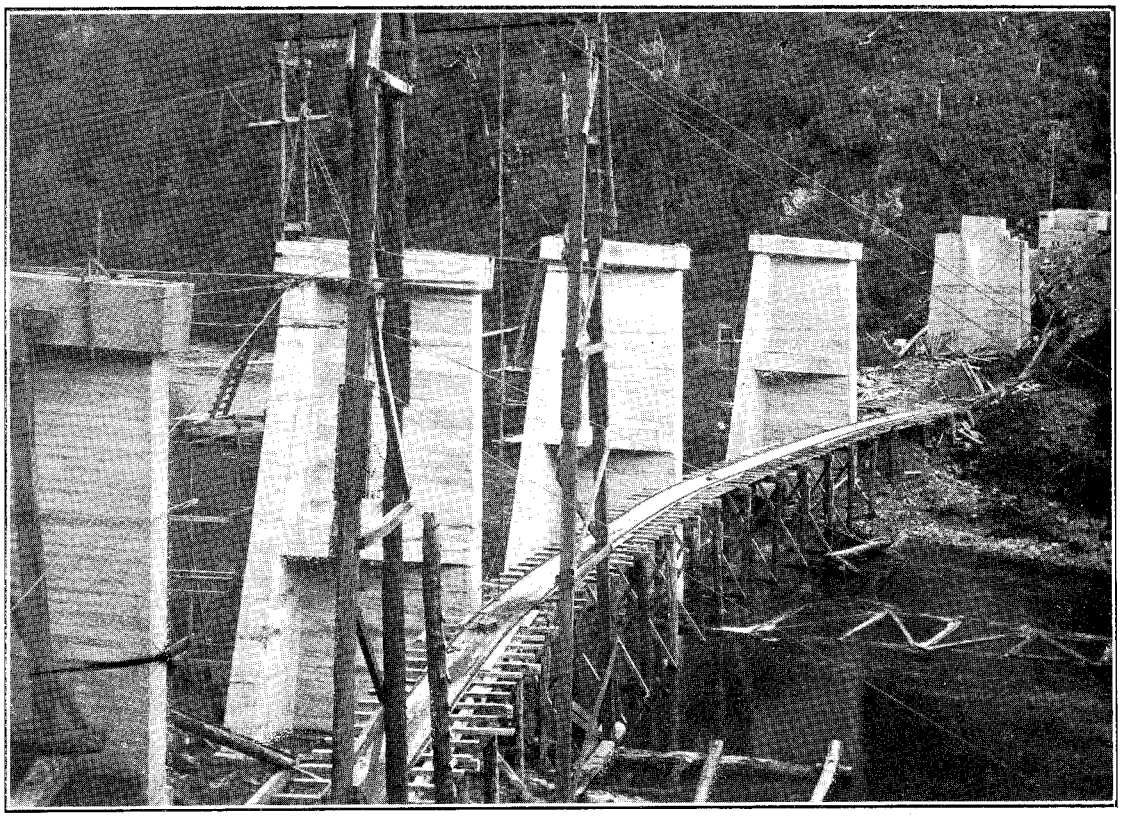
General Panoramic View showing Western End of Main Outfall Channel, also Pumping-station and System of Drains.

AHURIRI LAGOON RECLAMATION.



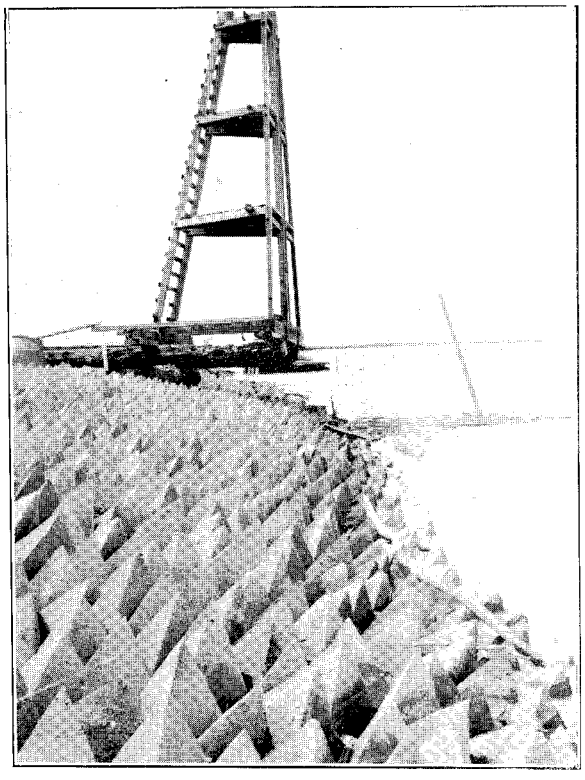
Turakina Tunnel, South Portal.

TURAKINA–OKOIA RAILWAY DEVIATION.

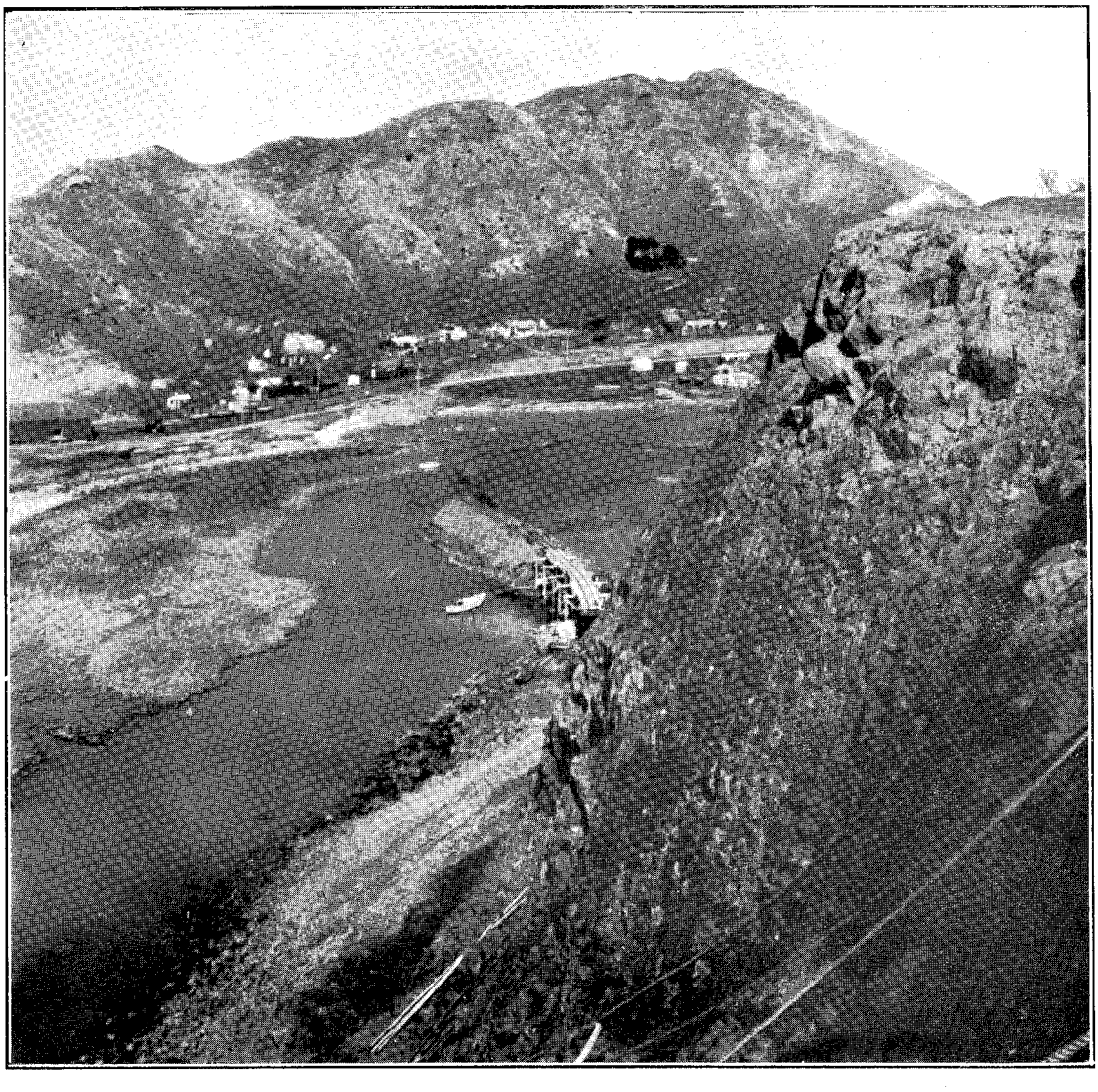


Piers and Abutments; and Gantry being erected for placing Girders in Position.

CASCADE CREEK BRIDGE, WESTPORT–INANGAHUA RAILWAY.

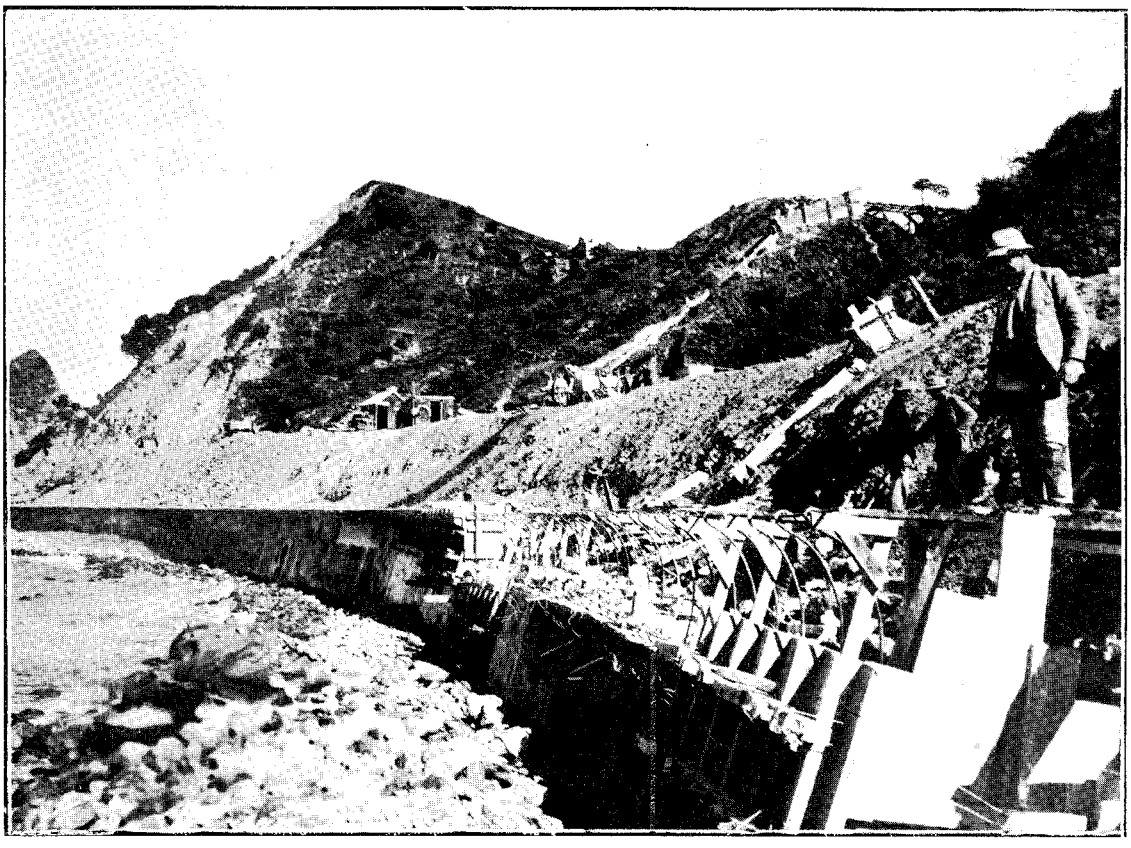


TETRAHEDRAL CONCRETE BLOCK APRON PROTECTING NORTH BANK AT WAIPAOA RIVER RAILWAY BRIDGE.

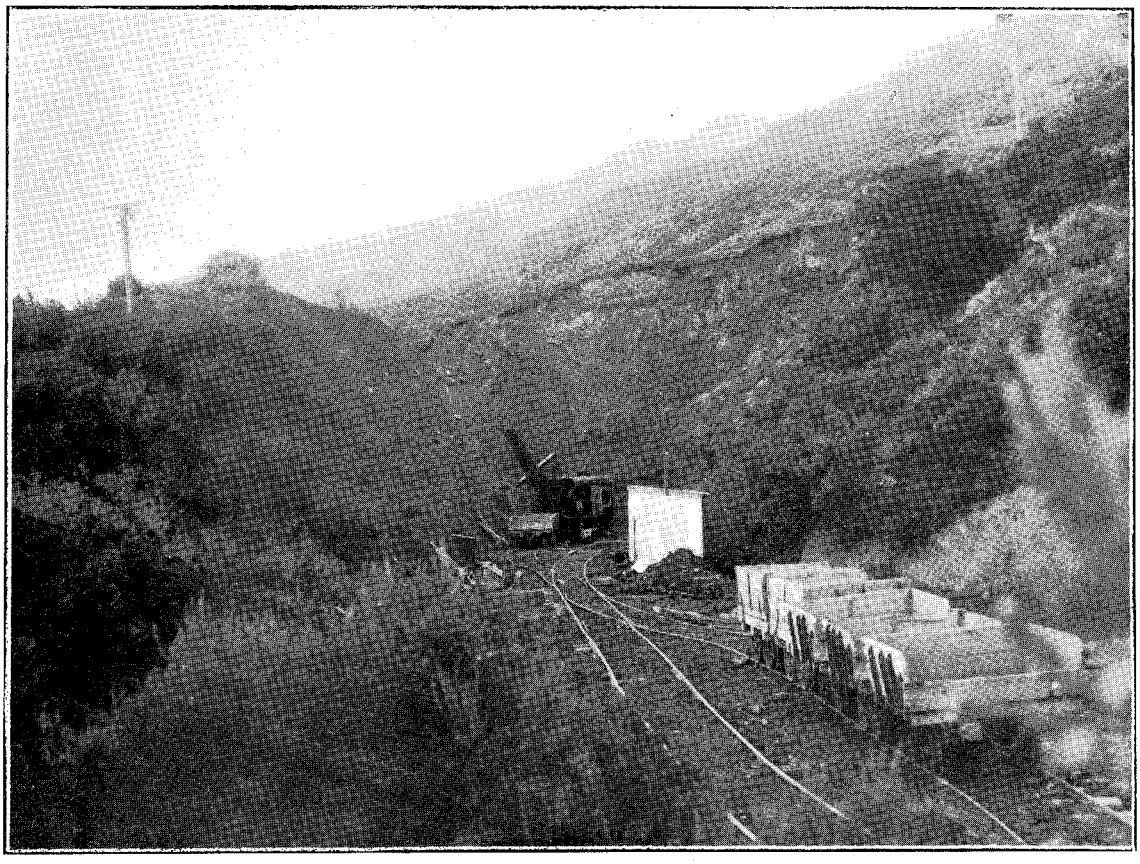


RAILWAY FORMATION, WAIKOKOPU BLUFFS.

NAPIER–GISBORNE RAILWAY.

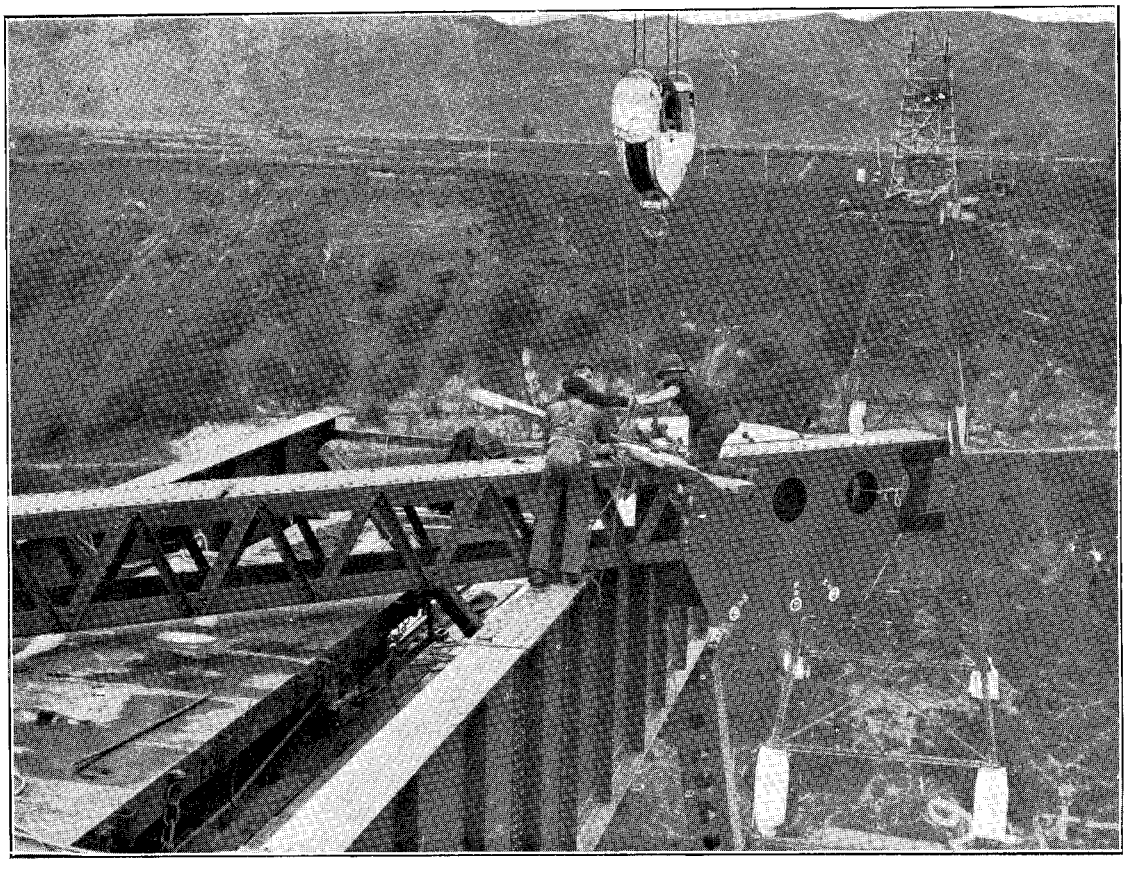


Sea-wall in Course of Construction, Waikokopu Bluffes.

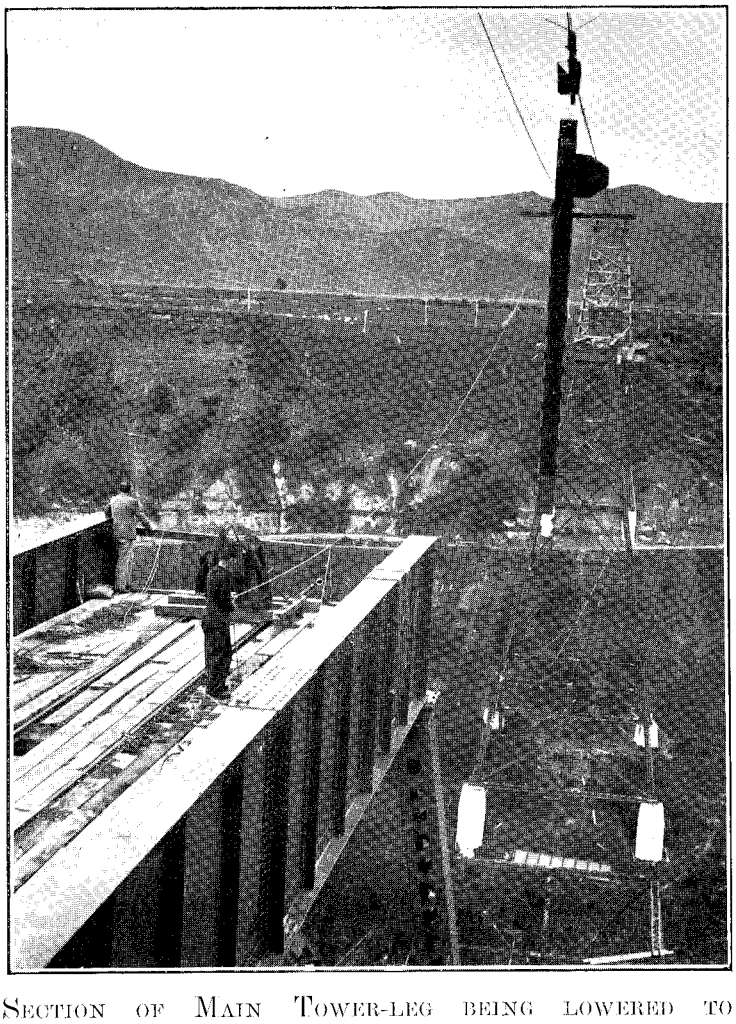


Diesel Shovel at Work in Cutting at 19 m. 47 ch.

NAPIER–GISBORNE RAILWAY.

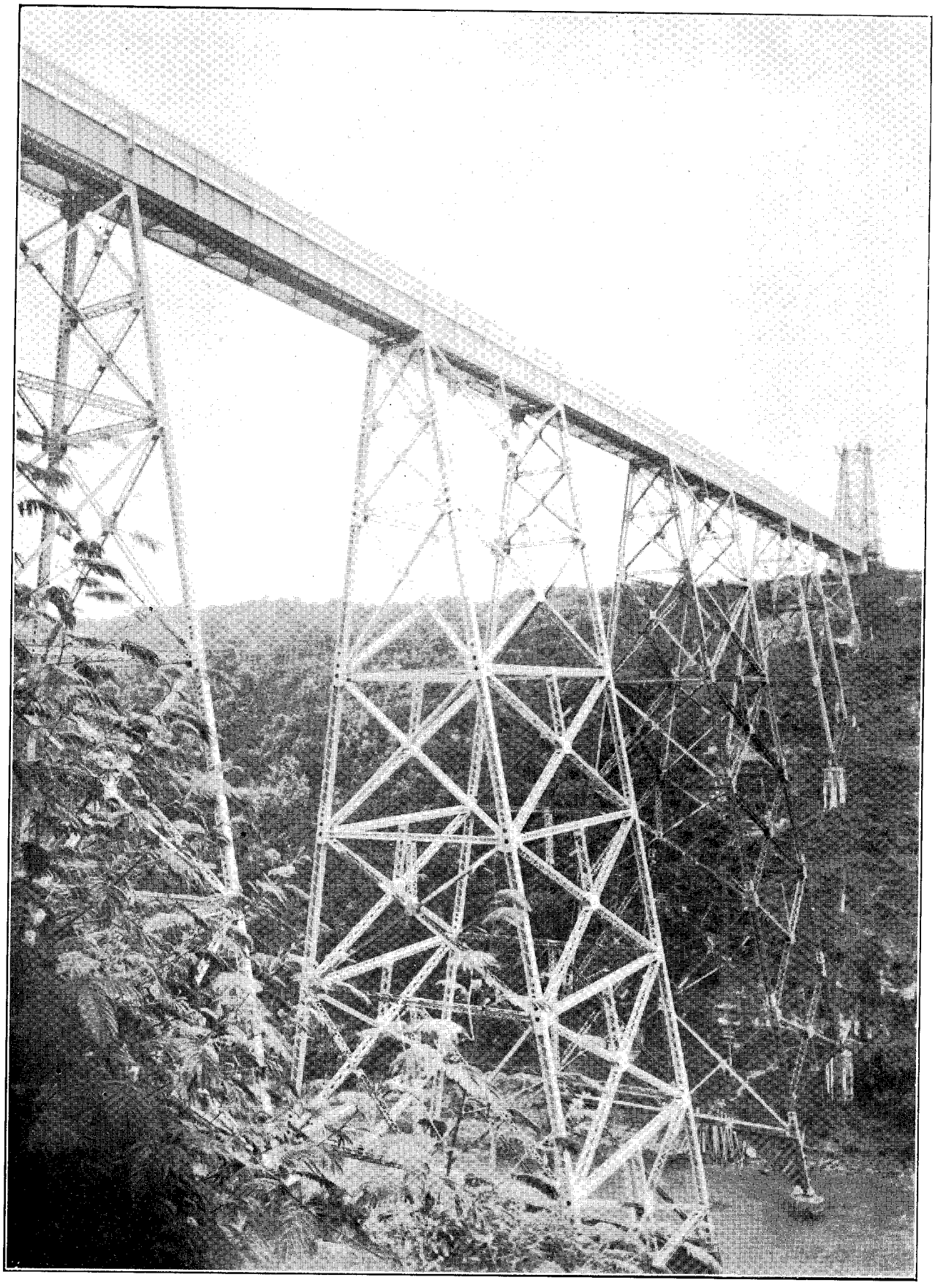


Section of Main Tower-leg being slung for Lowering.



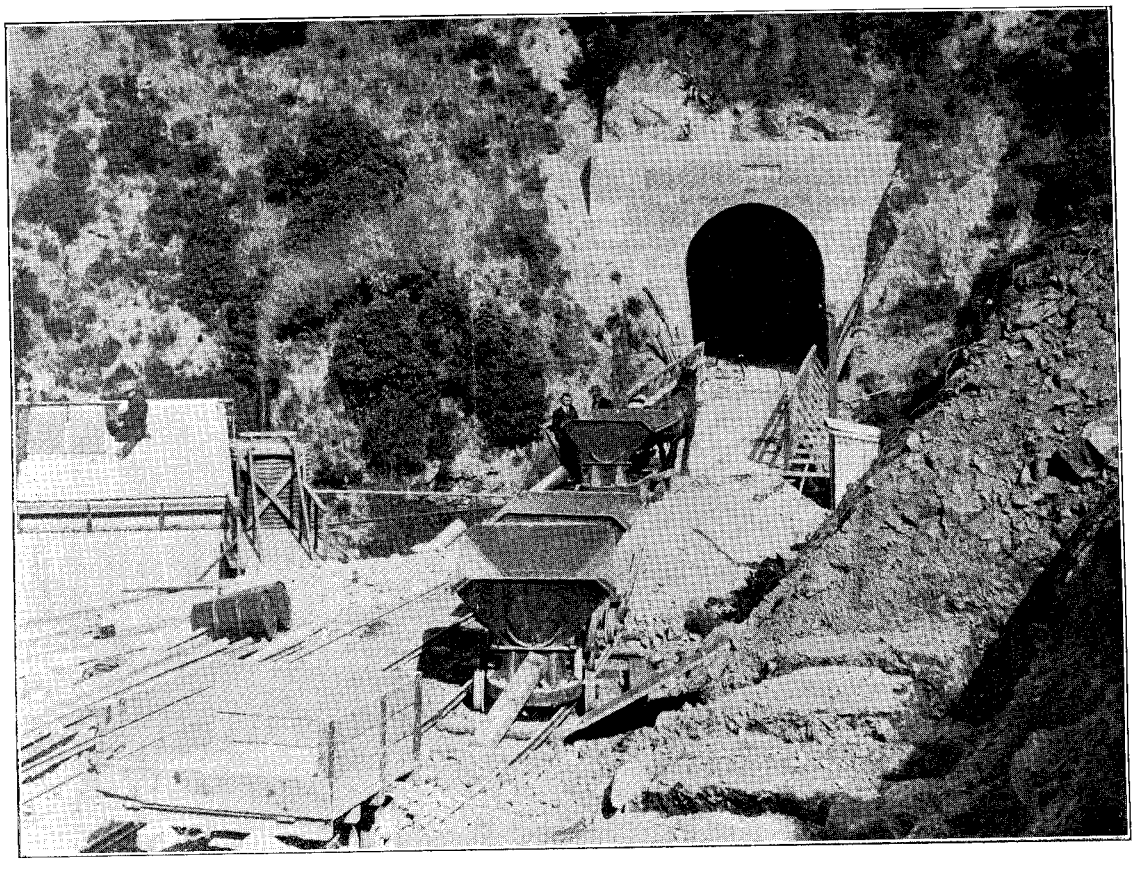
Section of Main Tower-leg being lowered to Position.

NAPIER–GISBORNE RAILWAY, MOHAKA VIADUCT.

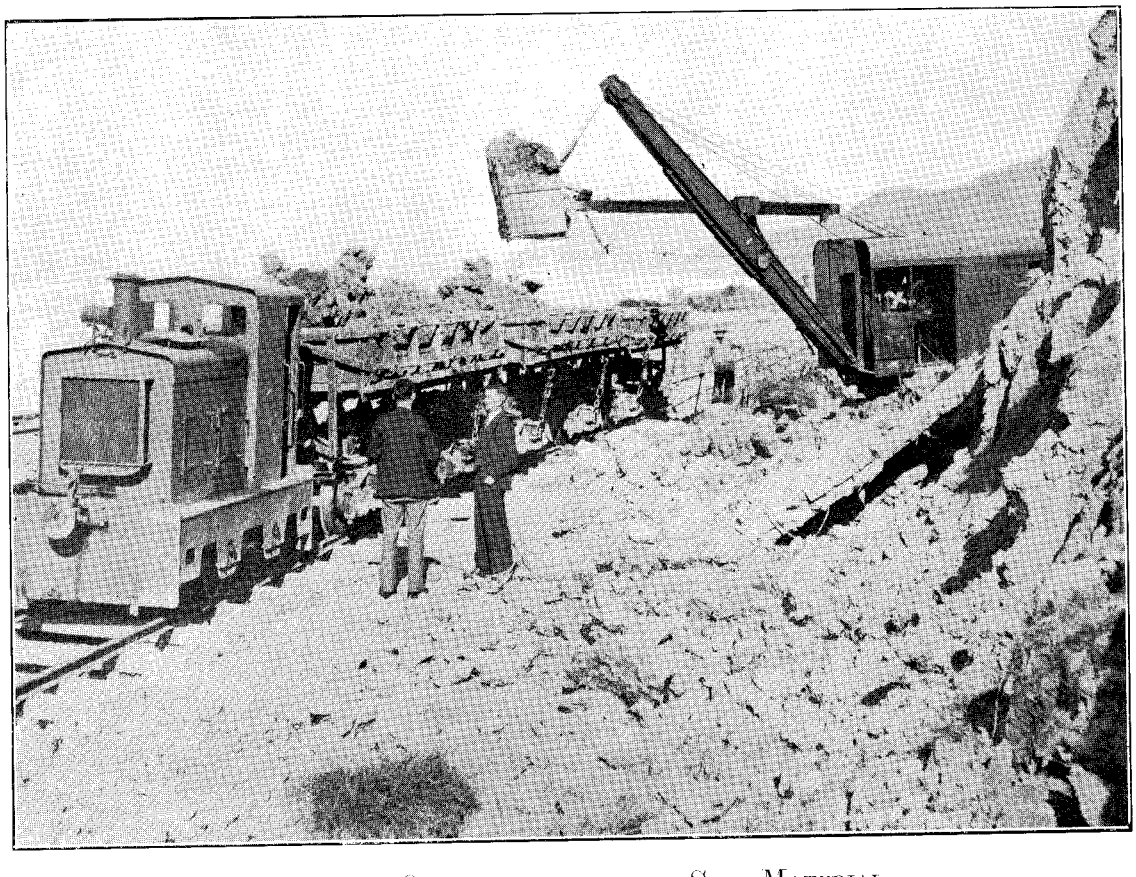


Mohaka Viaduct; Cable-way Towers still in Position. Length approximately 908 ft., made up of Four 50 ft., One 65 ft., Three 81 ft., and Four 100 ft. Steel-plate Girder Through Spans on Steel Towers. Height from ordinary Water-level to Rail-level, 312 ft.

NAPIER–GISBORNE RAILWAY.



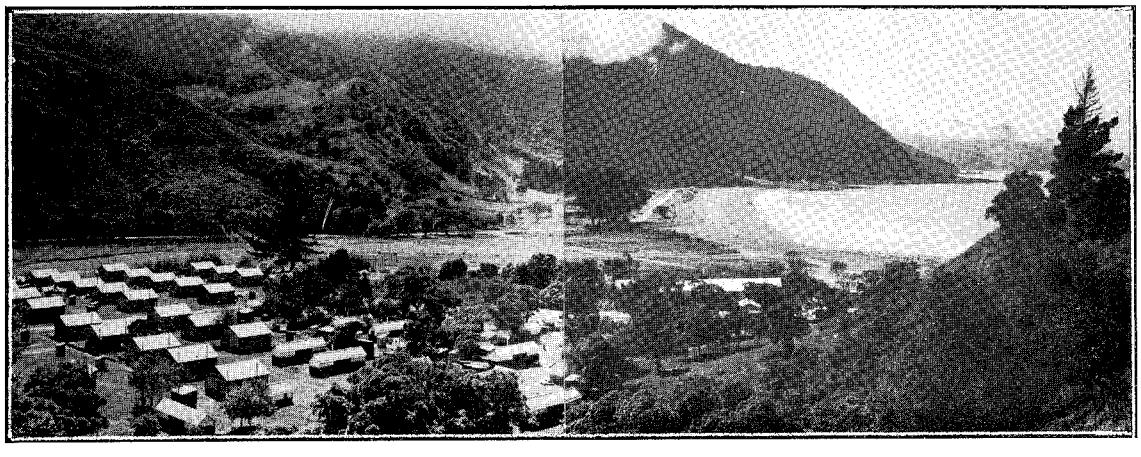
Ohau Tunnel, Northern Portal.



Plant in Operation removing Slip Material.

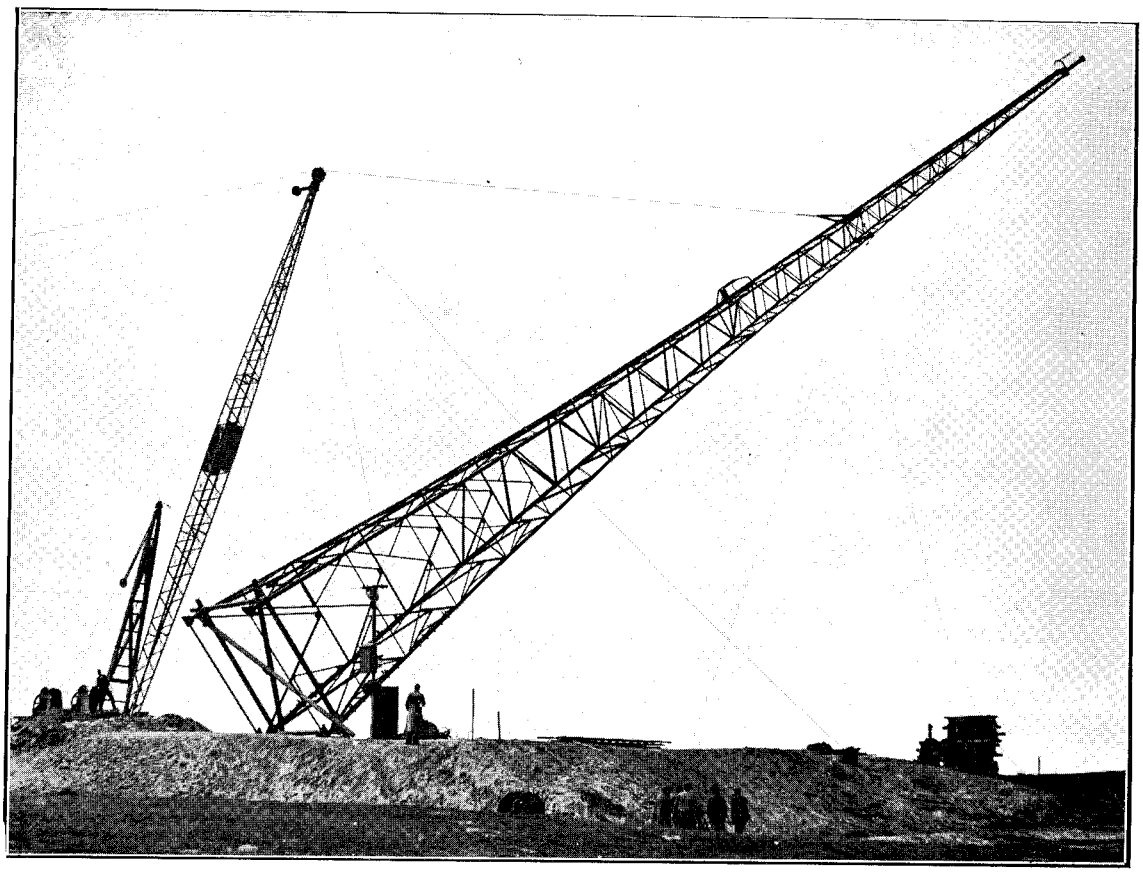
SOUTH ISLAND MAIN TRUNK RAILWAY.

Drag-line Excavators, 1½-cub.-yd. Capacity, in Operation, Hawkeswood Cutting.



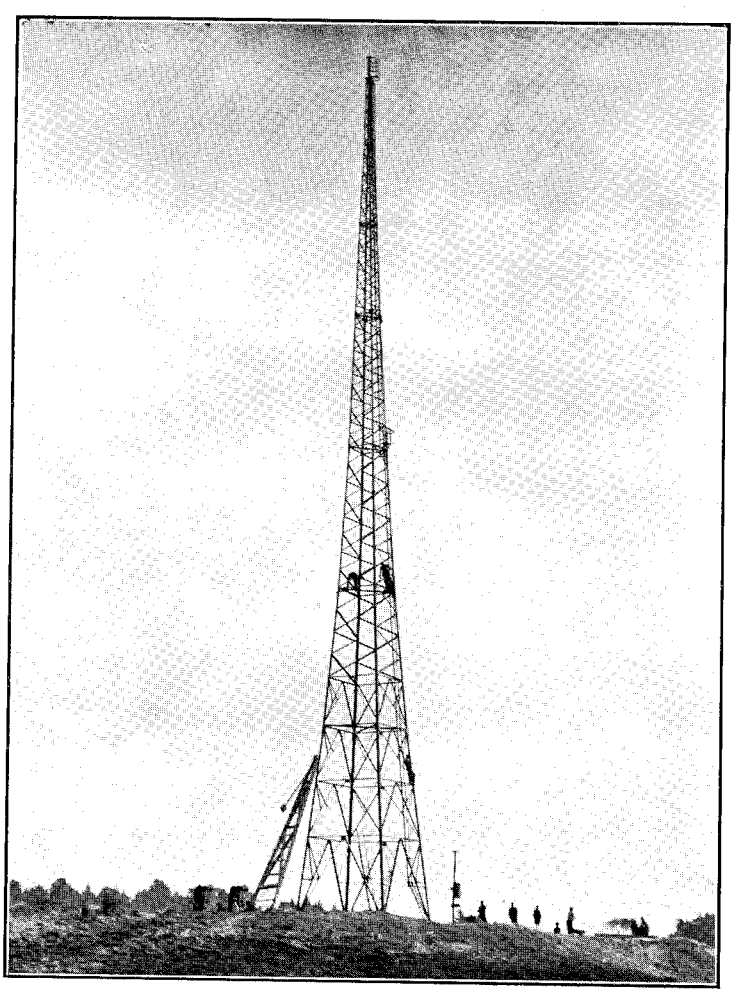
Public Works Camp at Oaro.

SOUTH ISLAND MAIN TRUNK RAILWAY.



MAST BEING RAISED.

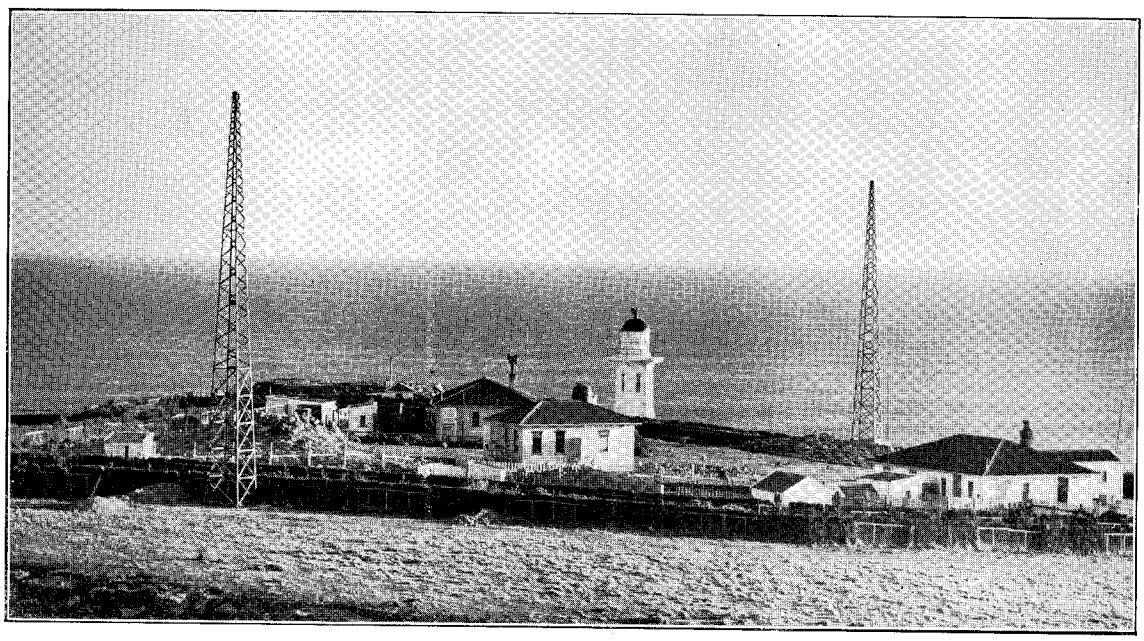
This method of erection was necessary on account of all-welded construction adopted to ensure electric continuity throughout the structure.



MAST IN POSITION.

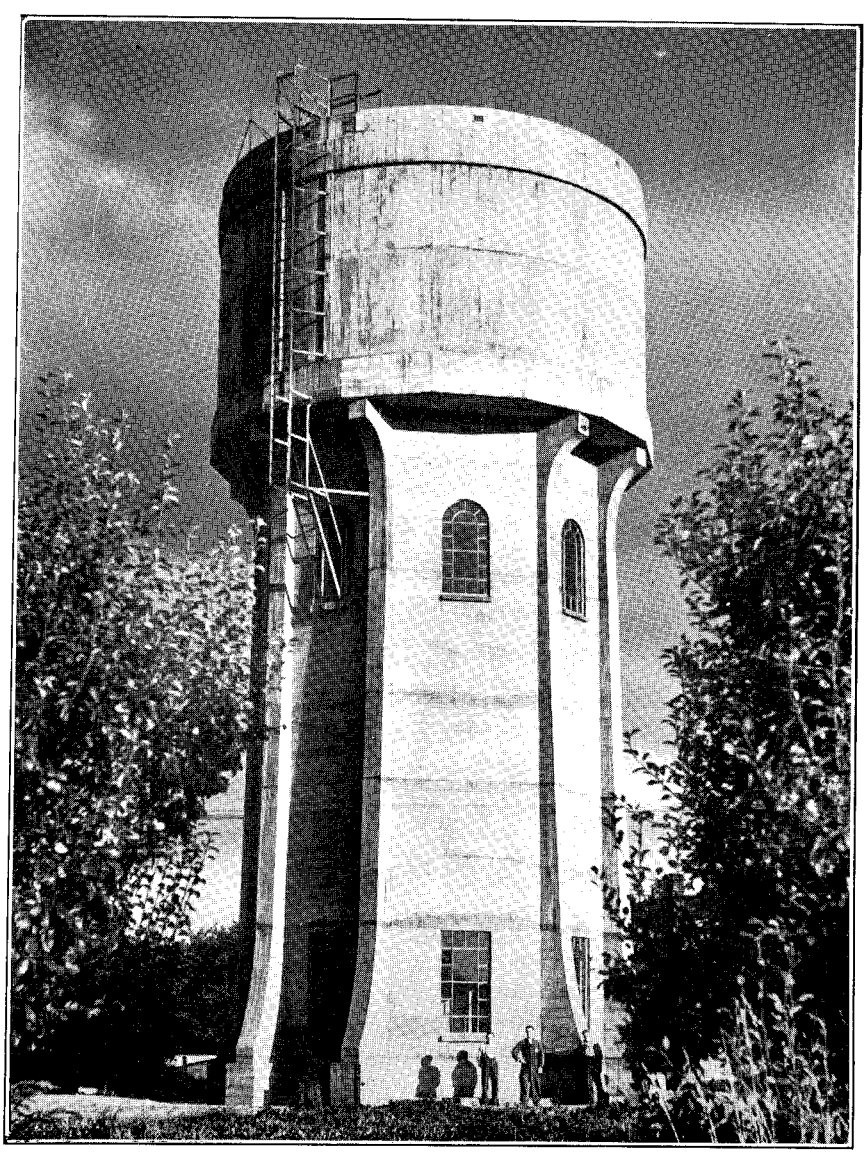
For aircraft protection, it is painted in bands of black and orange, and is being equipped with a beacon light.

170 FT. RADIO MAST FOR CHRISTCHURCH: THE FIRST OF A SERIES FOR THE STATIONS OF THE NATIONAL COMMERCIAL BROADCASTING SERVICES.



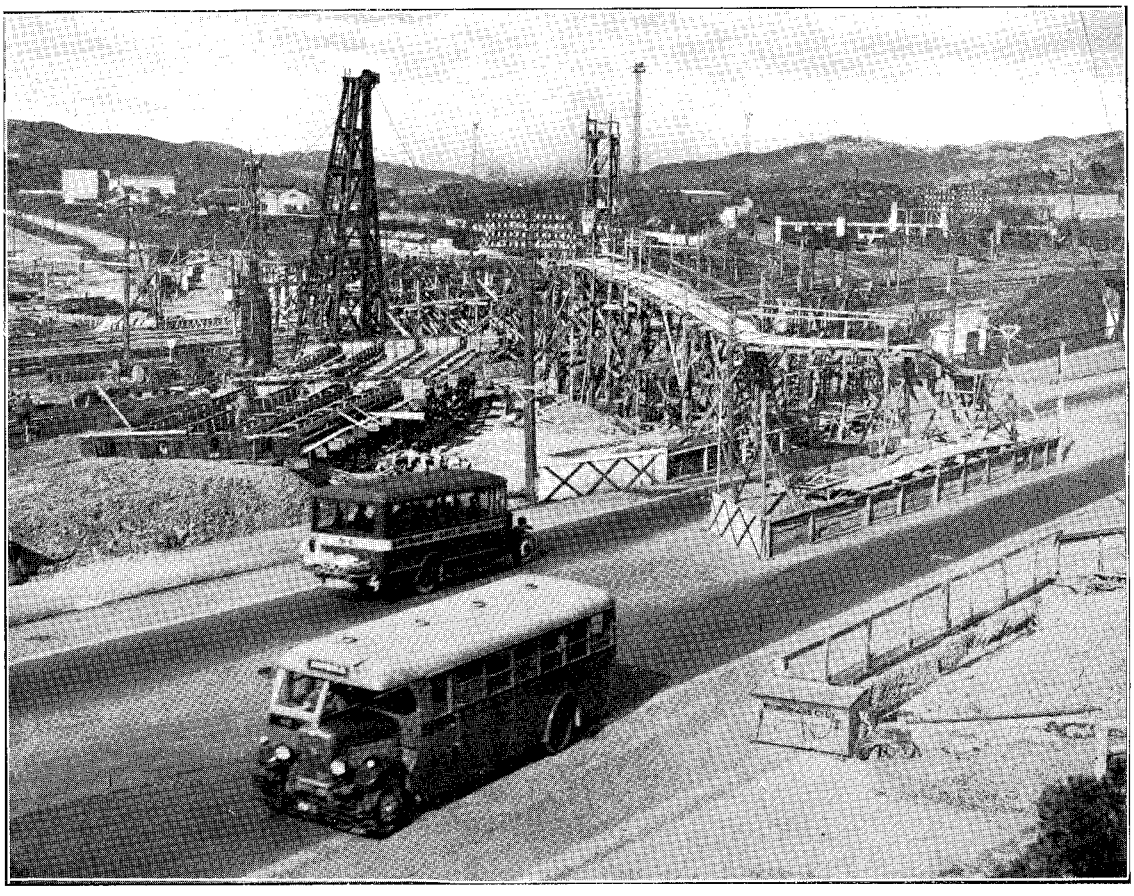
Marine Radio Beacons, Towers 75 ft. High.

BARING HEAD LIGHTHOUSE.



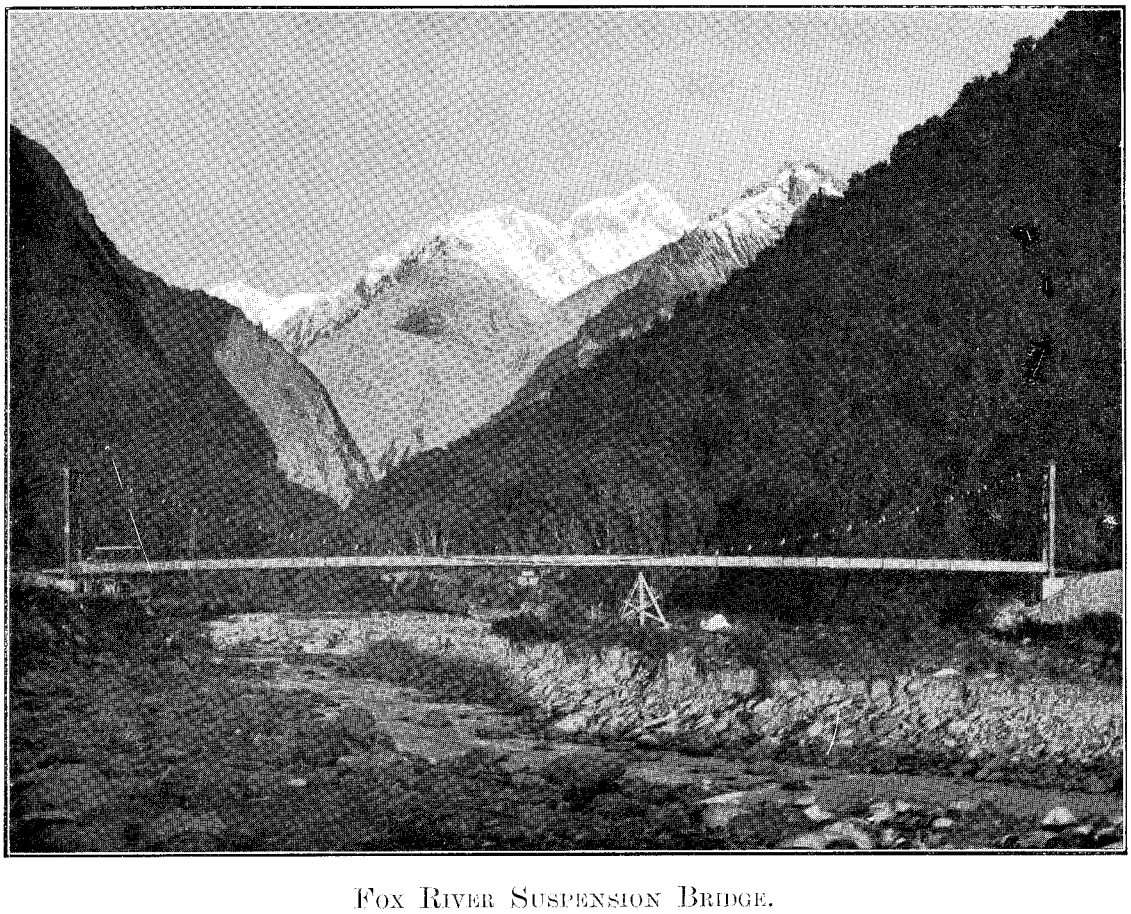
Elevated Tank of Reinforced Concrete 100,000 Gallons Capacity.

SUNNYSIDE MENTAL HOSPITAL.



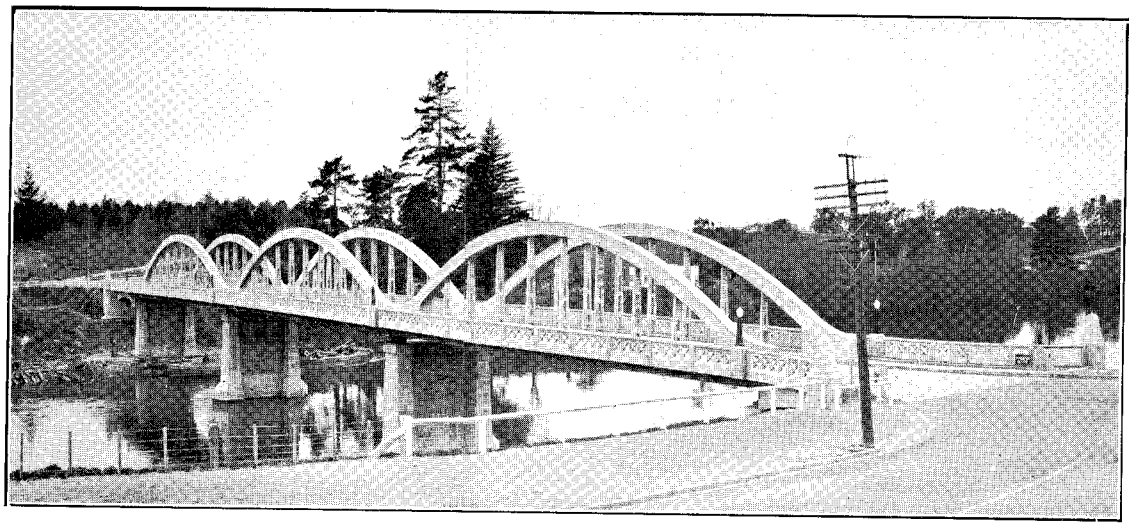
General View, showing Progress of Construction.

THORNDON OVERBRIDGE, WELLINGTON CITY.



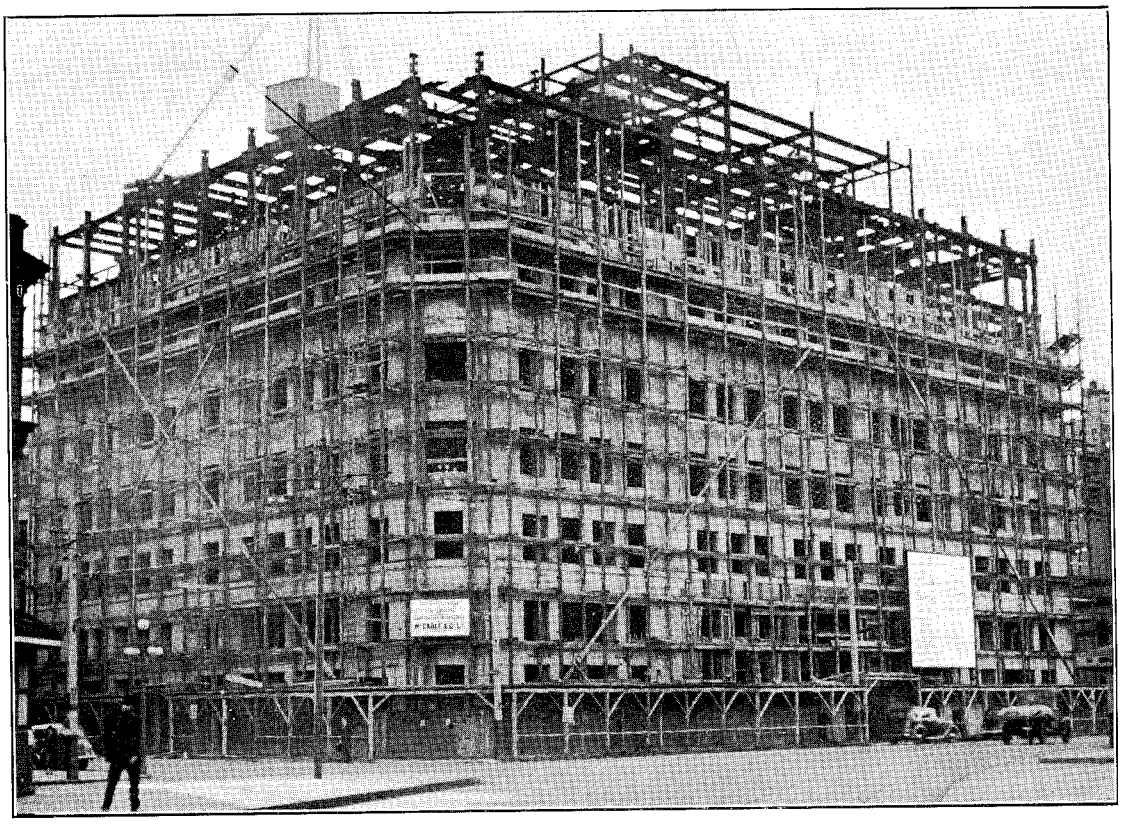
Fox River Suspension Bridge.

MAIN SOUTH ROAD, WESTLAND.



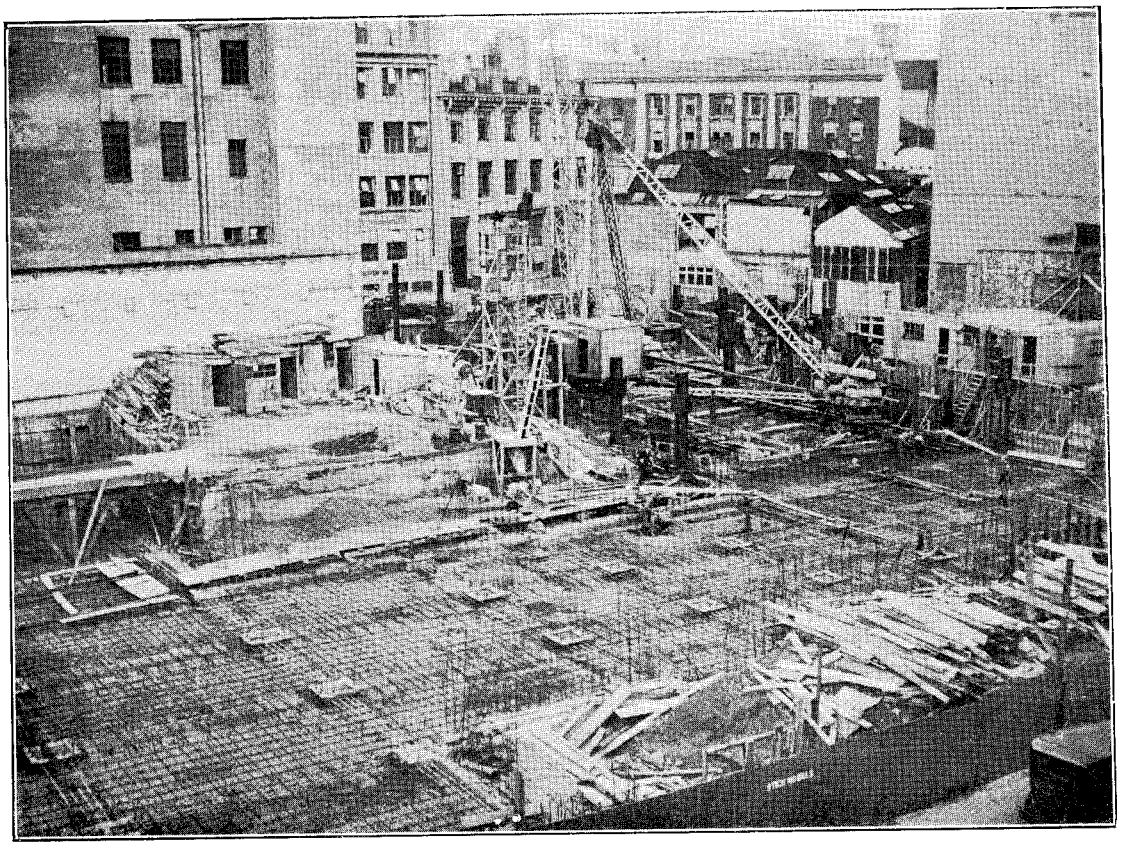
Road Bridge over Waikato River, Fairfield, Hamilton. Main Spans, 130 ft. Bowstring Arches in Reinforced Concrete.

DUNEDIN POST OFFICE.



View showing Progress of Construction.

GOVERNMENT LIFE INSURANCE BUILDING, WELLINGTON.



Construction of Foundation.

NEW GOVERNMENT BUILDINGS, WELLINGTON.

PUBLIC WORKS STATEMENT, 1937.

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TABLE No. 1.

SUMMARY SHOWING THE TOTAL EXPENDITURE ON PUBLIC WORKS AND OTHER SERVICES OUT OF PUBLIC WORKS FUND (GENERAL PURPOSES ACCOUNT) TO 31ST MARCH, 1937, AND THE LIABILITIES ON THAT DATE.

Number of Table containing Details.	Works.	Total Net Expenditure to 31st March, 1936.	Expenditure during Twelve Months ended 31st March, 1937.	Recoveries on Account of Services of Previous Years.	Total Net Expenditure to 31st March, 1937.	Liabilities on 31st March, 1937.	Total Net Expenditure and Liabilities.	Works.
		£	£	£	£	£	£	
3	Railways*	56,582,336	1,019,094	464	57,600,966	93,462	57,694,428	Railways.*
..	Roads†	22,986,307	913,720	172	23,899,855	92,378	23,992,233	Roads.†
4	Public buildings‡	12,069,672	714,941	2,625	12,781,988	56,361	12,838,349	Public buildings.‡
..	Telegraphs	11,755,917	232,513	..	11,988,430	615	11,989,045	Telegraphs.
..	Departmental	3,091,930	137,769	17,709	3,211,990	5,628	3,217,618	Departmental.
..	Charges and expenses of raising loans	3,828,307	..	..	3,828,307	..	3,828,307	Charges and expenses of raising loans.
..	Lighthouses, harbour-works, and harbour-defences	1,322,048	1,299	2	1,323,345	104	1,323,449	Lighthouses, harbour-works, and harbour defences.
..	Irrigation and water-supply§	1,303,179	11,062	..	1,314,241	17,360	1,331,601	Irrigation and water-supply.§
..	Lands improvement‖	928,036	62,673	10,366	980,343	18,340	998,683	Lands improvement.‖
..	Tourist and health resorts	717,136	16,789	..	733,925	436	734,361	Tourist and health resorts.
..	Settlement of unemployed workers¶	664,486	92,016	..	756,502	15,092	771,594	Settlement of unemployed workers.¶
..	Swamp land drainage	55,916	24,965	..	80,881	173	81,054	Swamp land drainage.
..	Native land settlement	357,971	112,318	3,423	466,866	26,414	493,280	Native land settlement.
..	Dairy industry loans	10,750	30,510	..	41,260	..	41,260	Dairy industry loans.
		115,673,991	3,369,669	34,761	119,008,899	326,363	119,335,262	
	Closed accounts :—							Closed accounts :—
..	Immigration	3,313,059	..	146	3,312,913	..	3,312,913	Immigration.
..	Purchase of Native lands	2,054,024	..	..	2,054,024	..	2,054,024	Purchase of Native lands.
..	Defence	1,401,144	..	64	1,401,080	..	1,401,080	Defence.
..	Development of mining	830,872	..	17	830,855	..	830,855	Development of mining.
11 of 1877	Aiding works on Thames goldfields	50,000	..	..	50,000	..	50,000	Aiding works on Thames goldfields.
..	Plant, material, and services	140,986	..	1,642	139,344	..	139,344	Plant, material, and services.
..	Interest and sinking fund	218,500	..	..	218,500	..	218,500	Interest and sinking fund.
..	Rates on Native lands	68,672	..	..	68,672	..	68,672	Rates on Native lands.
..	Motor transport services	33,635	..	..	33,635	..	33,635	Motor transport services.
..	Thermal springs	14,600	..	..	14,600	..	14,600	Thermal springs.
10 of 1878	Coal-exploration and mine-development	10,835	..	..	10,835	..	10,835	Coal-exploration and mine-development.
		8,136,327	..	1,869	8,134,458	..	8,134,458	
..	Transfer to Main Highways Account, Construction Fund	1,226,000	..	..	1,226,000	..	1,226,000	Transfer to Main Highways Account, Construction Fund.
	Totals	125,036,318	3,369,669	36,630	128,369,357	326,363	128,695,720	Totals.

* Does not include expenditure on Hutt Railway and Road Improvement, Wellington-Manawatu Purchase, and Railways Improvement Accounts. Includes £150,000 paid to Midland Railway bondholders. † Includes £4,500 expended under section 16 (1), Native Land Amendment and Native Land Claims Adjustment Act, 1923. ‡ Includes £12,500 expended under Finance Act, 1929, section 32. Includes £60,032 expended under Reserves and other Lands Disposal Act, 1936, section 32. § Includes £115,000 previously expended under Irrigation and Water-supply Account, 1911–12 to 1915–16 and part 1917–18, now included in Public Works Fund; also £6,727 previously expended on irrigation under Lands Improvement now transferred to Irrigation and Water-supply. ‖ £6,727 previously expended on irrigation under this item now transferred to Irrigation and Water-supply; does not include £300,930 expended and included under Roads Class. ¶ Includes £4,865 expended under Finance Act, 1932 (No. 2), section 6.

TABLE No. 2.

GENERAL SUMMARY.

Showing NET YEARLY EXPENDITURE out of PUBLIC WORKS FUND (GENERAL PURPOSES ACCOUNT), 1915–16 to 1936–37.

N.B.—The figures in italics, prefixed by "*Cr.*," are either recoveries on account of services of previous years or receipts-in-aid applied in reduction of expenditure.

Description of Services.	Total Net Expenditure to 31st March, 1915.	Expenditure.										
		1915–16.	1916–17.	1917–18.	1918–19.	1919–20.	1920–21.	1921–22.	1922–23.	1923–24.	1924–25.	1925–26.
	£	£	£	£	£	£	£	£	£	£	£	£
Immigration	2,321,742	10,010 *Cr. 10*	6,533	3,856	*Cr. 12,018*	*Cr. 62,561*	*Cr. 7,806*	247,528	90,611 *Cr. 140*	92,600 *Cr. 1,267*	136,353 *Cr. 16*	107,521 *Cr. 443*
Public Works, Departmental	951,465	111,489	131,701	127,962 *Cr. 2,662*	115,419 *Cr. 4,119*	121,677	143,280 *Cr. 6,280*	128,002 *Cr. 525*	111,367 *Cr. 131*	110,445 *Cr. 69*	127,556 *Cr. 19*	126,596 *Cr. 129*
Irrigation and Water-supply	101,954	29,874	28,754	11,650 *Cr. 18,451*	22,919	34,115	55,345 *Cr. 9,854*	83,313	58,131	95,467	127,995	56,227 *Cr. 31*
Railways	32,039,361	1,065,171 *Cr. 4,633*	620,947 *Cr. 4,845*	495,771 *Cr. 110*	387,923 *Cr. 4,924*	748,649 *Cr. 105,196*	1,365,466 *Cr. 388*	3,133,200 *Cr. 751*	2,110,859 *Cr. 3,171*	1,776,413 *Cr. 1,167*	1,878,729 *Cr. 37,924*	1,988,614 *Cr. 16,875*
Payment to Midland Railway Bondholders	150,000	..	..	..	..	..	..	..	..	..	..	..
Roads :—												
Miscellaneous Roads and Bridges	9,271,492	400,062	203,746	128,730 *Cr. 600*	221,887 *Cr. 997*	376,097 *Cr. 603*	527,854 *Cr. 81*	552,895 *Cr. 197*	643,156 *Cr. 244*	751,370 *Cr. 188*	603,968 *Cr. 231*	564,694 *Cr. 4,810*
Roads on Goldfields..	1,027,316	24,432	17,099	6,912	4,186	12,465	11,050	11,264	4,850	2,867	2,755	3,934
Development of Thermal Springs and Natural Scenery ..	16,023	..	..	..	..	..	..	..	..	..	..	..
Lands Improvement Account*	300,930	..	..	..	..	..	..	..	..	..	..	..
Total, Roads	10,615,761	424,494	220,845	135,042	225,076	387,959	538,823	563,962	647,762	754,049	606,492	563,818
Development of Mining	884,820	6,602	4,592	27 *Cr. 6,545*	518 *Cr. 1,000*	1,173 *Cr. 7,008*	2,153 *Cr. 1,606*	2,130 *Cr. 51*	*Cr. 98* *Cr. 1,785*	1,363 *Cr. 2,310*	..	..
Purchase of Native Lands	1,571,823	*Cr. 972*	*Cr. 868*	*Cr. 57*	..	*Cr. 57*	*Cr. 59*	*Cr. 52*	..	..	..	..
Native Lands Purchase Account	491,980	..	..	..	..	..	..	..	..	..	..	..
Total, Land Purchases	2,063,803	*Cr. 972*	*Cr. 868*	*Cr. 57*	..	*Cr. 57*	*Cr. 59*	*Cr. 52*	..	..	..	..
Telegraph Extension	2,958,166	249,554	203,311	213,955	198,611	249,379	336,468	590,981	512,657 *Cr. 11,082*	717,409	957,294	931,661

* Excludes expenditure subsequent to 1900 included under separate class "Lands Improvement."

[*Continued on page 6.*

TABLE No 2—*continued.*

GENERAL SUMMARY—*continued.*

Showing Net Yearly Expenditure out of Public Works Fund (General Purposes Account), 1915–16 to 1936–37—*continued.*

Description of Services.	Total Net Expenditure to 31st March, 1915.	Expenditure.										
		1915–16.	1916–17.	1917–18.	1918–19.	1919–20.	1920–21.	1921–22.	1922–23.	1923–24.	1924–25.	1925–26.
	£	£	£	£	£	£	£	£	£	£	£	£
Public Buildings :—												
General (including Miscellaneous)	348,983	22,050	12,648	11,646	43,168	64,207	39,504	87,057	113,553	8,160	30,791	29,369
				Cr. 15,067							*Cr. 35*	*Cr. 345*
Parliamentary	407,378	17,133	22,586	37,233	..	..	..	..	..	..	..	..
Judicial { Courthouses		4,902	299	21	..	868	1,400	4,358	2,018	2,448	5,363	7,209
									Cr. 13		*Cr. 19*	
Judicial { Prisons	839,100	17,786	15,685	13,195	16,299	20,981	30,038	41,740	23,113	26,484	25,279	24,197
							Cr. 800			*Cr. 2,568*	*Cr. 86*	
Judicial { Police-stations		25,484	21,147	18,814	6,157	24,944	36,843	22,544	6,298	12,838	18,553	16,594
												Cr. 102
Post and Telegraph	1,184,748	35,258	22,744	33,525	26,072	66,543	93,364	112,906	77,211	108,395	65,917	89,865
							Cr. 560	*Cr. 675*	*Cr. 69*		*Cr. 210*	*Cr. 453*
Customs	49,441	..	..	..	..	..	..	..	..	..	..	..
Quarantine Stations	6,255	..	..	..	..	35,490	15,529	4,581	154	171	284	..
Mental Hospitals	732,622	54,898	44,602	26,502	14,640	18,277	27,368	41,838	13,852	26,541	68,438	77,835
		Cr. 15										*Cr. 283*
Public Health	32,754	..	..	..	..	..	..	..	..	..	..	..
Health and Hospital Institutions	139,883	1,426	7,570	4,080	2,332	8,484	4,099	26,131	20,981	7,420	27,951	31,177
									Cr. 1,399			*Cr. 300*
School Buildings	2,320,246	97,972	70,367	63,082	115,656	195,500	244,722	2,469	..	..	..	..
								Cr. 9,255	*Cr. 368*	*Cr. 1,090*	*Cr. 905*	*Cr. 1,050*
Agricultural	48,264	2,972	3,046	5,685	4,229	7,227	9,345	1,115	514	282	3,242	7,932
									Cr. 27	*Cr. 171*	*Cr. 686*	*Cr. 865*
Workers' Dwellings	179,116	55,893	35,437	15,505	7,293	26,674	..	..	..	..	..	..
Total, Public Buildings	6,288,790	335,759	256,131	214,221	235,846	469,195	500,852	334,809	255,818	188,910	243,877	280,780
Lighthouses, Harbour-works, and Harbour-defences :—												5,690
Lighthouses..	203,505	1,415	449	561	1,663	253	758	16,350	3,260	4,473	2,850	*Cr. 750*
Harbour-works	377,068	9,355	2,280	2,359	3,729	3,245	4,080	2,424	6,524	6,334	423	3,717
												Cr. 131
Harbour-defences	542,062	2,903	1,038	56	..	..	..	..	..	..	..	..
									Cr. 1,235	*Cr. 16*		
Total, Lighthouses, &c.	1,122,635	13,673	3,767	2,976	5,392	3,498	4,838	18,774	8,549	10,791	3,273	8,526
Rates on Native Lands	68,672	..	..	..	..	..	..	..	..	..	..	..

[*Continued on page 7.*

TABLE No. 2—*continued.*

GENERAL SUMMARY—*continued.*

Showing NET YEARLY EXPENDITURE out of PUBLIC WORKS FUND (GENERAL PURPOSES ACCOUNT), 1915-16 to 1936-37—*continued.*

Description of Services.	Total Net Expenditure to 31st March, 1915.	Expenditure.										
		1915–16.	1916–17.	1917–18.	1918–19.	1919–20.	1920–21.	1921–22.	1922–23.	1923–24.	1924–25.	1925–26.
	£	£	£	£	£	£	£	£	£	£	£	£
Contingent Defence	989,615	37,620	9,742	6,714	8,809 *Cr. 922*	10,187	8,701	15,586	1,702 *Cr. 463*	4,931 *Cr. 280*	27,133 *Cr. 580*	89,670 *Cr. 33*
Tourist and Health Resorts	252,748	5,167 *Cr. 500*	1,094	931	1,620	6,194	19,041	17,996 *Cr. 110*	5,435	27,264	12,343 *Cr. 81*	43,486
Lands Improvement*	127,838	5,936	*Cr. 2,731*	1,838	*Cr. 4,268*	2,964	2,064	17,478	26,204	18,182	34,172	70,493 *Cr. 19*
Charges and Expenses of raising Loans	1,253,033	5,037 *Cr. 5,030*	35	1	..	..	184	174,280	62,399	311,905	241,930	297,180
Interest and Sinking Funds	218,500	..	..	..	..	..	..	..	..	..	..	..
Coal-exploration and Mine-development	10,835	..	..	..	..	..	..	..	..	..	..	..
Thermal Springs	14,600	..	..	..	..	..	..	..	..	..	..	..
Plant, Material, and Services	..	74,417	9,778	6,811	20,638 *Cr. 31*	47,682	169,910	122,801	*Cr. 4,983*	*Cr. 49,159* *Cr. 16*	*Cr. 30,956* *Cr. 1*	36,930 *Cr. 855*
Motor Transport Service	..	..	..	..	..	..	..	..	22,679	962	5,000	4,994
Transfer to Main Highways Account :— Construction Fund	..	..	..	..	..	..	..	..	..	..	226,000	..
Total Ways and Means Credits	..	*11,160*	*5,713*	*43,492*	*11,993*	*112,864*	*19,628*	*11,616*	*20,127*	*9,142*	*40,793*	*27,474*
Grand Total—Net Expenditure	62,434,338	2,363,658	1,488,786	1,193,930	1,195,489	1,907,850	3,121,132	5,449,351	3,892,320	4,056,423	4,558,570	4,588,111

* Expenditure prior to 1901 (totalling £300,930) included under separate class "Roads."

[*Continued on page 8.*

TABLE No. 2—*continued.*

GENERAL SUMMARY—*continued.*

Showing Net Yearly Expenditure out of Public Works Fund (General Purposes Account), 1915–16 to 1936–37—*continued.*

Description of Services.	Expenditure.											Total Net Expenditure to 31st March, 1937.
	1926–27.	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34.	1934–35.	1935–36.	1936–37.	
	£	£	£	£	£	£	£	£	£	£	£	£
Immigration	184,918	67,157	50,266 *Cr. 283*	41,756	33,544	5,265 *Cr. 210*	.. *Cr. 583*	.. *Cr. 532*	.. *Cr. 370*	.. *Cr. 362*	.. *Cr. 146*	3,312,913
Public Works, Departmental	115,866 *Cr. 35,948*	130,951 *Cr. 13,328*	142,252 *Cr. 88,499*	132,783 *Cr. 51,671*	131,816 *Cr. 16,381*	151,377 *Cr. 33,947*	104,904 *Cr. 52,639*	98,703 *Cr. 33,872*	76,486 *Cr. 31,154*	99,384 *Cr. 28,178*	137,769 *Cr. 17,709*	3,211,990
Irrigation and Water-supply*	56,937	49,735 *Cr. 2,798*	55,198 *Cr. 8*	69,657	62,614	37,749	53,290 *Cr. 96*	66,838	91,241	85,414	11,062	1,314,241
Railways	1,480,807 *Cr. 95,647*	1,141,822 *Cr. 1,699*	1,216,277 *Cr. 2,595*	1,812,521 *Cr. 1,296*	1,987,196 *Cr. 792*	952,388 *Cr. 20,568*	160,853 *Cr. 9,056*	132,111 *Cr. 20*	125,600	258,011 *Cr. 134,696*	1,019,094 *Cr. 464*	57,450,966
Payment to Midland Railway Bondholders	..	..	..	..	..	..	..	..	..	..	..	150,000
Roads:—												
Miscellaneous Roads and Bridges	575,898 *Cr. 981*	669,833 *Cr. 540*	780,990 *Cr. 330*	1,005,330 *Cr. 415*	1,379,810 *Cr. 472*	1,078,270 *Cr. 564*	396,559 *Cr. 1,171*	359,671 *Cr. 445*	371,573 *Cr. 471*	444,377 *Cr. 250*	913,720 *Cr. 172*	22,208,220
Roads to give access to Outlying Districts	..	33,642	51,582	53,693	91,126	3,940	..	..	..	..	..	233,983
Roads on Goldfields	2,230	2,330 *Cr. 467*	1,005	1,885	4,586	..	..	..	..	..	..	1,140,699
Development of Thermal Springs and Natural Scenery	..	..	..	..	..	..	..	..	..	..	..	16,023
Lands Improvement Account	..	..	..	..	..	..	..	..	..	..	..	300,930
Total, Roads	577,147	704,798	833,247	1,060,493	1,475,050	1,081,646	395,388	359,226	371,102	444,127	913,548	23,899,855
Development of Mining	..	..	..	..	..	..	..	..	..	..	..	880,855
		Cr. 1,130	*Cr. 260*	*Cr. 260*	*Cr. 260*		*Cr. 50*			*Cr. 143*	*Cr. 17*	
Purchase of Native Lands	*Cr. 535*	*Cr. 56*	..	..	..	..	..	*Cr. 7,123*	..	..	..	1,562,044
Native Lands Purchase Account	..	..	..	..	..	..	..	..	..	..	..	491,980
Total, Land Purchases	*Cr. 535*	*Cr. 56*	..	..	..	..	..	*Cr. 7,123*	..	..	..	2,054,024
Settlement of Unemployed Workers	..	..	..	..	..	..	118,723	172,109	222,309	151,345	92,016	756,502
Telegraph Extension	558,042	625,540	624,414	594,383	419,756	249,978 *Cr. 32*	99,999	144,160	135,933	195,380	232,513	11,988,430

* Includes £6,727 previously included under Lands Improvement class.

TABLE No. 2—*continued.*

GENERAL SUMMARY—*continued.*

Showing NET YEARLY EXPENDITURE out of PUBLIC WORKS FUND (GENERAL PURPOSES ACCOUNT), 1915-16 to 1936-37—*continued.*

Description of Services.	Expenditure.											Total Net Expenditure to 31st March, 1937.
	1926-27.	1927-28.	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.	
Public Buildings :—	£	£	£		£	£	£	£	£	£	£	£
General (including Miscellaneous)	119,864	42,553	4,272	14,106*	85,204	33,189	2,107	594	30,713	39,447	57,668	1,072,798
	Cr. 429	*Cr. 1,065*	*Cr. 420*	*Cr. 3,156*	*Cr. 55*	*Cr. 4,231*	*Cr. 2,067*	*Cr. 1,075*	*Cr. 14,087*	*Cr. 125,964*	*Cr. 59*	
Parliamentary	..	..	35	27,142	15,723	37	..	..	..	..	27	527,294
Judicial — Courthouses	1,261	7,531	8,387	15,765	19,572	3,513	970	72	533	8,701	2,655	1,520,840
	Cr. 13	..	*Cr. 95*	*Cr. 29*	*Cr. 16,403*	*Cr. 529*	*Cr. 222*	*Cr. 255*	*Cr. 93*	*Cr. 4,278*	*Cr. 644*	
Judicial — Prisons	22,812	22,358	12,573	18,814	2,504	2,621	2,026	1,018	1,605	2,123	4,621	
	Cr. 908	*Cr. 524*	*Cr. 321*	*Cr. 285*	*Cr. 134*	*Cr. 67*	*Cr. 71*				*Cr. 20*	
Judicial — Police-stations	7,411	5,561	6,925	8,442	8,360	2,535	1,022	74	2,754	6,710	7,149	
	Cr. 13	*Cr. 970*	*Cr. 605*	*Cr. 319*	*Cr. 54*	*Cr. 91*	*Cr. 80*	*Cr. 79*	*Cr. 240*	*Cr. 35*	*Cr. 172*	
Post and Telegraph	86,052	77,194	62,087	104,157	138,671	104,505	2,763	21,078	100,484	232,285	158,005	2,982,064
	Cr. 1,114	*Cr. 834*	*Cr. 1,980*	*Cr. 197*	*Cr. 1,391*	*Cr. 3,179*	*Cr. 4,823*	*Cr. 1,502*	*Cr. 582*	*Cr. 2,760*	*Cr. 1,436*	
Customs	..	..	..	..	..	..	..	..	..	..	..	49,441
Quarantine Stations	..	..	..	..	..	..	..	..	..	..	..	62,464
Mental Hospitals	68,635	51,119	96,782	152,096	134,140	45,938	28,756	73,021	98,629	67,465	142,109	2,101,128
		Cr. 3,600				*Cr. 860*			*Cr. 40*		*Cr. 177*	
Public Health	..	..	..	..	..	..	..	..	..	..	..	32,754
Health and Hospital Institutions	15,840	14,361	19,637	16,651	17,338	3,316	301	1,248	656	2,191	12,921	383,721
		Cr. 310				*Cr. 1*	*Cr. 113*	*Cr. 150*				
School Buildings	..	..	..	..	..	259,149	52,623	52,239	51,506	122,357	268,884	3,890,616
	Cr. 7,953		*Cr. 2,428*		*Cr. 1,110*	*Cr. 40*		*Cr. 805*	*Cr. 217*	*Cr. 933*	*Cr. 2*	
Agricultural	4,164	2,863	2,808	2,963	1,509	..	..	48	88	85	60,902‡	158,868
	Cr. 310		*Cr. 2,395*	*Cr. 1,721*	*Cr. 194*	*Cr. 1,927*	*Cr. 1,535*	*Cr. 437*	*Cr. 32*		*Cr. 115*	
Workers' Dwellings†	..	..	..	..	..	..	..	..	*Cr. 319,918*	..	..	..
Total, Public Buildings	315,299	216,237	205,262	354,429	403,680	443,878	81,657	145,089	*Cr. 48,241*	347,394	712,316	12,781,988
Lighthouses, Harbour-works, and Harbour-defences :—												
Lighthouses	5,758	7,979	2,637	4,460	4,103	5,046	688	1,276	4,021	3,320	630	279,895
				Cr. 500								
Harbour-works	13,263	15,891	14,425	10,736	6,742	6,987	*Cr. 5,277*	11,988	2,581	*Cr. 399*	669	498,642
	Cr. 204	*Cr. 165*									*Cr. 2*	
Harbour-defences	..	..	..	..	..	..	..	..	..	..	..	544,808
Total, Lighthouses, &c.	18,817	23,705	17,062	14,696	10,845	12,033	*Cr. 4,589*	13,264	6,602	2,921	1,297	1,323,345
Rates on Native Lands	..	..	..	..	..	..	..	..	..	..	..	68,672

* Includes £12,500 expended under Finance Act, 1929, section 32.

† Transferred to State Advances Account.

‡ Includes £60,032 expended under Reserves and other Lands Disposal Act, 1936, section 32 (Flock House purchase).

TABLE No. 2—*continued.*

GENERAL SUMMARY—*continued.*

Showing NET YEARLY EXPENDITURE out of PUBLIC WORKS FUND (GENERAL PURPOSES ACCOUNT), 1915–16 to 1936–37—*continued.*

Description of Services.	Expenditure.											Total Net Expenditure to 31st March, 1937.
	1926–27.	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34.	1934–35.	1935–36.	1936–37.	
	£	£	£	£	£	£	£	£	£	£	£	£
Contingent Defence	34,014 *Cr. 751*	39,986 *Cr. 455*	67,652 *Cr. 648*	46,766 *Cr. 1,325*	13,812 *Cr. 586*	.. *Cr. 4,039*	.. *Cr. 624*	.. *Cr. 76*	..	.. *Cr. 704*	.. *Cr. 64*	1,401,080
Tourist and Health Resorts	31,981	36,673 *Cr. 516*	39,254 *Cr. 440*	20,547 *Cr. 1,213*	60,288 *Cr. 2,494*	87,609 *Cr. 85*	14,454 *Cr. 877*	13,510 *Cr. 21*	12,880 *Cr. 705*	13,683 *Cr. 20*	16,789	733,925
Lands Improvement*	56,267 *Cr. 135*	72,898 *Cr. 2,574*	85,861 *Cr. 87*	79,454 *Cr. 112*	70,534 *Cr. 1,041*	38,899 *Cr. 506*	38,906 *Cr. 248*	71,825 *Cr. 329*	82,092 *Cr. 722*	37,909 *Cr. 1,006*	62,673 *Cr. 10,366*	980,343
Swamp Land Drainage	..	..	..	..	..	..	14,807	13,959 *Cr. 297*	15,019 *Cr. 231*	12,922 *Cr. 263*	24,965	80,881
Dairy Industry Loans..	..	..	..	..	..	..	..	..	..	10,750	30,510	41,260
Charges and Expenses of raising Loans	155,373	100,297	438,238 *Cr. 3,811*	518,158	164,535	98,098	15,851	14	600	..	..	3,828,307
Interest and Sinking Funds	..	..	..	..	..	..	..	..	..	..	..	218,500
Coal-exploration and Mine-development	..	..	..	..	..	..	..	..	..	..	..	10,835
Thermal Springs	..	..	..	..	..	..	..	..	..	..	..	14,600
Plant, Material, and Services	*Cr. 9,334* *Cr. 1,992*	*Cr. 17,610* *Cr. 8,985*	*Cr. 6,551* *Cr. 1,224*	*Cr. 35,092* *Cr. 360*	*Cr. 42,824* *Cr. 216*	*Cr. 103,571* *Cr. 1,338*	*Cr. 45,463* *Cr. 161*	1,421 *Cr. 22*	*Cr. 10,513* *Cr. 165*	22,438 *Cr. 418*	‡ *Cr. 1,642*	139,344
Native Land Settlement	..	..	..	..	..	..	..	179,485 *Cr. 52*	125,790 *Cr. 9,662*	71,901 *Cr. 9,491*	112,318 *Cr. 3,423*	466,866
Motor Transport Service	..	..	..	..	..	..	..	..	..	..	..	33,635
Transfer to Main Highways Account:— Construction Fund	400,000	200,000	200,000	200,000	..	..	..	..	..	..	..	1,226,000
Total Ways and Means Credits	*146,933*	*40,026*	*106,429*	*62,859*	*41,583*	*72,214*	*74,416*	*47,092*	*378,689*	*309,501*	*36,630*	..
Grand Total—Net Expenditure	3,841,126	3,360,638	3,870,577	4,854,314†	4,769,076	2,994,624	984,446	1,369,370	1,163,891	1,578,298	3,333,039	128,369,357

* Expenditure on Irrigation and Water-supply—1905–6, £22; 1906–7, £750; 1907–8, £1,554; 1908–9, £1,966; 1909–10, £2,435, now transferred to Irrigation and Water-supply. † Includes £12,500 expended under Finance Act, 1929, section 32. ‡ Now provided for under Consolidated Fund.

TABLE No. 3.

Expenditure on Railways to 31st March, 1937.

Lines of Railway.	Mileage opened for Traffic.	Total Expenditure by General Government to 31st March, 1936.	Recoveries on Account of Expenditure of Previous Years.	Expenditure out of Public Works Fund during Year 1936-37. New Works.		Total Expenditure by General Government to 31st March, 1937.	Valuation of Works constructed by Provinces and Midland Railway Company.
				Construction and Surveys.	Railways Improvement and Works on Open Lines.		
	M. ch.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Kaihu Valley	24 32	179,143 14 9	..	..	..	179,143 14 9	..
Opua Wharf to Whangarei and Onerahi	58 06	605,268 15 11	25 0 0	..	Cr. 57 4 3	605,186 11 8	..
Otiria to Ngapuhi	13 45	127,370 15 6	..	..	75 0 0	127,445 15 6	..
Whangarei Branch (Kioreroa to Waiotira)	19 79	420,483 1 0	..	..	..	420,483 1 0	..
North Auckland Main Trunk—							
Ngapuhi Northwards	11 00	882,560 4 0	439 8 0	Cr. 714 4 9	..	881,406 11 3	..
Helensville Northwards	83 39	2,989,181 4 0	..	1 0 0	Cr. 130 0 0	2,989,052 4 0	..
North Auckland Main Trunk to Dargaville	..	450,382 4 7	..	Cr. 249 7 0	..	450,132 17 7	..
Helensville to Te Awamutu	148 67	5,915,282 15 6	..	..	25,875 5 1	5,941,158 0 7	..
Waiuku Branch (Paerata to Waiuku)	12 69	208,909 9 6	..	..	..	208,909 9 6	..
Huntly to Awaroa	8 75	184,379 5 0	..	..	..	184,379 5 0	..
Waikokowai Branch	..	3,442 0 0	..	..	..	3,442 0 0	..
Frankton to Thames	62 58	506,021 3 7	..	..	..	506,021 3 7	..
Cambridge Branch (Ruakura Junction to Cambridge)	12 02	61,831 17 3	..	..	..	61,831 17 3	..
Morrinsville to Rotorua	69 33	433,602 7 1	..	..	Cr. 2 2 0	433,600 5 1	..
Marton to Te Awamutu	209 69	3,122,672 13 5	..	..	Cr. 15 0 0	3,122,657 13 5	..
Waipa Gravel Access Branch	..	114 0 0	..	..	..	114 0 0	..
Raetihi Branch	8 50	89,452 2 1	..	..	..	89,452 2 1	..
Rotorua to Taupo	..	37,862 13 11	..	..	..	37,862 13 11	..
Paeroa to Pokeno	..	22,890 1 8	..	..	..	22,890 1 8	..
Paeroa to Tauranga	50 65	1,250,374 18 6	..	..	219 4 1	1,250,594 2 7	..
Tauranga to Taneatua, including Te Maunga to Maunganui Branch	59 17	1,497,553 7 8	..	Cr. 125 5 8	..	1,497,428 2 0	..
Gisborne to Motu	49 32	625,075 6 9	..	..	..	625,075 6 9	..
Gisborne to Ormond Tramway	..	4,975 1 7	..	..	..	4,975 1 7	..
Napier to Gisborne—							
Gisborne Southwards	11 51	284,846 10 1	..	..	..	284,846 10 1	..
Waikokopu Northwards	..	546,906 8 8	..	248,421 18 4	..	795,328 7 0	..
Wairoa Northwards	..	20,681 12 6	..	..	..	20,681 12 6	..
Napier Northwards	38 62	2,381,602 16 5	..	68,212 11 1	..	2,449,815 7 6	..
Waikokopu Branch	..	628,326 13 5	..	1,723 3 9	..	630,049 17 2	..
Wellington to Napier—							
Napier to Woodville and Palmerston North	114 06	1,166,059 7 8	..	..	467 4 0	1,166,526 11 8	..
Wellington to Woodville, including Te Aro Extension	129 30	3,255,711 9 0	..	..	1,759 13 1	3,257,471 2 1	..
Featherston to Martinborough	..	399 0 0	..	..	..	399 0 0	..
Wellington to Waitara—							
Wellington to Longburn	83 37	3,530,962 2 4	..	..	348,288 12 10	3,879,250 15 2	..
Foxton to Waitara and Moturoa	196 22	2,102,682 8 2	..	..	37,254 2 11	2,139,936 11 1	..
Mount Egmont Branch	6 00	70,536 1 6	..	..	..	70,536 1 6	..
Moturoa to Opunake	..	3,105 0 0	..	..	..	3,105 0 0	..
Opunake Branch (Te Roti to Opunake)	22 63	447,862 16 7	..	..	..	447,862 16 7	..
Manaia Branch (Kapuni to Manaia)	..	9,483 6 0	..	..	..	9,483 6 0	..
Rangitikei River Quarry Line	..	206 0 0	..	..	..	206 0 0	..

TABLE No. 3—*continued.*

Expenditure on Railways to 31st March, 1937—*continued.*

Lines of Railway.	Mileage opened for Traffic.	Total Expenditure by General Government to 31st March, 1936.	Recoveries on Account of Expenditure of Previous Years.	Expenditure out of Public Works Fund during Year 1936-37: New Works.		Total Expenditure by General Government to 31st March, 1937.	Valuation of Works constructed by Provinces and Midland Railway Company.
				Construction and Surveys.	Railways Improvement and Works on Open Lines.		
	M. ch.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Stratford to Okahukura	89 00	3,072,401 17 5	..	321 15 4	..	3,072,723 12 9	..
Nelson to Greymouth—							
Nelson to Inangahua	64 47	718,235 13 6	..	25 5 6	..	718,260 19 0	..
Stillwater to Inangahua	57 32	226,593 15 11	..	..	..	226,593 15 11	78,307 0 0
Ngahere to Blackball	3 40	147,881 12 11	..	..	..	147,881 12 11	279,685 0 0
Westport to Ngakawau	19 56	209,904 14 2	..	..	..	209,904 14 2	..
Ngakawau to Mokihinui	7 12	*	..	..	..	*	..
Mokihinui to Colliery Line	3 69	*	..	..	..	†	..
Westport to Cape Foulwind	7 00	‡	..	..	..	‡	..
Westport to Inangahua	5 74	627,339 0 11	..	78,738 3 9	..	706,077 4 8	..
Greymouth to Rewanui	2 44	259,815 10 2	..	..	..	259,815 10 2	..
Point Elizabeth Branch	8 70	74,363 10 11	..	..	..	74,363 10 11	..
Greymouth to Ross and Mikonui	38 68	431,438 12 10	..	..	*Cr.* 22 3 7	431,416 9 3	..
Picton to Waipara—							
Picton Southwards	56 06	952,646 17 6	..	85,683 16 4	..	1,038,330 13 10	..
Waipara Northwards	44 14	605,007 10 9	..	123,997 11 0	..	729,005 1 9	..
Christchurch to Greymouth—							
Rolleston to Bealey	73 07	1,012,029 5 11	..	..	..	1,012,029 5 11	61,579 0 0
Whitecliffs Branch	11 38	25,021 0 0	..	..	..	25,021 0 0	..
Greymouth to Bealey	58 12	1,979,775 8 11	..	..	888 8 10	1,980,663 17 9	263,889 0 0
Hurunui to Waitaki—							
Main Line (Waiau to Waitaki)	219 07	2,700,860 8 7	..	..	10,607 6 7	2,711,467 15 2	316,135 0 0
Oxford Branch (Rangiora to Oxford West)	21 76	49,697 17 2	..	..	..	49,697 17 2	..
Eyreton Branch (Kaiapoi to Bennett's)	20 07	44,277 0 0	..	..	*Cr.* 20 0 0	44,257 0 0	..
Lyttelton Branch	6 26	230,493 18 4	..	..	..	230,493 18 4	340,500 0 0
Southbridge Branch (Hornby to Southbridge)	25 31	92,181 4 8	..	..	..	92,181 4 8	..
Little River Branch (Lincoln to Little River)	22 46	111,940 7 9	..	..	350 0 0	112,290 7 9	..
Rakaia to Methven	22 20	77,090 19 2	..	..	..	77,090 19 2	..
Ashburton to Springburn	27 29	64,025 11 3	..	..	..	64,025 11 3	..
Orari to Geraldine	..	321 0 0	..	..	..	321 0 0	..
Fairlie Branch (Washdyke Junction to Fairlie)	36 05	70,502 15 5	..	..	..	70,502 15 5	75,124 0 0
Waimate Branch	12 63	80,862 4 6	..	..	..	80,862 4 6	..
Canterbury Interior Main Line—							
Oxford to Malvern	11 44	46,248 0 0	..	..	..	46,248 0 0	..
Whitecliffs to Rakaia	..	542 0 0	..	..	..	542 0 0	..
Temuka to Rangitata	..	5,152 0 0	..	..	..	5,152 0 0	..
Waitaki to Bluff—							
Main Line, including Port Chalmers Branch	252 71	4,180,254 15 11	..	..	11,828 3 7	4,192,082 19 6	82,259 0 0
Duntroon Branch (Pukeuri to Kurow)	37 33	86,265 8 6	..	..	..	86,265 8 6	37,500 0 0
Ngapara Branch (Waiareka Junction to Ngapara)	14 76	25,238 2 0	..	..	..	25,238 2 0	58,009 0 0

* The funds for this extension—namely, £35,501 2s. 11d.—were provided by the Westport Harbour Board. † The funds for purchase of this line—namely, £15,745—were provided by the Harbour Board. ‡ The funds for this line—namely, £93,450—were provided by the Westport Harbour Board.

TABLE No. 3—*continued.*

EXPENDITURE ON RAILWAYS TO 31ST MARCH, 1937—*continued.*

Lines of Railway.	Mileage opened for Traffic.	Total Expenditure by General Government to 31st March, 1936.	Recoveries on Account of Expenditure of Previous Years.	Expenditure out of Public Works Fund during Year 1936-37: New Works.		Total Expenditure by General Government to 31st March, 1937.	Valuation of Works constructed by Provinces and Midland Railway Company.
				Construction and Surveys.	Railways Improvement and Works on Open Lines.		
Waitaki to Bluff—*continued.*	M. ch.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Livingstone Branch (Windsor to Tokarahi)	11 75	75,864 15 4	..	..	*Cr.* 482 8 0	75,382 7 4	..
Waihemo Branch (Palmerston to Dunback)	8 55	32,906 8 11	..	..	..	32,906 8 11	..
Fernhill Railway	1 60	1,330 0 0	..	..	..	1,330 0 0	..
Brighton Road Branch	..	6,474 0 0	..	..	..	6,474 0 0	12,829 0 0
Outram Branch (Mosgiel to Outram)	8 78	12,051 0 7	..	..	..	12,051 0 7	29,691 0 0
Lawrence Branch	58 67	718,258 17 1	..	..	..	718,258 17 1	..
Balclutha to Tuapeka Mouth	..	2,489 0 0	..	..	..	2,489 0 0	..
Catlin's River Branch (Balclutha to Tahakopa)	42 67	463,709 6 3	..	..	..	463,709 6 3	..
Heriotburn Branch (Waipahi to Edievale)	26 23	124,808 4 5	..	..	..	124,808 4 5	..
Waikaka Branch (McNab to Waikaka)	12 65	68,423 0 0	..	..	..	68,423 0 0	..
Gore to Lumsden	36 39	112,294 3 2	..	..	91 11 6	112,385 14 8	..
Edendale to Glenham	9 36	50,490 13 11	..	..	..	50,490 13 11	..
Riversdale to Switzers	13 70	82,285 4 0	..	..	..	82,285 4 0	..
Seaward Bush to Catlin's (Appleby to Tokanui)	32 79	185,229 5 5	..	..	..	185,229 5 5	..
Otago Central (Wingatui to Cromwell)	147 27	1,453,717 10 1	..	..	..	1,453,717 10 1	..
Invercargill to Kingston—							
Main Line	87 04	369,244 14 9	..	..	..	369,244 14 9	91,937 0 0
Mararoa Branch (Lumsden to Mossburn)	10 40	27,508 4 4	..	..	..	27,508 4 4	..
Winton to Heddon Bush	..	140 0 0	..	..	..	140 0 0	..
Makarewa to Orepuki and Waiau	56 34	360,075 18 5	..	..	..	360,075 18 5	37,097 0 0
Thornbury to Wairio	22 15	103,790 15 10	..	..	..	103,790 15 10	23,200 0 0
Forest Hill (Winton to Hedgehope)	12 40	23,337 0 0	..	..	..	23,337 0 0	..
Expenses of Railway Commissions and other Expenditure not chargeable to Individual Lines	..	10,337 0 0	..	..	..	10,337 0 0	..
Surveys of New Lines—							
North Island	..	31,235 10 1	..	..	..	31,235 10 1	..
South Island	..	5,763 0 0	..	..	..	5,763 0 0	..
Rolling-stock	..	11,977,319 17 11	..	..	..	11,977,319 17 11	..
Motor-omnibus Service, Wellington	..	60,571 1 11	..	..	..	60,571 1 11	..
General	..	14,076 12 9	..	..	..	14,076 12 9	..
Depreciation provided for out of Railway Revenue and actually repaid to Public Works Fund	..	*Cr.* 762,612 9 4	..	..	..	*Cr.* 762,612 9 4	..
Stock of Permanent-way Materials	..	3,542 3 11	..	5,400 11 10	..	8,942 15 9	..
Totals	3,388 46	67,891,270 0 5*	464 8 0	611,436 19 6	436,975 14 8	68,939,218 6 7*	1,787,741 0 0†

* The £10,400,000 accrued depreciation of assets referred to in section 23 (2), Government Railways Amendment Act, 1931, not deducted.

† Includes value for £150,000 paid to debenture-holders under the Midland Railway Petitions Settlement Act Amendment Act, 1903.

TABLE No. 4.

EXPENDITURE ON PUBLIC BUILDINGS OUT OF PUBLIC WORKS FUND TO THE 31ST MARCH, 1937, AND THE LIABILITIES ON THAT DATE.

—	Total Expenditure to 31st March, 1936.	Expenditure for Year ended 31st March, 1937.	Total Expenditure to 31st March, 1937.	Liabilities on Authorities, Contracts, &c., 31st March, 1937.	Total Expenditure and Liabilities.
General—	£	£	£	£	£
Alexandra Depot, Wellington*	8,084	..	8,084	..	8,084
Government House, Wellington (land and new building)	74,290	*Cr.* 43	74,247	..	74,247
Offices for public Departments†	814,533	12,227	826,760	136	826,896
Miscellaneous	118,282	45,425	163,707	963	164,670
Parliament Buildings—					
Old buildings	76,553	..	76,553	..	76,553
New buildings	393,625	27	393,652	..	393,652
Alterations to streets surrounding grounds, and purchase of land	57,089	..	57,089	..	57,089
Judicial‡	1,507,251	13,589	1,520,840	1,834	1,522,674
Postal and telegraph‖	2,825,495	156,569	2,982,064	30,477	3,012,541
Customs	49,441	..	49,441	..	49,441
Quarantine-stations	62,464	..	62,464	..	62,464
Mental hospitals	1,959,196	141,932	2,101,128	7,668	2,108,796
Health and Hospital Institutions§	403,554	12,921	416,475	66	416,541
School buildings	3,621,734	268,882	3,890,616	14,656	3,905,272
Agricultural	98,081	60,787¶	158,868	561	159,429
Totals	12,069,672	712,316	12,781,988	56,361	12,838,349

* Expenditure *re* Defence requirements only. Other expenditure included in "Judicial" class. † Includes £12,500 expended under Finance Act, 1929, section 32. ‡ Includes Courthouses, prisons, and police-stations. § Includes £32,754 previously shown under "Public Health." ‖ Includes £134,485 for land transferred from Railway Department. ¶ Includes £60,032 expended under Reserves and other Lands Disposal Act, 1936, section 32 (Flock House purchase).

TABLE No. 5.

ELECTRIC SUPPLY ACCOUNT.—STATEMENT OF ACCOUNTS AT THE 31ST MARCH, 1937.

GENERAL BALANCE-SHEET

AT 31ST MARCH, 1937, COMPARED WITH POSITION AT 31ST MARCH, 1936.

Liabilities.	1936–37. £ s. d.	1936–37. £ s. d.	*1935–36.* £ s. d.	*Assets.*	1936–37. £ s. d.	1936–37. £ s. d.	*1935–36.* £ s. d.
Aid to Water-power Works and Electric Supply Accounts—				North Island scheme—			
Debentures Stock issued—				Assets as per separate balance-sheet ..	9,446,309 4 5		*9,039,956 12 0*
At 3 per cent. interest	3,149,372 9 6		*954,632 17 3*	Profit and Loss Account—Loss to date ..	155,175 8 4		*399,315 0 9*
At 3½ per cent. interest	1,449,575 0 0		*1,000,000 0 0*			9,601,484 12 9	*9,439,271 12 9*
At 3¾ per cent. interest	574,555 0 0		*574,555 0 0*				
At 4 per cent. interest	1,644,915 0 0		*1,957,890 0 0*				
At 4·4 per cent. interest	950 0 0		..				
At 4½ per cent. interest	2,623,913 18 0		*2,623,913 18 0*	South Island scheme—			
At 4·8 per cent. interest	1,750 0 0		..	Assets as per separate balance-sheet ..	6,398,916 9 10		*4,563,834 17 10*
At 5 per cent. interest	3,159,227 13 6		*3,159,227 13 6*	Investments, Sinking Fund	13,429 15 1		*17,555 5 1*
At 5½ per cent. interest	1,200 0 0		*4,600 0 0*			6,412,346 4 11	*4,581,390 2 11*
At 6 per cent. interest	..		*1,884,642 6 3*				
Debentures not yet converted	50 0 0		*50 0 0*				
Treasury Bills—				Fixed deposit investments taken over from the Southland Electric Power Board	..	45,000 0 0	..
At 1¼ per cent. interest	1,300,000 0 0						
		13,905,509 1 0	*12,159,511 15 0*				
Consolidated Fund—							
Interest accrued on loans to 31st March, 1937	123,947 4 2		*126,724 8 4*				
Sundry creditors for interest unclaimed ..	1,418 1 8		*25 13 6*				
		125,365 5 10	*126,750 1 10*				
Temporary loan	..	12,000 0 0					
				Surveys and General	..	18,540 17 2	*17,101 16 10*
Interest reserve, being excess of interest charged to schemes over interest actually paid on capital liability	..	72,109 8 1	*27,281 1 8*				
Carried forward	..	14,114,983 14 11	*12,313,542 18 6*	Carried forward	..	16,077,371 14 10	*14,037,763 12 6*

TABLE No. 5—*continued.*

ELECTRIC SUPPLY ACCOUNT.—STATEMENT OF ACCOUNTS AT THE 31st MARCH, 1937—*continued.*

GENERAL BALANCE-SHEET

AT 31st MARCH, 1937, AS COMPARED WITH POSITION AT 31st MARCH, 1936—*continued.*

Liabilities.	1936–37.		1935–36.	*Assets.*	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
Brought forward	..	14,114,983 14 11	*12,313,542 18 6*	Brought forward	..	16,077,371 14 10	*14,037,763 12 6*
Sundry Creditors—				Balance in Electric Supply Account at the end of year—			
North Island scheme	85,432 1 2		*70,008 6 9*	Cash in Public Account	140,630 12 7		*39,501 13 2*
South Island scheme	15,786 14 2		*20,027 8 9*	Imprests outstanding	3,003 0 7		*3,101 17 4*
Surveys and general	13 16 2		*195 13 11*			143,633 13 2	
		101,232 11 6	*90,231 9 5*				*42,603 10 6*
Charges paid in advance—							
South Island scheme	..	1,756 0 2	*13 15 0*	Suspense Account	..	2,008 1 1	..
Depreciation Reserve—							
North Island scheme	949,888 3 11		*961,757 2 9*	Investment Account (amount invested until actually required)	..	..	*175,000 0 0*
South Island scheme	471,083 6 11		*388,546 3 4*				
		1,420,971 10 10	*1,350,303 6 1*				
Sinking Fund Reserve—							
Amount utilized for redemption of loans	313,614 7 4		*308,945 0 0*				
Available for further redemptions ..	13,429 16 1		*17,555 5 1*				
		327,044 3 5	*326,500 5 1*				
Writings-off in Suspense—							
South Island scheme	..	9 18 7	*45 1 0*				
Reserve Fund—							
South Island scheme	..	257,015 9 8	*175,809 3 3*	Sundry debtors for interest due but unpaid	..	..	1,078 15 4
Total	..	£16,223,013 9 1	*£14,256,445 18 4*	Total	..	£16,223,013 9 1	*£14,256,445 18 4*

NOTES.—(*a*) No charge for cost of exchange on interest payments made in London is included. (*b*) Owing to the interconnection of the various schemes in the North Island and the interconnection next year of the various schemes in the South Island, it has not been found practicable to show separately the accounts of these schemes as required by the State Supply of Electrical Energy Act, 1917.

H. G. PRIESTLEY, A.R.A.N.Z., Acting Chief Accountant, Public Works Department.

I hereby certify that the General Balance-sheet has been duly compared with the relative books and documents submitted for audit, and correctly states the position as disclosed thereby, subject to the departmental notes enfaced thereon and to the following comments: (1) In the case of the South Island Hydro-electric Power Supply Scheme, Lake Coleridge-Waitaki-Westland Section, the items "Plant, tools, &c.," and "Stocks of materials" are stated at the ledger figures and are not in agreement with those of the stock-sheets; (2) new agreements entered into with the Manawatu-Oroua Electric-power Board and the Wellington City Council in August and September, 1937, respectively, and operating retrospectively, have resulted in the overstatement of the asset "Sundry debtors" by £50,488 11s. 1d. and the profit for the year by £31,040 4s. 3d. in the accounts of the Mangahao-Waikaremoana Section of the North Island Hydro-electric Power Supply Scheme.—J. H. FOWLER, Controller and Auditor-General.

TABLE No. 5—*continued.*

NORTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY—*continued.*

PROFIT AND LOSS ACCOUNT

FOR YEAR ENDED 31ST MARCH, 1937, COMPARED WITH YEAR ENDED 31ST MARCH, 1936.

Gross Revenue Account.

——	1936–37.		1935–36.	——	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
To Generating-expenses, headworks, and power-house—				By Sales of energy—			
Arapuni	12,924 19 0		*10,929 5 3*	Wholesale	876,215 13 3		*785,264 5 3*
Horahora	5,799 16 4		*5,615 14 10*	Retail	1,929 12 8		*2,019 4 6*
Mangahao	13,065 13 7		*19,883 17 0*			878,145 5 11	
Waikaremoana	9,821 5 5		*9,560 19 3*				*787,283 9 9*
Standby stations	7,189 18 11		*10,272 3 9*	Rents—			
		48,801 13 3		Cottages, &c.	7,294 17 7		*6,885 13 3*
			56,262 0 1	Lines, plant, &c.	985 0 1		*667 2 7*
Transmission-lines—						8,279 17 8	
Patrol, maintenance, &c.		30,490 8 0	*32,501 19 6*				*7,552 15 10*
Substations—							
Operation and maintenance		23,869 7 0	*19,204 15 0*				
Management and general—				Miscellaneous—			
Salaries, office expenses, accident, sick, and holiday pay, testing, &c. ..		41,153 17 8	*36,099 6 11*	Tests and inspection	..	276 11 8	*360 16 7*
				Penalties	..	707 15 4	*194 0 1*
		144,315 5 11	*144,068 1 6*				
Balance to Net Revenue Account		743,094 4 8	*651,323 0 9*				
		£887,409 10 7	*£795,391 2 3*			£887,409 10 7	*£795,391 2 3*

Net Revenue Account.

——	1936–37.	1935–36.	——	1936–37.	1935–36.
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Interest for year ended 31st March, 1937	391,241 5 10	*408,050 14 2*	By Balance from Gross Revenue Account	743,094 4 8	*651,323 0 9*
Depreciation on completed works	10,463 14 7	*17,591 5 6*			
King's Wharf Station, half annual charges on capital costs thereon	38,119 11 9	*38,147 11 3*			
Cost of raising loans and expenses	59,130 0 1	..			
Balance to Profit and Loss Appropriation Account ..	244,139 12 5	*187,533 9 10*			
	£743,094 4 8	*£651,323 0 9*		£743,094 4 8	*£651,323 0 9*

TABLE No. 5—*continued.*

NORTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY—*continued.*

Profit and Loss Appropriation Account

For Year ended 31st March, 1937, compared with Year ended 31st March, 1936.

—	1936–37.	1935–36.	—	1936–37.	1935–36.
	£ s. d.	*£ s. d.*		£ s. d.	*£ s. d.*
To Balance from previous year	399,315 0 9	*586,848 10 7*	By Balance from Net Revenue Account	244,139 12 5	*187,533 9 10*
			Balance to General Balance-sheet	155,175 8 4	*399,315 0 9*
	£399,315 0 9	*£586,848 10 7*		£399,315 0 9	*£586,848 10 7*

Depreciation Reserve Account.

	£ s. d.	*£ s. d.*		£ s. d.	*£ s. d.*
To Replacements, renewals, &c.	60,802 19 1	*53,283 7 6*	By Balance at close of previous year	961,757 2 9	*959,085 16 1*
Balance to General Balance-sheet	949,888 3 11	*961,757 2 9*	Interest at 4 per cent. per annum	38,470 5 8	*38,363 8 8*
			Amount set aside as per Net Revenue Account ..	10,463 14 7	*17,591 5 6*
	£1,010,691 3 0	*£1,015,040 10 3*		£1,010,691 3 0	*£1,015,040 10 3*

Sinking Fund Account.

	£ s. d.	*£ s. d.*		£ s. d.	*£ s. d.*
To Balance	55,929 15 6	*55,929 15 6*	By Balance at close of previous year	55,929 15 6	*55,929 15 6*
	£55,929 15 6	*£55,929 15 6*		£55,929 15 6	*£55,929 15 6*

TABLE No. 5—*continued.*

NORTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY—*continued.*

BALANCE-SHEET AT 31ST MARCH, 1937.

Liabilities.	1936–37.		1935–36.	*Assets.*	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
Depreciation Reserve	..	949,888 3 11	*961,757 2 9*	Headworks, power-house, machinery, &c.—			
				Arapuni	2,402,081 7 0		*2,188,149 16 4*
				Horahora	310,719 2 10		*310,703 14 11*
				Mangahao	1,280,951 17 7		*1,273,163 14 11*
Sinking Fund—				Waikaremoana	555,197 18 6		*542,899 8 11*
Utilized for redemption of loans.. ..	..	55,929 15 6	*55,929 15 6*			4,548,950 5 11	
							4,314,916 15 1
				Auxiliary plants—			
				Diesel Station, Penrose	62,190 14 11		*61,801 16 11*
				Steam Station Grand Junction	8,991 11 6		*9,099 17 4*
				Steam Station, Huntly..	10,847 1 11		*10,847 1 11*
Sundry creditors—						82,029 8 4	
Public Works Department	22,675 5 8						*81,748 16 2*
Other Government Departments ..	1,827 7 3						
Non-departmental	60,929 8 3			Transmission-lines	..	1,588,877 17 10	*1,518,092 11 8*
		85,432 1 2	*70,008 6 9*	Substations	..	978,772 12 1	*924,081 1 1*
				Office buildings, land, railway siding, harbour facilities, &c.	..	42,347 6 1	*38,234 9 0*
Head Office Account	..	8,510,234 12 2	*8,351,576 7 9*	Temporary development, Waikaremoana ..	..	800 0 0	*39,241 9 10*
				Salaries and expenses of engineers and others on surveys and during construction	..	490,189 4 5	*479,987 19 1*
				Cost of raising loans	..	296,584 12 0	*297,753 19 11*
				Interest during construction	..	947,644 13 6	*940,943 7 4*
						8,976,196 0 2	*8,635,000 9 2*
				Plant, motor-vehicles, &c.	..	50,396 16 4	*43,325 18 11*
				Stocks	..	137,035 9 8	*144,043 16 7*
				Sundry debtors—			
				Public Works Department	2,939 14 0		
				Other Government Departments ..	8,116 13 7		
				Non-departmental	271,624 10 8		
						282,680 18 3	*217,586 7 4*
				Accumulated loss to 31st March, 1936 ..	399,315 0 9		
				Profit, 1936–37	244,139 12 5		
						155,175 8 4	*399,315 0 9*
		£9,601,484 12 9	*£9,439,271 12 9*			£9,601,484 12 9	*£9,439,271 12 9*

TABLE No. 5—*continued.*

SOUTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY.

Profit and Loss Account

For Year ended 31st March, 1937, compared with Year ended 31st March, 1936.

Gross Revenue Account.

——	1936–37.		1935–36.	——	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
To Generating-expenses, headworks, power-houses, and auxiliary plant—				By Sales of energy—			
Lake Coleridge	14,246 3 1		*10,931 13 5*	Wholesale	283,631 7 6		*241,920 12 2*
Waitaki	8,618 2 5		*8,313 8 3*	Retail	39,356 15 1		*556 10 7*
Lyttelton Diesel station	824 0 6		*874 10 0*			322,988 2 7	
Southland	4,256 18 8		..				*242,477 2 9*
		27,945 4 8		Bad debts recovered	..	112 10 2	..
			20,119 11 8	Discounts forfeited	..	22 2 6	*1 3 10*
Transmission and distribution—				Rents—			
Primary distribution	11,040 14 4		*6,244 2 10*	Land and buildings	2,460 2 9		
Secondary distribution	6,489 17 10		*2,184 14 0*	Electric lines and plant, &c. ..	480 17 8		
		17,530 12 2				2,941 0 5	*2,615 19 2*
			8,428 16 10				
				Fees for testing and repairing electrical appliances and earnings of motor-vehicles	..	1,031 17 1	*163 16 0*
Substations	..	15,667 18 7	*10,545 2 2*				
Plant, tools, testing, &c.	..	252 1 0	*496 2 5*				
Electrical testing	..	254 14 3	*88 18 1*				
Trunk telephone system	..	557 1 11	*662 1 9*				
Management and general expenses ..	..	23,439 15 3	*13,559 13 10*	Miscellaneous—			
				Commissions, sales of appliances, &c.	..	1,825 11 11	..
		85,647 7 10	*53,900 6 9*				
Balance, to Net Revenue Account ..	..	243,273 16 10	*191,357 15 0*				
		£328,921 4 8	*£245,258 1 9*			£328,921 4 8	*£245,258 1 9*

Net Revenue Account.

		£ s. d.	£ s. d.			£ s. d.	£ s. d.
To Interest for year ended 31st March, 1937	..	212,640 4 4	*177,217 9 7*	By Balance from Gross Revenue Account	..	243,273 16 10	*191,357 15 0*
Depreciation on completed works ..	..	112,274 19 5	*79,749 13 7*	Revenue from rates, &c.	..	137 10 7	..
Cost of raising loans	..	26,420 9 0	..	Balance to Profit and Loss Appropriation Account	..	108,105 15 9	*65,609 8 2*
Commission, collecting rates, &c. ..	..	181 10 5	..				
		£351,517 3 2	*£256,967 3 2*			£351,517 3 2	*£256,967 3 2*

TABLE No. 5—*continued.*

SOUTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY—*continued.*

Profit and Loss Appropriation Account.

——	1936–37.	1935–36.	——	1936–37.	1935–36.
To Balance from Net Revenue Account	£ s. d. 108,105 15 9	£ s. d. *65,609 8 2*	By Transfer from General Reserve Account	£ s. d. 108,105 15 9	£ s. d. *65,609 8 2*
	£108,105 15 9	*£65,609 8 2*		£108,105 15 9	*£65,609 8 2*

Depreciation Reserve Account.

To Amounts written off—			By Balance from previous year's statement	388,546 3 4	*323,599 14 1*
Motor-vehicles, tools, plant, &c.	45,279 12 8	*27,747 4 1*	Interest at 4 per cent. per annum	15,541 16 10	*12,943 19 9*
Balance	471,083 6 11	*388,546 3 4*	Amount set aside as per Net Revenue Account	112,274 19 5	*79,749 13 7*
	£516,362 19 7	*£416,293 7 5*		£516,362 19 7	*£416,293 7 5*

General Reserve Account.

To Transfer to Profit and Loss Appropriation Account under section 13 (2) (*b*) of the State Supply of Electrical Energy Act, 1917	108,105 15 9	*65,609 8 2*	By Balance at close of previous year	175,809 3 3	*241,418 11 5*
Balance	67,703 7 6	*175,809 3 3*			
	£175,809 3 3	*£241,418 11 5*		£175,809 3 3	*£241,418 11 5*

Sinking Fund Reserve Account.

Balance	271,114 7 11	*270,570 9 7*	By Balance at close of previous year	270,570 9 7	*270,553 19 9*
			Amount taken over from Southland Electric Power Board ..	522 4 0	..
			Interest	21 14 4	*16 9 10*
	£271,114 7 11	*£270,570 9 7*		£271,114 7 11	*£270,570 9 7*

TABLE No. 5—*continued.*

SOUTH ISLAND HYDRO-ELECTRIC-POWER SUPPLY—*continued.*

BALANCE-SHEET AT 31ST MARCH, 1937.

Liabilities.	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.
Depreciation Reserve	..	471,083 6 11	*388,546 3 4*
Reserve Fund—			
Balance at close of previous year ..	175,809 3 3		
Loss for year	108,105 15 9		
		67,703 7 6	*175,809 3 3*
Southland—Balance taken over from Southland Electric-power Board		189,312 2 2	
Sinking Fund—			
Amount utilized for redemption of loans	257,684 11 10		*253,015 4 6*
Available for further redemptions ..	13,429 16 1		*17,555 5 1*
		271,114 7 11	*270,570 9 7*
Sundry creditors—			
Public Works Department	6,953 4 6		*5,354 4 2*
Other Government Departments ..	2,966 18 7		*280 8 4*
Non-departmental	5,866 11 1		*14,392 16 3*
		15,786 14 2	*20,027 8 9*
Charges paid in advance	..	1,756 0 2	*13 15 0*
Writings-off in suspense	..	9 18 7	*45 1 0*
Head Office Account	..	5,395,580 7 6	*3,726,378 2 0*
		£6,412,346 4 11	*£4,581,390 2 11*

Assets.	1936–37.		1935–36.
	£ s. d.	£ s. d.	£ s. d.
Power stations—			
Lake Coleridge—			
Headworks	544,291 11 6		*544,281 1 8*
Buildings and machinery	248,068 7 7		*247,945 18 2*
		792,359 19 1	*792,226 19 10*
Waitaki—			
Headworks	1,123,410 13 6		*1,109,652 10 8*
Buildings and machinery	642,265 9 5		*618,427 14 11*
		1,765,676 2 11	*1,728,080 5 7*
Southland—			
Headworks	218,148 16 4		
Buildings and machinery	16,717 18 4		
		234,866 14 8	..
Auxiliary plants—			
Dobson Diesel station	34 19 8		
Lyttelton Diesel station	89,066 3 7	89,101 3 3	*89,066 3 7*
Transmission and distribution—			
Primary	1,250,403 14 8		*598,985 5 8*
Secondary	297,794 3 2		*64,462 7 10*
		1,548,197 17 10	*663,447 13 6*
Substations	..	456,701 11 1	*416,488 7 11*
Offices and stores, buildings, &c. ..	19,762 3 8		
Trunk Telephone System	36,680 9 6		*29,179 5 6*
Exploration and preliminary surveys ..	..		*26,263 6 3*
Salaries and expenses during construction	207,499 11 11		*111,910 14 5*
Interest during construction	468,053 4 1		*454,822 18 3*
Charges and expenses of raising loans ..	530,925 12 7		*148,896 13 8*
		1,262,321 1 9	*771,072 18 1*
		6,149,224 10 7	*4,460,382 8 6*
Plant, tools, &c.	..	102,519 11 2	*21,064 3 11*
Stocks of material	..	88,789 11 4	*48,697 1 2*
Sundry debtors—			
Public Works Department	3,626 5 6		*611 2 4*
Other Government Departments ..	1,553 5 6		*1,307 7 11*
Non-departmental	53,180 2 3		*31,738 17 0*
		58,359 13 3	*33,657 7 3*
Payments in advance	..	23 3 6	*33 17 0*
Sinking Fund investments	..	13,429 15 1	*17,555 5 1*
		£6,412,346 4 11	*£4,581,390 2 11*

TABLE No. 6.

IRRIGATION AND WATER-SUPPLY.

SCHEDULE OF SCHEMES COMPLETED OR UNDER CONSTRUCTION.

Scheme.	Source of Supply.	River Discharge (Minimum).	Main Canal Discharge (Maximum).		Average Rainfall from Records available.	Rainfall, 1936.	Area commanded (Gross).	Area for which Irrigation Water is available.	Works authorized.		Works completed.		Expenditure to 31st March, 1937.*	Remarks.
			As per Design.	During 1936–37.					Main Canals.	Distributaries.	Main Canals.	Distributaries.		
Canterbury—		Cusecs.	Cusecs.	Cusecs.	Inches.	Inches.	Acres.	Acres.	M. ch.	M. ch.	M. ch.	M. ch.	£	
Ashburton ..	Rangitata River ..	1,500	800	..	23·00	37·00	210,000	..	55 0	80 0	8 0	14 0	49,100	Under construction.
Levels	Opihi River ..	180	180	..	22·00	34·40	20,000	11,000	7 0	56 0	7 0	55 0	69,636	Nearing completion.
Redcliff ..	Waitaki River ..	3,000	55	55	21·00	22·00	7,000	4,603	3 69	13 76	3 69	13 76	27,551	Completed.
Otago North—														
Otekaike ..	Otekaike River ..	9	15	..	20·94 (Duntroon)	19·85	1,500	800	14 37	3 47	14 37	3 47	3,631	Completed. Used only on west side of river.
Steward Settlement	Waitaki River ..	..	110	..	20·25 (Steward Settlement)	22·12	18,000	..	14 60	50 31	14 60	50 31	12,115	Completed.
Otago Central—														
Ardgour ..	Lindis River ..	35	20	21	19·64 (Tarras)	19·93	2,000	1,364	13 0	2 40	13 0	2 40	33,700	Completed.
Arrow River ..	Arrow River ..	40	50	33	27·62 (Arrowtown and Frankton)	28·33	6,536	2,936	..	..	9 18	27 60	143,028	Completed.
Bengerburn ..	Bengerburn ..	1	4	4	..	..	1,000	144	2 6	..	2 6	..	755	Completed.
Earnscleugh (Fraser River)	Fraser River and storage dam	10	47 (all races)	57	15·53 (Earnscleugh)	18·26	2,743	2,058	11 30	17 60	11 30	17 60	57,159	Completed. Dam nearing completion.
Hawkdun (formerly Mount Ida)	Tributaries of Manuherikia River and Eweburn Reservoir	..	60	37	24·05 (Naseby and Naseby Plantation)	26·26	10,000	8,517	66 0	101 0	66 0	90 12	71,867	Completed.
Idaburn ..	Idaburn Dam ..	3	8	7	23·16 (Moa Creek, Blackstone Hill)	22·42	2,500	565	10 0	0 40	7 26	0 40	6,739	Main scheme completed.
Ida Valley and Galloway—														
Ida Valley ..	Manorburn, Poolburn, Moa Creek, and Totara Creek. (Storage Manorburn Dam)	..	110	92	16·80 (Moa Creek)	15·73	14,000	11,474	73 0	54 0	73 0	29 50	298,926	Completed. Additional storage furnished by Poolburn Dam.
Galloway ..	Manorburn Dam ..	..	30	25	14·29 (Galloway)	14·87	3,450	2,618	10 50	10 7	10 50	10 7		
Lower Manorburn Dam	Manorburn Creek	4	7	6	..	..	..	..	..	2 0	..	2 0	5,329	Dam and race-work completed. Protective works now completed.

TABLE No. 6—*continued.*

IRRIGATION AND WATER-SUPPLY—*continued.*

SCHEDULE OF SCHEMES COMPLETED OR UNDER CONSTRUCTION—*continued.*

Scheme.	Source of Supply.	River Discharge (Minimum).	Main Canal Discharge (Maximum).		Average Rainfall from Records available.	Rainfall, 1936.	Area commanded (Gross).	Area for which Irrigation Water is available.	Works authorized.		Works completed.		Expenditure to 31st March, 1937.*	Remarks.
			As per Design.	During 1936–37.					Main Canals.	Distributaries.	Main Canals.	Distributaries.		
Otago Central—ctd.		Cusecs.	Cusecs.	Cusecs.	Inches.	Inches.	Acres.	Acres.	M. ch.	M. ch.	M. ch.	M. ch.	£	
Last Chance (Fruitlands and Earnscleugh Tops)	Shingle, Coal Gorge, Butcher's Creek, and Conroy's Creek	8	20	16·5	16·69 (Earnscleugh and Roxburgh East)	19·72	4,300	2,118	22 0	5 70	20 78	5 70	64,445	Butcher's Creek Dam now completed will augment existing supply and serve an additional area.
Manuherikia–Alexandra - Clyde No. 1	Manuherikia River	77	100	88	14·99 (Alexandra, Ophir, and Clyde)	14·91	7,000	4,795	23 0	46 20	23 0	46 20	251,767	Completed. Portion of present race is being replaced by a tunnel approximately one mile in length.
Omakau ..	Manuherikia River and Storage Dam, Thompson's Creek, and Dunstan Creek	36 7	65 7	46 11	20·31 (Clyde, Ophir, and Blackstone Hill)	20·42	10,800 (irrigable)	13,400	42 0	50 0	44 10	49 36	297,553	Completed. Additional supply being obtained from Dunstan Creek, now under construction.
Tarras	Lindis River ..	35	70	33	19·64 (Tarras)	19·93	6,000	2,675	21 70	17 55	21 70	17 55	136,804	Completed.
Teviot River ..	Teviot River and Lake Onslow Dam	40	80	50	17·85 (Roxburgh East)	21·44	5,300	3,870	20 48	14 57	20 48	14 57	79,843	Completed and serving all land requiring water.
General investigations, and surveys, &c.	..	..	..	..	..	..	..	..	..	..	..	..	14,386	
Total: Schemes completed or under construction							332,129	72,937	410 50	526 23	371 22	451 21	1,624,334	

TABLE No. 6—*continued.*

IRRIGATION AND WATER-SUPPLY—*continued.*

SCHEDULE OF SCHEMES UNDER INVESTIGATION.

Scheme.	Source of Supply.	River Discharge (Minimum).	Main Canals Discharge (Maximum), as per Design.	Average Rainfall from Records available.	Rainfall, 1936.	Area commanded (Gross).	Length of Main Canal.	Length of Distributaries.	Expenditure to 31st March, 1937.*	Remarks.
Canterbury—		Cusecs.	Cusecs.	Inches.	Inches.	Acres.	Miles.	Miles.	£	
Barrhill	Rangitata River ..	800	250	..	36·74	53,000	..	..		Investigations into the feasibility of irrigation in the Canterbury Province have been in hand since January, 1934. Investigations include the following phenomena, viz.: Soil moisture, mechanical analysis of soil, depth of ground water, evaporation, rainfall, and river-flow.
Mayfield-Hinds ..	Rangitata River ..	800	450	..	36·21	113,000	..	..		
Orari	Rangitata River ..	1,500	250	..	32·23	40,000	..	..		
Rakaia	Rakaia River ..	2,000	450	..	32·68	92,000	..	..	20,724	
Valetta-Tinwald ..	Rangitata River ..	800	450	23	36·96	84,000	40	..		
Investigations of other proposed schemes	..	..	..	..	..	..	..	..		
Marlborough—										
Investigation of proposed schemes	..	..	..	..	..	..	..	..	2,906	Comprehensive investigation surveys of schemes for the Wairau Valley and parts of the Wairau Plains are in hand.
Otago Central—										
Cromwell Flat and Lowburn (Roaring Meg)	Hydro-electric development of Roaring Meg and pumping from Clutha and Kawarau Rivers	29 (Roaring Meg)	..	20·72 (Luggate)	23·87	..	..	..	3,774	Hydro-electric scheme under investigation. Power would be available for pumping irrigation supplies to 8,000 acres in Upper Clutha Valley. Portion of this area could be supplied from Hawea River power and pumping scheme.
Maniototo (Upper Taieri)	Taieri River and storage dam	25	500	16·88 (Waipiata)	17·79	100,000	60	..	16,220	Modified scheme for complete irrigation of 5,000 acres is possible without storage, or for reasonable partial irrigation of 15,000 acres. Surveys practically complete for scheme to irrigate 100,000 acres.
Scandinavian ..	Tributaries of Manuherikia River	..	20	30·66 (St. Bathan's)	31·76	..	..	..	..	For lands about St. Bathan's. To bear £15,000 towards cost of Falls dam, Upper Manuherikia scheme. Irrigable area, 3,000 acres.
Upper Clutha Valley (including Hawea Flats)	Hawea and Clutha Rivers (pumping) with power-station at outlet of Lake Hawea	580 (Hawea R.) 3,000 (Clutha R.)	..	21·97 (Hawea Flat, Luggate, and Tarras)	24·85	..	..	..	..	Investigations have been made for a hydro-electric power development at the outlet of Lake Hawea. Sufficient power would be available to pump water from the Hawea and Clutha Rivers to 13,700 acres in the Upper Clutha Valley.
Upper Manuherikia (extension of Omakau Scheme)	Manuherikia River and storage dam at Manuherikia Falls	36 (at dam-site)	..	20·31 (Clyde, Ophir, and Blackstone Hill)	20·42	16,000	58	60	6,553	Surveys and investigations have been made for the extension of the Omakau scheme (now under construction) to supply lands between Tiger Hill and Clyde. Irrigable area, 12,000 acres.
Investigation of proposed schemes	..	..	..	..	..	..	..	..	2,145	Includes the reading of river and rain gauges.
Total: Schemes under investigation		..	..	..	..	..	..	..	52,322	
Grand total ..	..	..	..	..	..	..	..	..	1,676,656	

* Includes expenditure from Public Works Fund, Consolidated Fund, Unemployment Fund; also administration and loan charges.

APPENDICES TO THE PUBLIC WORKS STATEMENT, 1937.

APPENDIX A.

AUDITED STATEMENT OF EXPENDITURE ON PUBLIC WORKS OUT OF THE PUBLIC WORKS FUND FOR THE YEAR 1936–37.

Prepared in compliance with Section 8 of the Public Works Act, 1928.

SIR,— Public Works Department, Wellington, 17th June, 1937.

In compliance with the 8th section of the Public Works Act, 1928, I enclose a statement of the expenditure during the preceding financial year on all works and services chargeable to the Public Works Fund.

I have, &c.,

R. SEMPLE,
Minister of Public Works.

The Controller and Auditor-General, Wellington.

STATEMENT OF NET EXPENDITURE ON ALL WORKS AND SERVICES CHARGEABLE TO THE PUBLIC WORKS FUND FOR THE YEAR 1936–37.

Vote No.	Summary.	Appropriation.	Gross Expenditure.	Credits in Aid.	Net Expenditure.
	General Purposes Account—	£	£ s. d.	£ s. d.	£ s. d.
35	Public Works, Departmental	170,075	346,582 9 11	208,834 2 4	137,748s 7 7
36, 37	Railways	1,241,700	1,121,143 2 6	102,049 7 8	1,019,093 14 10
38, 45	Public Buildings	1,217,700	674,519 3 10	19,609 11 11	654,909 11 11
46, 47	Lighthouses and Harbour-works ..	12.000	5,183 7 10	3,884 10 2	1,298 17 8
48	Development of Tourist Resorts ..	30,000	17,460 0 7	670 12 10	16,789 7 9
49	Roads, Bridges, and other Public Works	1,015,000	996,675 11 3	82,955 14 6	913,719 16 9
50	Telegraph Extension	360,000	379,226 11 4	146,714 2 6	232,512 8 10
51	Lands, Miscellaneous	195,000	232,071 9 11	169,398 18 7	62,672 11 4
52	Irrigation, Water-supply, and Drainage	145,000	186,716 5 8	175,654 15 8	11,061 10 0
53	Swamp Land Drainage	30,000	33,209 19 0	8,245 0 0	24,964 19 0
54	Settlement of Unemployed Workers ..	425,000	305,621 8 7	213,605 1 11	92,016 6 8
55	Native Land Settlement	124,000	521,961 4 9	409,642 10 1	112,318 14 8
56	Dairy Industry Loans	90,000	30,509 11 10	..	30,509 11 10
	Unauthorized—				
	Services not provided for.. £30 0 3				
	Less amounts recovered or transferred to votes .. 9 0 3	..	..	..	21 0 0
	Totals, General Purposes Account ..	5,055,475	4,850,880 7 0	1,541,264 8 2	3,309,636 18 10
	Electric Supply Account—				
57	Development of Water-power	819,500	789,804 18 3	26,029 15 8	763,775 2 7
	Totals, Public Works Fund ..	874,975	5,640,685 5 3	1,567,294 3 10	4,073,412 1 5

APPENDIX A—*continued.*

Vote No.	Name of Vote.	Appropriation.	Gross Expenditure.	Credits in Aid.	Net Expenditure.
	PUBLIC WORKS FUND.				
	General Purposes Account—	£	£ s. d.	£ s. d.	£ s. d.
35	Public Works, Departmental	170,075	346,582 9 11	208,834 2 4	137,748 7 7
	Railways—				
36	Railway-construction	585,000	628,628 9 4	41,646 9 10	586,981 19 6
37	Railways Improvements and Additions to Open Lines	656,700	492,514 13 2	60,402 17 10	432,111 15 4
	Public Buildings—				
38	General	106,600	59,592 0 0	1,027 2 6	58,564 17 6
39	Courthouses	32,000	9,204 17 2	6,550 0 0	2,654 17 2
40	Education Buildings	500,000	276,732 1 11	7,847 12 8	268,884 9 3
41	Prison Buildings and Works ..	8,000	4,621 3 11	..	4,621 3 11
42	Police-stations	26,500	10,599 6 7	3,450 0 0	7,149 6 7
43	Postal and Telegraph	300,000	158,096 17 9	92 1 8	158,004 16 1
44	Mental Hospital Buildings	213,000	142,464 2 2	355 2 3	142,108 19 11
45	Health and Hospital Institutions ..	31,600	13,208 14 4	287 12 10	12,921 1 6
	Lighthouses and Harbour-works—				
46	Lighthouses	7,000	630 15 8	0 16 9	629 18 11
47	Harbour-works	5,000	4,552 12 2	3,883 13 5	668 18 9
48	Development of Tourist Resorts ..	30,000	17,460 0 7	670 12 10	16,789 7 9
49	Roads, &c.	1,015,000	996,675 11 3	82,955 14 6	913,719 16 9
50	Telegraph Extension	360,000	379,226 11 4	146,714 2 6	232,512 8 10
51	Lands, Miscellaneous	195,000	232,071 9 11	169,398 18 7	62,672 11 4
52	Irrigation, Water-supply, and Drainage	145,000	186,716 5 8	175,654 15 8	11,061 10 0
53	Swamp Land Drainage	30,000	33,209 19 0	8,245 0 0	24,964 19 0
54	Settlement of Unemployed Workers ..	425,000	305,621 8 7	213,605 1 11	92,016 6 8
55	Native Land Settlement	124,000	521,961 4 9	409,642 10 1	112,318 14 8
56	Dairy Industry Loans	90,000	30,509 11 10	..	30,509 11 10
	Unauthorized—				
	Services not provided for.. £30 0 3				
	Less amounts recovered or transferred to votes .. 9 0 3	..	..	..	21 0 0
	Totals, General Purposes Account ..	5,055,475	4,850,880 7 0	1,541,264 8 2	3,309,636 18 10
	Electric Supply Account—				
57	Development of Water-power	819,500	789,804 18 3	26,029 15 8	763,775 2 7
	Totals, Public Works Fund ..	5,874,975	5,640,685 5 3	1,567,294 3 10	4,073,412 1 5

NOTE.—This statement includes only the expenditure on works, and does not include expenditure such as interest, sinking funds, and charges and expenses of loans.

H. G. PRIESTLEY, A.R.A.N.Z.
Acting Chief Accountant.

J. WOOD,
Engineer-in-Chief and Under-Secretary.

Examined and found correct, subject to the foregoing departmental note.—J. H. FOWLER, Controller and Auditor-General.

APPENDIX B.

ANNUAL REPORT ON PUBLIC WORKS BY THE ENGINEER-IN-CHIEF.

The Engineer-in-Chief to the Hon. the Minister of Public Works.

Sir,—

I have the honour to submit the following report upon the various works under my control completed and in progress throughout the Dominion during the period 1st July, 1936, to 30th June, 1937.

Table No. 3 (pages 9–11) shows the expenditure on Government Railways in New Zealand up to 31st March, 1937, and also the mileage opened for traffic.

RAILWAYS.

North Auckland Main Trunk Railway.—Okaihau Northwards.

Rangiahua Section.—Work was mostly confined to the disposal of surplus stocks, buildings, &c., which were on hand when construction was suspended in 1931. Maintenance work was confined to the repairs of fences where rain had caused formation to slip.

Dargaville Branch Railway.

Tauraroa Section.—Work was restricted to the operation of goods and passenger service with the necessary maintenance of the permanent-way. Flood damage was also repaired. The workshop was employed in running repairs as required, and the store in issuing tools and material as required. Traffic handled during the period comprised the following: Passengers, 5,913; lambs, 8,424; sleepers, 7,173; pigs, 14,077; cattle, 2,898; calves, 14,224; timber, 363,127 superficial feet; sleepers, 195; bicycles, 55; horses, 240; wool, 539 bales; fencing-posts, 325; goods, 3,858 tons.

Dargaville Section.—Information relating to the Government's intention to complete this line was received during the year, and, with a view to being ready to commence work at the appropriate time, resurveys of the completed section have been made. The Government's decision to eliminate level-crossings has made it necessary to review the question of the route of the unformed section in and adjacent to Dargaville Borough, and surveys of various alternatives are receiving attention.

Tauraroa Quarry.—This quarry was active for a total of three months, during which time the average output per month was 3,585 cubic yards. The total amount of crushed metal was 10,617¾ cubic yards, in addition to which 139 cubic yards of spalls were produced. Of the above amounts 3,392½ cubic yards were used on roads and highways metalled by the Department, 4,760 cubic yards were used by the Railway Department, 2,345 cubic yards by local bodies, and 312¾ cubic yards were sold to farmers, &c., in the adjoining district. Maintenance of the quarry plant and buildings was carried out throughout the year, and, in addition, a new crusher was installed to increase the production of fines. Alterations to accommodation to improve the standard have been in progress and will be completed during the current year.

Napier-Gisborne Railway.

Work on this railway has been vigorously prosecuted during the year, the number of men employed at the beginning of the period being 500, increasing to about 1,300 at the end of the period. In addition, considerable plant was in operation at various points on the line. The total expenditure on this railway over the period from 30th June, 1936, to 30th June, 1937, was £442,011.

Details of the work carried out on the various sections of the railway are as follows:—

Napier–Putorino Section (Length 38 m. 62 ch.).—Work on this section consisted of the restoration of the existing track, which had been badly damaged by the 1931 earthquake, and left neglected for five years. This has entailed the clearing of weeds and growth, reballasting and lifting throughout, clearing slips, restoring damage to culverts, retaining-walls, bridges, and buildings.

The existing pit at Bayview was used to obtain beach shingle for ballast, which was transported for use as far north as Kotemaori. A considerable amount of shingle was also used for formation work. The total quantity obtained from the pit was 67,250 cubic yards.

Owing to the effects of the earthquake of February, 1931, the banks were considerably out of shape, and a large amount of lifting and regrading had to be done. The whole section has now been lifted and put into good running-condition.

The earthquake of 1931 did a considerable amount of damage to the bridges and culverts on this section of the line. These have been reconstructed or repaired where necessary.

A new spillway for the flat-topped culvert at 14 m. 28·86 ch. was constructed, also a dry stone wall to retain the filling.

At 17 m. 50 ch. a reinforced-concrete retaining-wall 120 ft. long and 25 ft. high was built to replace a mass concrete wall destroyed by the earthquake. A new reinforced-concrete spillway has also been built at this point.

All other culverts and water-drives were inspected and repaired where necessary. None of the culverts in the solid ground suffered from the earthquake.

The Westshore Bridge had been repaired shortly after the earthquake, and beyond the extension of the banks no further work was necessary on this bridge.

On the Mangakopikopiko Bridge at 11 m. 60 ch. the sliding holes were lengthened and new holding-down bolts put in to replace those sheared off by the earthquake.

The Esk Bridge, which had been extensively damaged, was repaired, pier C being entirely rebuilt, using eight new 14 in. octagonal reinforced-concrete piles 22 ft long, with a heavily reinforced pier on top. The other piers were all repaired where necessary and strengthened by means of two 6 in by 3 in. channels bolted to each face. The channels were bedded in and covered with concrete. All girder-seats were relevelled and reseated, and all sliding ends reslotted and made free to move. The rails were lifted and straightened. The maximum transverse movement due to the earthquake had been 1½ in.

Waikoau Viaduct suffered very little damage in the earthquake, practically all damage being confined to the northern abutment. This has now been repaired.

Matahoura Viaduct suffered fairly severely during the earthquake, especially the portions of the structure on the northern bank. The damage was repaired shortly after the earthquake, and no further work has been found necessary.

A considerable amount of slip material had to be removed, and banks had to be built up in the Esk Valley beyond Eskdale, the total amount shifted in the twelve months being 73,220 cubic yards.

Fences had to be repaired throughout this section and new fences built up the Esk Valley on the river side, between 14 m. and 20 m. New fencing was also required round the Westshore Embankment. Fencing has been completed, except for 3 miles of repair south of Waikoau.

The telephone-line was in bad condition throughout, and has been rebuilt from Esk River north with new poles and closer spacing on a better alignment. The work was carried out by the New Zealand Railways linesmen.

Cottages at Westshore (1), Bayview (1), and Eskdale (2), have been renovated and painted, and electric light installed. One cottage was shifted from Bayview to Eskdale and re-erected.

A considerable amount of local traffic has been carried by the departmental work trains in an effort to encourage the use of the railway. A very considerable amount of stock has been transported to the saleyards and freezing-works. The number of sheep carried has exceeded 25,000. A very considerable increase in this traffic can be anticipated once the line is opened on a regular train service.

The line from Napier to No. 1 tunnel (17 m. 50 ch.) was worked from Napier by means of a works train, no accommodation having to be found for these men. A camp was established at Waipunga, and later shifted to Waikoau, to do the work north of 17 m. 50 ch. By using the railway houses at Waikoau, tents were reduced to a minimum.

An average of 120 men has been employed on this section of the railway during the last twelve months.

Putorino-Wairoa Section (Length, 33 m. 32 ch.).—The old formation has been cleared up and slips removed throughout the greater part of this section. About 50,000 cubic yards of earthwork were involved in this work.

The platelaying was completed on this section. 70 lb. rails were laid over the length from 41 m. 75 ch. to 49 m. 53 ch., including Mohaka Viaduct and Kotemaori Tunnel.

Fences had to be repaired throughout, and at present are in an uncompleted state, being about 75 per cent. complete.

The old telephone-line was repaired to establish communication between Napier and Wairoa. A party of New Zealand Railways linesmen are proceeding to relocate throughout. They have completed a length from 37 m. 35 ch. to 45 m.

A ballast-pit was established at 49 m. 20 ch., 15 ft. below formation immediately to the right of the permanent way. The material was red metal, and screening and washing was necessary to obtain a good material. Bins capable of holding 100 cubic yards were built and elevators and a large crusher established. The daily output has averaged 80 cubic yards, which is sufficient for our purpose.

Ballast has come from three main sources: (1) Shingle-pit at Bayview; (2) ballast-pit at 49 m. 20 ch.; and (3) Wairoa River.

Bayview ballast was used in first lift from Putorino to 46 m., and as second and final lifts from Putorino to 39 m. 40 ch. Over this length there was previously a considerable amount of ballast from Waikoau pit.

Mohaka ballast has been used as first lift from 46 m. to 49 m. 30 ch. and as second lift from 42 m. to 49 m. 30 ch. No third lift has yet been put on over this length.

Wairoa River ballast has been used throughout the length from Mohaka Viaduct (49 m. 45 ch.) to Te Kumi crossing (55 m. 44 ch.). First lift had been put on from this source previous to 1931. The second lift has been completed throughout this length. The third lift is in progress, and has been completed over sections 49 m. 45 ch. to 50 m. 20 ch., 53 m. 25 ch. to 55 m. 44 ch.

Formation has been practically completed for Kotemaori and Mohaka yards.

Crossings and turnouts are fabricated and in position on temporary sleepers at Kotemaori. They are 50 per cent. completed at Mohaka.

No buildings are erected at Kotemaori.

At Mohaka there have been no new buildings erected; the 20 ft. by 30 ft. goods-shed has been shifted to its new site.

Ballasting in yards has not yet been commenced.

Two platelayers' cottages have been transported from Tutira and erected on old concrete foundations at Mohaka. The two concrete-block cottages were dismantled and walls and partitions rebuilt in wood, using old floors and roofs. These cottages were completely renovated and occupied by staff.

Sites of two old concrete-block cottages were cleared and a cottage dismantled at Putorino for re-erection at Kotemaori. One completely new wooden cottage is to be built on the old foundations.

In general, drains were in a bad state, and have been almost entirely reopened. Culverts have been cleared throughout.

Kotemaori Tunnel was completely regraded and plates laid throughout. Drainage was bad, and 6 in. field tiles have been laid throughout.

Chimney Creek tunnels were trimmed throughout, and 6 in. field tiles were laid.

Mohaka Tunnel was distorted by earthquake pressure, but not sufficient to foul railway clearances, and nothing has been done. Field tiles have been laid throughout, and drainage work on north portal has yet to be done.

During the year the Mohaka Viaduct was completed. This viaduct is 908 ft. long and 312 ft. above creek-bed. By means of overhead cables 1,796 tons of steel were erected in seven months, breaking all previous New Zealand records. Foundations had been put in prior to 1931, and during the current year head and tail towers were re-erected and main cableways replaced. Steelwork was all erected and temporary works dismantled.

Sleepers and permanent way has been laid, windscreen erected and painted, and the first coat of red-lead paint is two-thirds completed. Platelayers' refuges have been put in.

Accommodation in tents for approximately sixty single and twenty married men was provided at Raupunga for workmen employed on the viaduct and in the vicinity, the balance of numbers being local residents and those housed in old standard accommodation. A cookhouse, staff bach, and recreation-hall were also provided at Raupunga.

The number of men throughout this period on the Putorino–Wairoa section has varied from 140 to 200, averaging 170 men.

It is anticipated that this length will be completed early in the New Year, and handed over to the working railways.

Wairoa–Waikokopu Section (Length, 24 m. 39 ch.).—Work on this section has been mainly confined to clearing up, reballasting and preparatory work in connection with the construction of station yards and buildings.

Kopuawhara Section (Length, 10 m. 72 ch.).—Work is in full swing practically throughout the whole length of this section, and good progress is being made.

Considerable cleaning-out of the cuttings commenced in 1930 was done, and several new cuttings were opened up. A total of 182,000 cubic yards was excavated. Almost all of this was done by co-operative contract, although the clearing of old cuttings was in general done by newly arrived men as the man-strength of the work was being built up.

Work on the Waikokopu Bluffs between 23 m. 24 ch. and 23 m. 73 ch. progressed satisfactorily, the highest section between 23 m. 32·50 ch. and 23 m. 35·25 ch. being taken down in a series of steps from elevation 181 ft. above formation-level. In this short distance the excavation entailed amounts to 23,600 cubic yards.

Substantial sea-walls were built at various places between 23 m. 36 ch. and 23 m. 73 ch., the total length amounting to 338 lineal yards, requiring 1,050 cubic yards of concrete and stone. Work is at present in progress on a section between 23 m. 73 ch. and 24 m. 3 ch. These walls are found to afford complete protection to the embankments concerned.

The cutting at 29 m. 20 ch. was worked by a Diesel shovel, motor-lorries disposing of the spoil into the adjacent filling. Very extensive slipping took place in this cutting, the present estimated total excavation required being 27,000 cubic yards as against an original figure of 19,000 cubic yards.

Tests for foundations were completed for the viaduct at 30 m. 15 ch. and bridge at 32 m. 1 ch. Site plans were prepared for bridges at 33 m. 27 ch. and 33 m. 33 ch.

Lengths of 24 ft. of 2 ft. diameter, 71 ft. of 2 ft. 6 in. diameter, 23 ft. of 3 ft. arch, and 40 ft. of 4 ft. arch culverts were constructed. Owing to the relative difficulty of access to the majority of culverts remaining to be constructed, temporary measures are being adopted until the formation is further advanced and access is thereby improved.

The 7 ft. by 5 ft. water-drives at 28 m. 69 ch. and 31 m. 6 ch. which had been under construction in 1931 were completed, lengths of 96 ft. and 325 ft. respectively being excavated and lined, and stepped outfall channels constructed.

The 9 ft. by 8 ft. 7 in. water-drive at 29 m. 22 ch. under construction in 1931 was completed by the addition of 25 lineal feet of concrete lining and the construction of a stepped outfall.

A 6 ft. by 5 ft. water-drive at 33 m. 6 ch. was partly completed during the year, a length of 125 ft. being driven and invert only set in over 112 ft.

Maintenance of the service road from the Kopuawhara River Bridge to the south end of Tikiwhata Tunnel, a distance of 9¾ m., has been carried out and the access road to the East Coast Road trimmed and metalled. Two and a half miles of the later road have been surfaced and metalled to the junction with No. 4 Road leading to the north end of the Tikiwhata Tunnel. Metal for this work has been supplied by a departmental crusher in the vicinity of 33 m.

In the tunnel at 30 m. 9·50 ch. a top heading has been driven 109 lineal feet. The length of this tunnel is 2·35 ch.

Approach cuttings are being cleared for the tunnels at 30 m. 47 ch. and 31 m. 40 ch.

At 32 m. 6 ch. the excavation of the approach cutting was completed at the southern end.

At the tunnel from 33 m. 6·90 ch. to 33 m. 12·80 ch. approach cuttings were excavated for both ends, and a bottom heading driven for a length of 5 ch.

From the south end of the Waiau–Tikiwhata Tunnel at 33 m. 36·50 ch. a bottom heading was driven a distance of 9 ch. 60 links. Towards the end of the year the enlargement to full dimensions was commenced.

At the portal of this tunnel a fitting and blacksmith's shop was constructed and plant installed to carry out necessary repair and maintenance work to construction plant.

The installation of an 800-cubic-feet compressor unit was almost completed, and the portable machine at present supplying the tunnel and workshop will be available shortly for transfer to another tunnel party.

A very considerable amount of work was carried out in connection with the provision of accommodation for workmen. This included the renovation of fifty-six old-type married quarters and ninety-five single men's quarters, as well as the construction of eighty new-type married quarters and the erection of 136 single men's tent accommodation, complete with floors, sidewalls, and chimneys. Seventy-six standard washhouses were constructed.

Cookhouses were built at Waikokopu No. 2 Camp, No. 4 Camp, and No. 5 Camp.

A new cottage for the Resident Nurse was erected at No. 3 Camp.

At each of the five camps, shower-rooms and washing-rooms were provided, and at No. 4 and No. 5 Camps drying-rooms were also provided.

The 11,000-volt power-line connected to the Wairoa Power Board's supply at Opoutama was carried through to Bartletts, and each camp was reticulated and power and light laid on to all accommodation. Suitable transformer stations were installed in each camp. At Opoutama complete metering and switching equipment was erected.

A Y.M.C.A. hall, with canteen and billiard-room, was established at No. 5 Camp (33 m.). At Waikokopu and No. 4 Camp (31 m. 25 ch.) smaller buildings, containing billiard-room, canteen, and reading-room only, were erected. The original building at No. 3 Camp (29 m. 40 ch.) was destroyed by fire in April last. A new hall, with billiard-room, canteen, reading-room, social hall, and post-office, is now practically ready for occupation.

A new stores building and carpenters' shop were erected at No. 3 Camp, and repairs and renewals effected in the case of other service buildings.

Two foot suspension bridges were erected over the Kopuawhara River to give access to work on the side of the stream opposite the service road.

The clearing of willows from the Kopuawhara River has been completed from opposite 28 m. 40 ch. to service road bridge, a distance of 1½ m.

The maximum number of men employed on this section was 470, in February, but the number at the end of the period was down to 385.

Wharerata Section (Length 9 m. 17 ch.).—At the beginning of the period one of the major problems was to erect accommodation rapidly in order to employ workmen at the desired rate. With the assistance of the Gisborne Workshop, and in spite of the difficulty of obtaining sufficient materials, good progress was made. The number of men employed was increased from seventy-two at the 1st July to 462 at the 9th October, and reached a maximum of 535 men in January, 1937. The number at the end of the period was 458.

With the exception of 45 ch. of the Coast Road to the Waiau Valley all access roads, aggregating 475 ch., have been metalled.

Culverts on the section are mostly completed, except for a number of small culverts between 19 m. and 35 m. 43 ch., which can be constructed more easily when the formation is further advanced. 314 lineal feet of concrete-pipe culvert from 1 ft. to 3 ft. in diameter have been completed during the year.

Four water-drives 6 ft. by 4 ft., aggregating 655 lineal feet, and one drive 7 ft. by 5 ft. have been excavated and lined with concrete.

Substantial progress has been made with formation work. The rugged nature of the country and difficult access precluded the employment of heavy excavating machinery to any great extent.

Two Diesel shovels have, however, been employed on cuttings in the Waikoura Valley and at 19 m. 38 ch. to 47 ch.

In the Waikoura Valley formation has been completed between 15 m. 19 ch. and the tunnel portal at 17 m. 51 ch., with the exception of cuttings at 15 m. 57 ch. and 17 m. 43 ch., and the embankment from 16 m. 6 ch. to 46 ch., which will be formed with tunnel spoil.

A short deviation of the centre-line and a stream-diversion at 17 m. 6 ch. saved the removal of large slips which occurred while construction work was suspended.

The heavy cuttings and the 100 ft. embankment in the Wharekakaho Valley are nearing completion, including the approach cutting to the south portal of the Waikoura Tunnel at 18 m. 42 ch.

From 19 m. 2 ch. to 19 m. 46 ch. formation is practically completed except for the 80 ft. embankment at 19 m. 30 ch.

From 19 m. 46 ch. to 20 m. 36 ch. occurs the heaviest earthwork on the section. The country which appeared somewhat treacherous proved better than anticipated; 38 ch. out of the 70 ch. have been completed, and a further 20 ch. are well advanced.

In the Tikiwhata Valley formation work has been confined to the approach cuttings to the tunnels, and cuttings at 35 m. 54 ch. and 65 ch.

Of the 6 m. 58 ch. of formation on this section, 3 m. 34 ch. have been completed. Earthwork completed amounts to 322,425 cubic yards, or 62 per cent. of the estimated total of 521,425 cubic yards.

The tunnelling-work is not as far advanced as was anticipated, owing to the difficulty of procuring tunnelling machinery. Nevertheless, considerable progress has been made.

The country which is to be pierced by the three larger tunnels consists of good stable sandstone, and warranted the adoption of the "American" or arched system of timbering, which has not previously been used for single-track tunnels in this country. This type of timbering enables the whole face of

the tunnel to be attacked at once, and ensures a maximum of operating-room for the workmen. To obtain the best advantage of the system, mechanical loaders or "scrapers" are necessary for loading excavated materials into trucks, but the bottom heading was adopted until suitable loaders could be secured.

In lining the larger tunnels the concrete is pumped into position behind steel form-work by means of electrically driven concrete pumps.

Waikoura Tunnel (1,555 lineal yards) North End: 264 lineal feet of bottom heading has been driven and 169 ft. of tunnel excavated to full size. Concrete lining has been completed for 117 ft., together with the tunnel portal. An 800-cubic-feet electrically driven air-compressor, 30 in. ventilating fan, aggregate bins, and concrete-mixing plant have been installed and are in operation.

Waikoura Tunnel, South End: A jigway 600 ft. long at an average slope of 28° has been constructed to serve the tunnel. A 600 cubic foot Diesel air-compressor is in course of erection. Driving will commence as soon as the approach cutting is completed.

Tunnel at 18 m. 70 ch. (101 lineal yards): The bottom and top headings have been completed and 200 ft. of tunnel lined with concrete. An additional 17 ft. has been excavated to full size ready for concreting.

Tunnel at 20 m. 10 ch. (131 lineal yards): The bottom heading has been completed through comparatively soft ground, which will require extra lining.

Coast Tunnel (1,024 lineal yards): Owing to the inaccessibility of the north face and the fact that tunnel spoil is required for the 90 ft. filling at 20 m. 27 ch., a bottom heading is being driven right through this tunnel. Lining will then be started at the south portal, enlargement spoil being trucked through the bottom heading to the filling at 20 m. 27 ch.

283 lineal feet of bottom heading has been completed from the north end and 316 ft. from the south end, making a total of 599 ft. A 600-cubic-foot Diesel-driven air-compressor has been installed for this tunnel.

Tunnels at 35 m. 58 ch., 35 m. 46 ch., and 35 m. 40 ch.: The bottom headings of these three tunnels have been completed, aggregating 956 lineal feet.

Tikiwhata Tunnel (3,267½ yards): The north portal of this tunnel is most difficult of access, and practically no working-space is available at the tunnel-level, owing to the next tunnel being only 1¾ ch. distant. A jigline 920 ft. long and with an average slope of 35° has been installed from the end of the service road to the portal for the transport of timber and machinery. Concreting-materials will be conveyed to bins by a chute erected close to the jigline.

An 800 cubic feet electrically driven air-compressor has been installed to the foot of the jigway; 15 ft. of the arch section of the tunnel has been driven and a further 30 ft. of the top heading completed.

An up-to-date machine shop has been erected at the north end of the Waikoura Tunnel to serve the whole of the section. This shop is working at high pressure.

A sawmill has been erected at Bartletts, where timber for all tunnels and other works is cut to requirements.

An 11,000-volt power-line was completed from Waikokopu to Bartletts for the purpose of driving tunnelling and other machinery. Transforming-stations have been erected at the various tunnels, and camps and workmen's accommodation, tunnels, cuttings, &c., reticulated for lighting.

In addition to accommodation for workmen, three Y.M.C.A.'s, one school, two cookhouses, and various bathhouses and drying-rooms have been erected.

Gisborne Section (Length, 14 m. 7 ch.).—With the exception of bridges and platelaying, most of the work on this section has been completed.

Formation has been completed from 0 m. to 5 m., except for light trimming and the approach bank to the Waipaoa Bridge, upon which a mechanical loader and bulldozer have been employed.

A Diesel drag-line has completed the embankment across swampy ground from 5 m. 10 ch. to 7 m.

7 m. to 14 m.: Major cuttings on this section are completed, with the exception of short lengths left for forming banks to bridge abutments.

A creek-diversion is finished at 13 m. 57 ch., and a concrete retaining-wall to protect formation from the Maractaha Stream is in course of erection.

139,663 cubic yards of earthwork have been moved, equal to 70 per cent. of the estimated total quantity.

The formation of 40 ch. of main-highway deviation to eliminate two level crossings at 8 m. 35 ch. and 8 m. 67 ch. is well advanced.

A total of 454 ch. of fencing has been erected on the railway-reserve boundaries during the period.

Bridge-work has been delayed to some extent owing to the difficulty in procuring reinforcing steel.

Bridges at 0 m. 62 ch. (three 20 ft. spans) and 2 m. 27 ch. (five 20 ft. spans) have been completed.

Concrete piles for bridges at 2 m. 55 ch. and 3 m. 4 ch. are all driven.

Waipaoa Bridge (six 30 ft. and nine 60 ft. spans): Good progress has been made on this bridge. Abutment A and pier B are completed, and all piles driven for piers C, D, E, and F, totalling sixty-two piles. An additional thirty-eight piles have been cast. The temporary staging has been erected for three-quarters of the total length. The north bank of the river at the bridge-site has been protected against erosion for a length of 10 ch., with tetrahedral concrete blocks set close together on a 6 in. crushed metal base, sloping at 18° to the horizontal. The blocks weigh 32 lb. each, and are made on a vibrating table at the rate of one per minute, 40,000 having already been placed. This method of protection is similar to that adopted on the Mississippi River, and is proving very successful.

The casting of concrete piles for the bridge at 11 m. 27 ch. has been started.

A Diesel-driven stone-crushing plant has been erected at 13 m. 66 ch.

The maximum number of men employed during the period on this section was forty-seven.

Westport–Inangahua Railway.

Cascade Section (5 m. 70 ch. to 8 m. 78 ch.; Length, 3 m. 8 ch.).—This section has been maintained during the year, and the Department took over the running of coal trains from the Westport-Cascade Co.'s mine to avoid dual running during construction operations.

Cascade–Inangahua Junction Section (8 m. 78 ch. to 22 m. 62 ch. (Westport Chainage) and 62 m. to 58 m. 30 ch. (Stillwater Chainage); Length, 18 m. 34 ch.).—This length was originally two sections, but with the resumption of activities it is now worked as one section.

The construction work was resumed on 8th July, 1936. Men were absorbed on construction work until the maximum number that could be economically employed—namely, 368—had been placed by February.

This rapid absorption of men required the provision of a large amount of workmen's accommodation.

Ten camps have been established, each with water-supply, bathhouses, and hot- and cold-water showers.

Two drying-rooms have also been established.

The construction headquarters at Tiroroa have been renovated and enlarged, and the workshop equipped with machinery suitable for the construction and maintenance operations that are necessary on works of this nature.

The Y.M.C.A. hut at Tiroroa has been renovated, and a further hut is being erected at Inangahua Junction.

The railway traverses the northern side of the Buller Gorge, and, owing to the road access being on the south side, the works are served from this road by five suspension bridges, which have been repaired, and in addition six boat ferries have been installed.

Four cableways were also installed to transport material and heavy plant across the river to the construction works.

Concurrent with this preparatory work the completion of the remaining earthwork has been carried out, and is in hand along the whole length, with the exception of 4 m. near the Inangahua Junction end.

This work consisted of trimming formation, clearing second growth, completing cuttings and banks, the construction of several concrete-lined water-drives, and the removal of slips over a section of 14 m.

The major operations in progress are as follows:—

Cascade Bridge: Five 80 ft. steel-girder spans and one 40 ft. steel span. The foundations of the piers were constructed prior to the suspension of the work five years ago, and the steel girders were fabricated. The piers and abutments have now been completed, and the erection of the steel spans is in hand.

Tunnel at 13 m. 41 ch. to 13 m. 54 ch. (12½ ch. long): The bottom heading of this tunnel is completed, except for 2½ ch., and work is now in progress.

Tunnel at 13 m. 26 ch. to 13 m. 28·3 ch.: This short tunnel will be put in hand on completion of the adjacent longer tunnel.

Buller River Bridge (60 m. 16 ch. to 60 m. 27 ch.): This bridge consists of six 100 ft. steel-plate girder spans, one 30 ft. steel-plate girder span, and one 45 ft. steel-plate girder span with concrete abutments and supported on seven concrete piers founded on cylinder foundations. The preparatory work has been completed, including the erection of a cableway, and the sinking of the first set of cylinders is proceeding.

Inangahua River Bridge (57 m. 17 ch. to 57 m. 26 ch.): This bridge is a combined road and railway bridge consisting of nine 60 ft. steel-girder spans supported on concrete piers founded on cylinder foundations. The piers are arranged to accommodate the railway and roadway side by side, and the piers and roadway superstructure were completed in 1936. The girders for the railway portion are now being manufactured, and the long railway embankment approach is now nearing completion.

Eight bridges still require constructing on this railway, and four reinforced-concrete designs have been prepared to date. Preparations are now completed to enable a start to be made with the construction of the first of these bridges at Redmond's Creek at 11 m. 41 ch.

The following major plant items are in operation on this railway:—

Two Diesel excavators, seven concrete-mixers, four petrol locomotives, two cableways, and two crushing and screening plants.

South Island Main Trunk Railway: North End.

Clarence Section (56 m. to 76 m.; length, 20 m.).—Formation had been largely completed over the whole of this section, but the track was heavily overgrown with lupins and other weeds, and cuttings had become filled with sand.

As soon as work was authorized a start was made to clear the section, and rails were uncovered, burnt sleepers replaced, culverts cleared, and washouts repaired. Temporary bridges were reconditioned to carry rolling-stock, ballast-pits were reopened, service-lines laid, and repairs carried out to existing ballast. Trimming had been completed to 71 m., and the first lift ballasting was completed to 69 m. 55 ch., the second to 67 m., and the third to 64 m. 10 ch.

The famous Blue Slip at 61 m., which is a moving hillside of pug over half a mile long, and 10 ch. to 30 ch. wide, has always been considered to be rather a problem, but the excavation here is proceeding steadily, and, although it is anticipated that between one-quarter and a half-million cubic yards will require removal before the slip is stabilized, there appears to be every prospect that the measures now being taken will be successful.

Woodside Creek Bridge (56 m. 50 ch.).—A start has been made with the erection of the permanent bridge at this creek. This bridge consists of six 25 ft. plate-girder spans on concrete-pile piers and abutments. The girders are at present in use on the temporary bridge and ten pier piles have been cast.

Waima Creek Bridge (59 m. 27 ch.).—This bridge will consist of four 25 ft. plate-girder spans on concrete-pile piers and abutments. Fifteen piles have been cast and the main girders are also is use at present on the temporary bridge.

A considerable amount of marram-grass planting has been carried out during the season in order to reinforce previous planting, and also to replace portions that had been damaged in the heavy gales of the last few years.

Additional accommodation for sixty-five single and thirteen married men has been provided, a recreation hall erected at the Blue Slip, office, store, workshop, and two staff cottages at the Shades, while all accommodation has been generally brought up to the standard required by the workers' agreement.

Kaikoura Section (76 m. 6 ch. to 103 m. 48 ch. ; length, 27 m. 43 ch.).—Marram-grass planting has been carried out extensively between 77 m. and 82 m. in order to stabilize the numerous sand-drifts.

Formation is in hand up to 91 m. 36 ch., and work is proceeding vigorously both by hand and machine over what is the roughest and most difficult portion of this section. 3 m. 77 ch. of formation have been completed since the work has been restarted.

Owing to the comparatively narrow shelf along the coastal cliffs over a large portion of this section it has been necessary to deviate the main highway very considerably in order to accommodate both road and rail with the minimum of sea-walling.

In spite of this general rearrangement there will still be a fair amount of protective work to carry out in order to protect either the road or the railway from the encroachment of the sea. 66½ chains of deviation have been completed, and 3 m. 5 ch. are in hand. Eight hundred lineal feet of culverts 36 in. and under have been completed, a 6 ft. flat-top culvert has been constructed at 77 m. 21 ch. and 90 m. 63 ch., one 10 ft. at 78 m. 68 ch., and one 4 ft. 6 in. × 3 ft. 6 in. at 85 m.

A contract has been let for the substructure of the Clarence River Bridge at 76 m. 40 ch. ; this bridge will consist of twelve 120 steel truss-deck spans and two 30 ft. end spans carried on concrete-cylinder piers and pile abutments.

Temporary trestling has been erected across the river. Piers B, D, E, G, and M have been excavated as far as possible in timber to remove the boulders, and the cavities have been back-filled with shingle and sand to water-level to provide easy sinking for the cylinders.

Form-work has been assembled for pier B, and the reinforcement has been fabricated, but no concreting had been completed at the end of the period.

The starting of tunnel-work has been somewhat delayed on account of the large amount of plant and machinery required, and which had to be obtained from overseas ; however, the majority of this is now installed and a start has been made on the tunnels as under :—

No. 1—Okiwi Bay at 82 m. 42 ch. : The top bench is being excavated.
No. 2—Ohau at 84 m. 40 ch. : The north portal and 6 ft. of lining have been completed, and driving for the next length has been commenced.
No. 3—Half-moon Bay at 85 m. 72 ch. : The south portal and 33 ft. of lining have been completed in the open, and driving of the first length underground has been commenced.

The main camp has been established at Aniseed, and to date 142 married men's quarters and twenty four-roomed cottages have been erected. The camp has been roaded and an electric-light generating-plant has been established and a water-supply provided, and a sanitary service established.

Small camps have also been established along the route as required for construction purposes, and accommodation has been provided on this section for approximately 400 single and married men, including staff officers.

An up-to-date recreation hall has been built at Aniseed Camp, and is controlled by the Y.M.C.A. This building, which has a total floor space of 4,000 ft., contains picture and social hall, reading, billiard, supper, and committee rooms, as well as canteen, stage, and offices for the staff.

Two schools, one with two large class-rooms and one with a single room only, have been erected at Aniseed, and the necessary workshops, stores, &c., for the repair and housing of stores have been provided.

In addition to motor-trucks and workshop machines, the following plant is in operation on the section :—

Two air-locks with hoist and generator sets.
Nine air-compressors.
Three Diesel excavators.
Two Diesel locomotives.
Three ventilating-fans and engines.
Five concrete-mixers.
Eight pumps.

A total of 462 men have been employed on the whole of the northern end of this railway, and up-to-date plant is being brought into use wherever possible in accordance with the Government's policy of speeding-up the work.

The survey from Kahautara River northwards to 98 m. is in hand, as well as the alterations necessary to bring the Kaikoura Station closer to the heart of the town.

SOUTH ISLAND MAIN TRUNK RAILWAY: SOUTH END.

(44 m.–57 m. 40 ch.; length, 29 m. 30 ch.)

When work was first recommenced and after the general clearing-up of the old formation had been completed, excavation was begun on the old Conway Section, and cuttings between 54 m. and 62 m. were put in hand and are now about 50 per cent. completed.

Road access has been opened from Oaro at 67 m. 30 ch. to the north end of the Amuri Bluff Tunnel at 62 m. 68 ch. by means of a track along the sea coast.

The most spectacular work on this section has been the excavation of the Hawkswood Cutting at 48 m. 30 ch. A start was made dismantling and re-erecting the 1½ cubic yards Ruston steam drag-line, which was put into operation digging a gullet 30 ft. deep and about 60 ft. to 70 ft. wide at the top in October, and an 8 cubic yard carry-all and Caterpillar tractor was provided to rehandle and spread the material clear of the final batter lines. Two ¾ cubic yards Diesel shovels were started at the south end on successive levels below the stream drag-line excavation from the south end, and a second steam drag-line was put into operation in February. The first steam drag-line had by this time excavated a gullet as mentioned, the whole length of the cutting, and both machines were then started widening the upper level. A third ¾ cubic yard Diesel shovel was then started at the north end of the cutting, working south. Later the south end second lift-shovel was converted to work as a drag-line, and, after digging a bench for the steam drag-line on the right batter to work from, was moved to pull the batters down for the north-end shovel to load to the trucks. All machines were working three shifts, material being led to bank by trucks and steam locos, and the rehandling of spoil from the steam drag-lines being taken care of by the 8 yard carry-all and tractor and angledozer and tractor. The best four-weekly output for all machines was 43,780 cubic yards. Of the 291,439 cubic yards left in the cuttings when the works closed in 1931, approximately 248,000 cubic yards had been excavated by the end of June, 1937.

At the same time as earthwork was proceeding and the formation work was advancing from Parnassus, the building of bridges to cross the gaps in this formation was also in hand. The two chief bridges in the first ten miles at Leader River (44 m. 65 ch.) and Conway River (50 m. 50 ch.) are of the same length, 724 ft., and have each sixteen spans of 45 ft. with plate girders on concrete piers founded on piles in the case of the Leader Bridge, and on solid papa in the case of the Conway. At the Leader River the piers have been completed, and a start has been made placing the girders. At the Conway River there are three piers yet to complete.

Construction of culverts and water-drives was well advanced in 1931, but the work has been continued and the back of the work has been broken in this branch of our activities. Three water-drives aggregating 300 ft. in length, six pipe culverts of a total length of 240 ft., and a 4 ft. arch culvert 72 ft. long make up the completed work.

Tunnelling is the controlling feature on the south end as there are 2¼ miles to pierce in fifteen tunnels. A certain amount of plant is on the job for the purpose, and a start has been made with the first tunnel at 61 m. 26 ch., where 100 ft. of bottom heading has been driven, while at the Amuri Bluff Tunnel (62 m. 27 ch. to 62 m. 66 ch.), which is the longest tunnel on the length, everything is in readiness for a start from the northern end. The driving of this tunnel controls the time for completion of this end of the railway, and everything has been done to expedite its commencement. Unfortunately, unlike all other tunnels on this section, it is a long way from a formed road, and before anything could be done access roads had to be formed to both ends. At the northern end this amounted to 2½ miles and at the southern end 1½ miles. While the Amuri Bluff Tunnel is being driven it is expected that all the other tunnels, together with bridge and culvert work on the whole length, can be completed.

Sea-protection forms quite a large part of the work along the coast from Oaro, 65 m. north, to the Kahautara River, 73 m. 30 ch. There are numerous road deviations necessitated by the location of the railway, and in many of these places banks encroach on the sea a considerable distance. It is estimated that nearly 100,000 cubic yards of heavy stone up to about six tons and more in weight will be required for building the outside of or facing filling. A start has been made quarrying stone at 67 m. 70 ch., and a steam-crane with two heavy-duty lorries is engaged getting out stone. At a later date, when the line is laid, it may be necessary to provide larger stone than five tons to six tons to protect the toes of the fillings in the more exposed positions, but in the meantime the stone now being quarried enables the banks to be pushed out with little chance of serious damage.

North of the Oaro work has been concentrated on opening up approach cuttings to tunnel portals, and six of these are in hand at present.

The provision of accommodation for the workmen employed on the work presented rather a problem on account of the shortage of building materials, but advantage was taken of the hutments and buildings which were available from the completed Waitaki works, and these were transferred and filled a gap while other supplies were being assembled.

Accommodation has now been provided for 212 married men, and the balance of 346 have been provided with single huts or tents. These men are distributed in sixteen camps, and at the main centres facilities for recreation have been provided in the shape of three large halls which are under the jurisdiction of the Y.M.C.A., and contain billiard-room, picture and social hall, canteen, staff quarters, &c. Two smaller halls are also in course of construction.

The old workshop at Parnassus has been re-equipped with machine tools for the maintenance and repair of all plant on the works, and a subsidiary shop, stores, &c., have also been provided at Oaro, which is now the main camp.

Some of the principal items of machinery at this end of the work are: One air-lock; one 800 ft., one 600 ft., five 200 ft., and three 85 ft. air-compressors; three ventilating-fans; six Crawler type Diesel-engined excavators; two steam drag-lines on crawler tracks; five Diesel electric-generating

sets; one Diesel locomotive; nine steam-locomotives; ten concrete-mixers; twelve sets of steel profiling for tunnel-lining; fifteen pumping-plants; two Diesel Crawler tractors and carry-alls; three oil-winches; two scraper-winches, slides, and hoes. Workshop equipment, lathes, drilling-machine, shaping and grinding machines, tool-sharpeners, oil furnaces, welding-plant, and large numbers of trucks of all description, rails, sleepers, &c., have also been provided.

Turakina–Okoia Railway Deviation.

This deviation, 10 m. 20 ch. in length, is designed to eliminate the heavy grades on the existing line between Turakina and Fordell, and to shorten the distance by approximately 3½ miles.

A start was first made with the actual construction of this deviation in October, 1936, but owing to a last-minute alteration in the finally adopted route there was still a considerable amount of survey work to be carried out before the complete section could be manned.

The first work was the establishment of camps for the construction forces, the provision of the necessary workshops and plant depots, as well as store buildings, offices, &c. This work involved the employment of some fifty artisans and skilled labourers and the purchase of large quantities of timber and building materials generally.

While this work was being carried out the necessary plant for the economical and expeditious prosecution of the formation work proper was ordered from overseas for urgent delivery.

The most important work on this deviation is the construction of two tunnels, 61½ ch. and 103½ ch. in length respectively, so that the adoption of suitable machinery for piercing these tunnels quickly and economically was of paramount importance.

It was decided to use the Canadian method of timbering with the latest type of scraper mucking, steel profiling for the concrete lining, and electrical operation of scraper-winches and air-compressors for drilling, while the transport of material is done by electric-battery locomotives. Concrete for the internal lining of the tunnel will be mixed by electrically-driven concrete-mixers and conveyed and deposited by the latest type of pneumatically operated "concrete guns."

The rest of the formation work consisting of cut and fill generally is being carried out by a combination of machine and hand labour.

The labour used on the work, as far as possible, is recruited from registered unemployed in Wanganui, consequently the accommodation provided has been limited, as it was considered preferable that the men should continue to live with their wives and families in Wanganui and travel out to their work daily, or else live in camp during the week and go home for the week-end.

The position to-day is that less than nine months after the route was finally decided on the following work has been completed:—

Accommodation.—The main camp at Fordell consisting of forty-four married men's camps, fourteen staff cottages, office, store, plant-repair depot, carpenter's shop, plumber's shop, blacksmith's shop, &c., has been built and occupied.

Two tunnel camps at Fordell, and one at Turakina containing accommodation for 130 men, together with completely equipped cookhouses and bathhouses, &c., are finished and in use.

Two large size Y.M.C.A. huts with reading-room, social hall, billiard-room, and picture equipment have been provided at Fordell and Turakina respectively.

Earthwork.—Service roads to both portals of the Turakina and Fordell tunnels have been formed and metalled, and the first three miles of the open formation have been practically completed. Five miles of permanent fencing has been erected, and over 400 ft. of culverting built.

The earthwork generally has been considerably hampered by the very wet winter experienced, especially since the service roads were quite new and in the early stages unmetalled, and the first three miles of railway formation follow the bed of the Okoia Valley, which was very soft under winter conditions. Still in spite of these difficulties good progress was been made.

Tunnels.—The approaches to the Fordell Tunnel, the short tunnel at 5 m., and the southern end of the Turakina Tunnel are well in hand.

The bins for the concrete aggregate and the mixing-plant generally have been erected at Fordell, the tunnel machinery is being assembled, and a start has been made with the underground work.

Plant.—All construction plant is either on the ground or is due to arrive very shortly. Among the principal items are: One oil-shovel and drag-line; one Crawler-type Diesel shovel and drag-line; one Diesel Crawler tractor and carry-all; four air-operated scraper-winches with hoes and slides; six 200 ft. portable compressors; one 800 ft. compressor; five ventilating-fans; four pumping-plants; four concrete-guns; one tractor-winch; five concrete-mixers; eleven sets of steel profiling for tunnel-lining; eight electric-battery locomotives; two Diesel-engined locomotives; a large supply of earth-wagons, rails, air-drills, and the necessary machine equipment for a modern plant-repair depot, including lathe, drills, shaper, planer, band and circular saws, metal bending and rolling equipment, &c.

Number of Men employed.—The average number of men employed since the commencement of the work, including all grades, has been 219, and the number at present engaged is 300.

IRRIGATION.

CENTRAL OTAGO.

Operation and Maintenance of Irrigation Schemes.

No new irrigation schemes were brought into operation during the past year, and the number of schemes operating on a trading basis stands at thirteen. Excluding the Omakau scheme, where no irrigation agreements are in force, and water is purchased as it is required, the area irrigated during

the past year was 39,329 acres. This shows an increase of 482 acres since the 1935–36 season for the twelve schemes concerned.

On these schemes the area which should have been irrigated was 43,135 acres, the difference representing the area to which water was refused on account of the non-payment of rates.

The past summer and autumn was a very wet one—in fact, the wettest experienced by old settlers—and the reduced demand for irrigation water was reflected in sales to settlers on the Omakau scheme. There, although the number of irrigators had increased from thirty-three to forty-one, and the area irrigated showed an increase of 300 acres, the sales of water were only 87 per cent. of those of the previous year.

The total irrigable area commanded by all schemes is in excess of 60,000 acres, and the number of irrigators supplied was 465, as against 459 for the 1935–36 season. The total area irrigated on all schemes shows an increase of 782 acres.

The completed schemes in operation are shown in the following table, the second column showing the area that should have been irrigated had all arrears of rates been paid :—

Scheme.	Area actually irrigated.	Area that should have been irrigated.	Number of Irrigators.
	Acres.	Acres.	
Arrow River	2,200	2,936	45
Ardgour	1,364	1,364	13
Bengerburn	114	144	13
Earnscleugh	1,863	2,058	47
Galloway	2,589	2,618	21
Hawkdun	7,244	8,517	57
Idaburn	565	565	8
Ida Valley	11,102	11,474	54
Last Chance	1,931	2,118	31
Manuherikia	4,389	4,795	72
Tarras	2,574	2,675	17
Teviot River	3,394	3,870	46
	39,329	43,135	424
Omakau	5,300	..	41
Totals	44,629	..	465

The second column shows a reduction from the previous year's figures. This has been due to the cessation of irrigation on certain areas of the Hawkdun and Manuherikia schemes, which had proved unsuitable for further development.

The financial results of the year's operations are as follows : Revenue, £23,963 ; working-expenses, £27,234 ; loss on working, £3,271.

Included in working-expenses is the sum of £6,390 expended on the renewal of the Teviot pipe-lines. Another factor contributing to the increase in working-expenses was the higher wages paid to racemen, this not being offset by any increase in revenue.

Where irrigators have been in arrears with their payments, current water-rates, as far as possible, have been collected in advance. The total amount collected for the year under review was £19,682, an increase over the preceding year of £2,659.

The cases of irrigators who have arrears of rates are being dealt with either by the Departmental Committee, consisting of representatives of the Public Works, Lands, and Agriculture Departments, or by the Mortgage Adjustment Commission. Settlements made in these cases, coupled with the fact that irrigation-rates are now a first charge on the produce of the land, will ensure less difficulty as regards collection of rates in the future.

Schemes under Construction.

Omakau Scheme.—The main works on this scheme were completed during the previous year, but a considerable amount of detail work remained to be done. A further 11 m. of distributary races were excavated, and numerous stock-bridges, gauge-boxes, race-drops, and other structures installed.

This scheme has been in satisfactory operation, and an irrigable area of 13,400 acres is commanded. This area will shortly be increased through the installation of a pumping plant to supply higher levels.

Teviot Scheme.—Seven of the old 36 in. diameter riveted steel pipe-lines in Ewing's race were replaced with 22 in. diameter concrete-lined steel pipes, the total length renewed being 4,660 ft. A considerable amount of labour was involved in the cartage of pipes to the site.

Portion of the main pipe-line from the power-house to the Roxburgh East side, which consisted of riveted pipes of various diameters, was in a bad state of repair, and was renewed in reinforced-concrete pipe of 24 in. diameter, the total length replaced being 5,000 ft.

Butcher's Dam.—This structure, a concrete arch of 105 ft. radius and 82 ft. in height, was completed early in the year, the total yardage of concrete being 2,056 cubic yards. A considerable amount of foundation grouting-work was carried out. Since the beginning of January water was supplied to Alexandra Borough, and to irrigators under the Last Chance extension scheme.

Earnscleugh Scheme : Fraser River Dam.—This dam, which is nearing completion, is a concrete arched structure of 175 ft. radius and 102 ft. in height. Very satisfactory progress has been made,

and to date 11,847 cubic yards of concrete have been placed, all but 1,079 cubic yards of this being placed during the year.

The total quantity of excavation to date is 8,800 cubic yards.

Extensive deep drilling and grouting of foundations has been carried out.

This dam will augment supplies to the Earnscleugh scheme.

Manuherikia Scheme: Manuherikia Tunnel.—This tunnel, which will eliminate a troublesome section of race in the Manuherikia Gorge, is 78 chains long. To date, the length driven is 3,714 ft., the balance to complete being 1,467 ft.

Dunstan Creek Scheme.—This scheme, which is an extension of the Omakau irrigation scheme, was commenced late in the year. To date, the length of main race excavated is 3 m., and work is proceeding on the intake in Dunstan Creek and other structures incidental to the scheme.

Surveys.

Maniototo Scheme.—The permanent pegging of the main race on the west side for an initial development of 30,000 acres was commenced, a length of 14 m. being completed and plans prepared. Other surveys and investigations were also carried out.

Hope's Creek Dam.—A survey of this dam-site and main race was completed during the year. This scheme would provide additional supplies for the Ida Valley area, and would permit of the irrigation of an additional 3,500 acres on the west side of the Valley.

General.

The usual work in connection with stream-gaugings, recordings of lake-levels, and meteorological records was carried out.

CANTERBURY.

Schemes under Construction.

Redcliff Irrigation Scheme.—This scheme was completed in the winter of 1936.

The total length of main race, laterals, and distributaries is 17 m. 44 ch., involving 63,000 cubic yards of race excavation.

Twelve properties are served by the scheme, and forty concrete turnouts were provided. The total area that can be irrigated is 4,603 acres.

The first sale of water was made in October, 1936, and 24 in. of water was applied to an area approximately 400 acres, or 9 per cent., of the irrigable area during the first year of operation. This result compares more than favourably with figures available from similar schemes in United States of America.

From a farming viewpoint the results from the practice of irrigation greatly exceeded anticipations, and to those farmers not cognizant with the potentialities of irrigation in Canterbury the results were astounding.

Fifty per cent. of the farmers bought water during the first season, and are preparing land for watering larger areas next season. The results already obtained have demonstrated that the application of water can increase the productivity fivefold in some cases, and in all cases is sufficient to reward handsomely those farmers practising irrigation.

Ashburton-Lyndhurst Irrigation Scheme.—The net area of the scheme when completed will be 25,500 acres, comprising eight soil types ranging from stony silt loam to heavy clay loam.

The total length of completed race-formation is 25 m., comprising 104,000 cubic yards of earthwork.

The bulk of this excavation was done by contract labour, but machinery is now being introduced, and 5,000 cubic yards were moved by this means.

The following structures have been completed: Seven concrete syphons, sixty-three concrete drops, fifteen concrete bridges, seventeen concrete bridges and drops combined, and four special structures.

The following workmen's accommodation was erected during the year: Thirty-one married men's units, thirteen single men's units, and two recreation-halls. This accommodation is in two camps where filtered-water supplies and bathhouses were also provided.

The usual constructional buildings were also provided.

An area of 36 acres has been levelled, border-dyked, and sown in readiness to demonstrate the possibilities of irrigation; 14½ chains of fencing have also been erected.

The amount of work already completed represents approximately one-third of the total amount involved, and to expedite this the following plant items have been delivered: Six concrete-mixers, one Barber Green elevator, one gravel crushing and screening plant, one large tractor with associated scraper, rooter, road-builder, and tamper attachments, and one large power grader.

It is expected to have this scheme ready for operation by the spring of 1938, and to enable this to be done the Rangitata diversion race, which is designed to provide water for several schemes, is being actively carried out.

Rangitata Diversion Race.—Last December work was authorized for the construction of the Rangitata River diversion race with the object of providing a plentiful and reliable water-supply for irrigation and stock purposes over an area of 210,000 acres in the Ashburton County. This area comprises that of the Ashburton-Lyndhurst irrigation scheme, and four more large projected schemes which are expected to be undertaken at an early date.

The scheme calls for the construction of a large intake structure in the Rangitata River Gorge, and 35 m. of main race traversing approximately the 1,000 ft. contour between Montalto and Barrhill.

This race will have a capacity of 900 cusecs at the intake, and gradually diminish in capacity as the various requirements are satisfied, but will still have a capacity of 450 cusecs at the South Ashburton River crossing. The first demand on this race will be 350 cusecs for the Ashburton-Lyndhurst scheme now under construction.

The outstanding features of the work are the large amount of earthwork—namely, 1,750,000 cubic yards—and the large reinforced-concrete structures which will be required to carry the water over six rivers along the route.

PROGRESS.

Work commenced on 8th December and an up-to-date self-contained camp has been established to accommodate fifty-five workmen and staff and provide workshop facilities for the maintenance of plant. The camp is provided with a water-supply, electric light, and a recreation-hall.

Suitable plant is now on order to cope with the large volume of earthwork mechanically, and the plant already in use consists of one large elevating-grader operated by a 100 h.p. Diesel tractor.

Under favourable conditions this latter plant item has delivered an output of 250 cubic yards per hour.

When all the machinery arrives it is anticipated that an output of earthwork approximating 65,000 cubic yards per month will be maintained.

The amount of race-excavation already completed is 37,000 cubic yards in two months' working.

The permanent survey of this race has been completed for 10 m.

Levels Plain Irrigation Scheme.—This scheme is now almost completed and is ready for operation during the coming season.

The total work completed is as follows: Race-formation, 49 m. 35 ch. comprising—Diversion race, 1 m. 22 ch.; main race, 5 m. 44 ch.; and laterals and distributaries 42 m. 52 ch.

The work remaining to be done is the construction of No. 7 lateral.

The scheme will command an irrigable area of 12,800 acres, and in addition to the 149,000 cubic yards of earthwork involved will contain 612 concrete structures which are completed and forty-eight additional structures on the No. 7 lateral at present under construction.

The scheme was officially opened on 16th December last, but as the season had so far advanced no water was used for the past season, which was a favourable one for natural moisture.

Downs Water-supply Scheme.—Considerable investigation work has been carried out with regard to a proposal to supply domestic and stock water to a large undulating area of rich land in the vicinity of Timaru.

The area covered by the proposal is approximately 153,000 acres situated in the Levels County and portions of the Mackenzie, Geraldine, and Waimate Counties.

Negotiations are now in progress to set up a water-supply area, so that the financial arrangements, maintenance, and operation can be finalized before the work proceeds.

CANTERBURY IRRIGATION INVESTIGATIONS.

Topographical Survey.—Owing to the shortage of staff it was not possible to extend the topographical survey of North Canterbury this year.

Stream-gauging.—Continuous records were obtained from all installed stations during the year.

A gauge-house was erected at Lake Heron, and the gauge is being installed.

A gauging weir and instrument house is under construction in the North Ashburton Gorge, and will shortly be completed and the gauge installed.

Sites for water-level recorders have been fixed on the Ashley, Hurunui, and Waiau Rivers, and instruments will be installed during the coming summer.

Observations of the depth of ground-water were recorded weekly at all the installed stations, and observations continued in regard to rainfall penetration.

Soil Moisture and Rainfall.—Observations of soil moisture and rainfall have been continued as follows: Ashburton County, at fifteen stations; Levels County, at four stations; Redcliffe Irrigation Scheme, at eight stations.

Evaporation.—Records of evaporation, wind, humidity, and temperature were continued at the following stations with the following results:—

Station.	Evaporation to 30th June.	Wind Mileage.	Period.
	Inches.		
Temuka	29·26	7,800	1 year.
Blenheim	42·49	16,890	1 year.
			From—
Ealing	33·50	6,583	25/8/36.
Methven	40·00	26,167	8/9/36.
Pendarves	30·60	14,115	6/10/36.
Kirwee	13·52	11,620	2/2/37.

The last four stations were in operation from the dates shown.

Soil Surveys.—Studies of field capacity and wilt point have been continued.

Rainfall Run-off.—Six long-period automatic rainfall-recorders were installed in the high country of the North Ashburton River drainage area at elevations ranging from 2,000 ft. to 6,000 ft., and satisfactory records are being obtained.

Sugar-beet Trials.—Tests are being made in collaboration with the officers of the Department of Agriculture to determine the sugar content of various strains of sugar-beet grown in the surrounding district, and these tests are to be continued for another year.

Marlborough Irrigation Investigations.

Topographical surveys have been completed for 35,000 acres in the Wairau and Waihopai Valleys.

A stream gauging station is being established on the Wairau River at Ferry Bridge to enable the river-flow to be studied.

Observations have been continued at the thirteen soil-moisture and rainfall stations already established last year, and evaporation and wind observations were continued at Blenheim.

A systematic soil survey of the Wairau and Waihopai Valleys was put in hand towards the end of the year.

HYDRO-ELECTRIC DEVELOPMENT.

Arapuni Scheme.

Work on the extension of the Arapuni Power-house to provide for the installation of further generating-units was continued, and during the year excavation was completed for the power-house site and foundations, together with most of the tail-race, 6,154 cubic yards being removed in the first few months of the year. The cable-way handled 3,830 cubic yards of excavation from the power-house site to the tip.

To date a total of 57,854 cubic yards of rock has been excavated from the power-house site, and the cable-way has handled 50,990 cubic yards of this from the power-house site to the tip. A steel-sheet piling cut-off wall was placed across the tail-race, a total length of 3,053 ft. of steel-sheet piles being driven to a maximum of 40 ft. depth below tail-race level.

Concreting work for the power-house foundations and tail-race was completed, and the power-house extension building with the machine foundations is well on towards completion. For the year, 9,405 cubic yards of concrete were placed, making the total to date 17,479 cubic yards. A total of 179,720 square feet of formwork has been built, 122,320 square feet of which was placed during the year. For the power-house and outdoor-station extensions, a total of 317·6 tons of steel reinforcement has been used to date, 126·8 tons of which were placed during the year. Painting and cement-washing of the finished portions of the power-house and outdoor-station extension concrete structures was commenced during the year, 2,262 square yards of cement-washing and 1,294 square yards of painting being completed. For drainage, sewage, water-supply, &c., at the power-house extensions, a total of 2,006 ft. of drain was laid during the year, 3,178 ft. being completed to date; 121 ft. of 7 ft. by 4 ft. tunnel was excavated in the hill at the rear of the power-house for the pitometer gallery, bringing the total completed to 196 ft. Pumping was carried out continuously throughout the year to keep the tail-race and power-house foundations and building dewatered during construction.

Work at the outdoor-station and repair-room extensions was carried on, the outdoor-station site excavation being completed, together with all foundation work. A total of 6,828 cubic yards has been excavated, 3,378 cubic yards of which were excavated during the year, representing the foundation work below formation level. 919 cubic yards of concrete were placed in tower foundations, switch frames, oil circuit breaker pads, cable trenches, and repair-room extensions. 20,250 square feet of concrete formwork was built during the year, and 75 ft. of drains for oil piping system and drainage were laid at the outdoor station. Crushed metal for concrete aggregate was supplied by the quarry, and totalled 8,021 cubic yards for the year, 15,103 cubic yards being supplied to date. 5,397 cubic yards of sand were supplied for concrete during the year, the total supplied to date being 10,205 cubic yards.

All the turbine, generator, and control equipment for the power-house, and structural steelwork and circuit-breakers for the outdoor station were unloaded at Putaruru and transported to Arapuni. Four transformers were also transported to Arapuni for drying-out in readiness for installation. Seventy-five per cent. of the structural steelwork for the power-house roof was erected and welded.

During the year a cookhouse was put into operation, and a reading-room and library was built in the camp for the use of workmen.

Waikaremoana Scheme.

Other than the building of eight staff cottages and several new garages, no construction work has been carried out on this scheme.

Surveys for the lower development intake were put in hand.

Waitaki River Scheme.

The work of closing the temporary sluice-gates in the dam was completed during the year.

CONSTRUCTION AND IMPROVEMENT OF ROADS AND BRIDGES.

Whangarei District.

Kerikeri Inlet Road (Bay of Islands County).—This is a new road which will provide access to a large number of settlers occupying land on the southern shore of Kerikeri Inlet and whose only access up till the present time has been by water. 2 m. 56 ch. was formed 14 ft. wide and culverted during the period. A contract for a bridge 90 ft. long over the Okura Stream has been let.

Opua to Black Bridge Road (Bay of Islands County).—Widening and realignment of this road was commenced as portion of a scheme for improved road access to the Port of Opua. 75 ch. was formed 16 ft. wide, and 1 m. 22 ch. was widened to a similar width.

Punakitere Valley Road (Bay of Islands County).—This road gives access to a large area of only partly developed country and is also a connection from the Mangakahia Valley to the Moerewa Freezing-works. Of the authorized programme covering a length of 10 m. 39 ch., a distance of 2 m. 40 ch. has been metalled 9 ft. by 6 in. Four bridges totalling 165 lineal feet will be provided.

Dargaville to Pukehuia Road (Hobson County).—This road serves a group of settlers who became isolated as a result of the cessation of a cream-boat service. The 3 m. 40 ch. of formation completed last year has now been metalled 9 ft. by 6 in. Two bridges yet need to be erected to complete the whole work.

Girls' High School Road (Hobson County).—2 m. 25 ch. was widened to 16 ft. and metalled 9 ft. by 6 in. for the purpose of giving better access to several settlers, and also to provide a through route for cream-collection.

Lusk's to Hoyle's Road (Hobson County).—The formation of 1 m. 23 ch. completed during the previous year was metalled 9 ft. by 6 in. The construction of this road saves 11 m. carting to the Waiotira Station for the settlers. Also, a bridge 40 ft. long with a deck 8 ft. wide was erected in rolled-steel joists and mixed Australian hardwood.

Omana Main Road (Hobson County).—This is the main road of the Omana Valley, and was previously of tortuous alignment. In continuation of the programme commenced last year a further length of 3 m. was widened to 16 ft.

Tikinui to Tangaihi Road (Hobson County).—A further length of 1 m. 16 ch. was metalled 8 ft. by 6 in. This road serves the whole of the Pouto Peninsula, forming the southern extremity of the county, and the metal now extends almost 18 m. south of Dargaville.

Wilson's Access Road (Hobson County).—Metalling over a distance of 2 m. 41 ch. has been carried out to give all-weather access to a small-farms block near Dargaville.

Mansbridge's Road (Hokianga County).—This road, which serves a small-farms settlement, had previously been formed and partly metalled, but in view of the need for further improvements an additional length of 2 m. 16 ch. was surfaced to complete the whole road.

Omapere to Waimamaku Road (Hokianga County).—This road was previously an unmetalled road of very poor alignment. In continuation of earlier operations a further 34 ch. was formed 16 ft. wide, and the whole length of 1 m. 30 ch. was metalled 9 ft. by 6 in.

Newton's Road (Hokianga County).—A distance of 1 m. 35 ch. was metalled 8 ft. by 6 in. to provide metalled access to four settlers who had been in occupation of their holdings for many years.

Ohuri Road (Hokianga County).—The sandstone base metalling previously laid over a distance of 68 ch. was surfaced, and an additional 64 ch. of new metalling was carried out, thus providing four settlers with all-weather access to their properties.

Waikerikeri Road (Hokianga County).—This road, which gives access to a group of settlers who have previously contended with unsatisfactory roading conditions, was formed 14 ft. wide over a distance of 1 m. 30 ch.

Waima Valley Road (Hokianga County).—This road gives access to three European settlers and a large Native settlement. A length of 1 m. 30 ch. was formed 20 ft. wide and culverted, while a further distance of 1 m. 75 ch. was formed 16 ft. wide. The new work was considerably damaged by floods, but has since been repaired. Metalling completed during the period covers a distance of 2 m. 60 ch.

Waiotemarama Road (Hokianga County).—1 m. 58 ch. was metalled 7 ft. 6 in. wide to provide an all-weather access to eight settlers.

Whirinaki to Taita Road (Hokianga County).—Five settlers now have the benefit of an all-weather access as a result of metalling over a distance of 1 m. 40 ch. on this road.

Awanui to Mangonui Road (Mangonui County).—This important road gives a direct connection between two northern townships. It serves many settlers and has five branch roads leading to other settled areas. A distance of 7 m. 14 ch. has been formed 18 ft. wide to a modern standard of alignment and 6 m. 9 ch. of base-course metal has been placed. The new formation is now in use from Taipa to Awanui, and a general description of the work yet remaining to be completed is re-formation and metalling between Taipa and Mangonui, together with the construction of five bridges.

Champion's Road (Mangonui County).—This is a road which was formed a few years ago, and which has now been metalled over a distance of 1 m. 60 ch. to give all-weather access to three settlers.

Church Road (Mangonui County).—This route gives a cross connection between Kaitaia and Kaingaroa and serves a large number of settlers. During the period under review a distance of 4 m. 10 ch. was re-formed to a width of 14 ft. and culverted.

Kohumaru Road (Mangonui County).—A distance of 2 m. 50 ch. was formed 14 ft. wide and 56 ch. metalled 8 ft. by 6 in. Corners were cut back to a width of 16 ft. over a length of 1 m. 60 ch., the whole work consisting of the re-formation of a section of the road to the standard of the remaining length.

Parapara to Taumata Junction Road (Mangonui County).—This road is a cross connection between the Awanui to Mangonui Road and the Kaingaroa to Fairburn's Road, and gives access to a large number of settlers. The authorized programme consists of formation and metalling throughout, and during the period under review a distance of 2 m. 64 ch. was formed 14 ft. wide and culverted.

Riley's Road (Mangonui County).—This road which serves three settlers and eventually will serve eight was formed 14 ft. wide for a length of 2 m. 75 ch. and metalled 8 ft. wide over a distance of 2 m. 13 ch.

Takahue to Herekino Road (Mangonui County).—The length of 6 m. 44 ch. formed to a width of 16 ft. during the previous year was metalled 9 ft. wide by 6 in. deep. As a result of the unfavourable weather experienced during the progress of the work a considerable amount of extra metal had to be placed.

Waipapakauri to Tangaoake (Far North) Road (Mangonui County).—A commencement was made with the metalling of this road, which gives access to the far North Peninsula. Up till the present time 4 m. 57 ch. of metalling has been completed. Suitable metal is scarce in the locality, and its cost is unavoidably increased by long leads. Against this, however, can be offset the fact that it need be only sparingly applied on account of the excellent foundation obtainable in this class of country.

Waipapakauri to West Coast Road (Mangonui County).—This road gives access from Waipapakauri Township to the Ninety-mile Beach, and during the period it was metalled throughout its distance of 3 m. 45 ch.

Bull's Road (Otamatea County).—In continuation of the work carried out in previous years the remaining length of 2 m. 40 ch. on this road was metalled 9 ft. wide by 6 in. deep, thus providing the settlers with all-weather access to the Waiotira Railway-station.

Kaiwaka to Oneriri Road (Otamatea County).—A further distance of 3 m. 27 ch. was metalled 9 ft. wide, and as a result the last settler on the road now has metalled access to Kaiwaka Railway-station.

Mangawai Gorge Road (Otamatea and Whangarei Counties).—A 9 m. length of the Main East Coast Road between Mangawai and Waipu Cove is being widened to a minimum width of 16 ft. Of the length of 6 m. 67 ch. widened up till the present time some 72 ch. has been metalled.

Kaiwaka (Brynderwyn) Waipu Road (Otamatea and Whangarei Counties).—This new road is 5 m. 73 ch. long and will join up two blind roads in the Whangarei and Otamatea Counties, thus shortening the main road to Whangarei by 5½ miles. Up till the present time a distance of 2 m. 44 ch. has been formed 24 ft. wide and culverted, while a length of 25 ch. has been only partly formed. Operations are proceeding vigorously with the aid of a Diesel excavator.

Connell's Bridge (Whangarei County).—A light traffic bridge 96 ft. long was complete during the period under review.

Whangarei to Kioreroa Road (Whangarei County).—This road is 1 m. 34 ch. in length, and provides access between Whangarei and its deep-water port at Kioreroa and to a small-farms settlement *en route.* The whole length has been formed, the major proportion of the spoil being pumped into position by the Whangarei Harbour Board's suction dredge. It is proposed to give attention to metalling at a later period.

Tangihua and Codlin's Road (Whangarei County).—These two roads give access to nine settlers, and provide a shorter route to the Tauraroa Railway-station. During the period metal was placed over a distance of 4 m. 2 ch.

Waipu to Mangawai Road (Whangarei County).—Three small reinforced-concrete bridges were erected at Waipu Cove to replace others destroyed by a cloudburst.

Whareora to Pataua Road (Whangarei County).—In continuation of earlier operations on this road, widening of 3 m. 55 ch. was carried out during the period.

Pupuke Bridge (Whangaroa County).—A bridge abutment which had been damaged by flood was replaced with a pier, and one new 30 ft. span in reinforced concrete has been added.

Waihapa to Kohe Road (Whangaroa County).—This road which is 3 m. 10 ch. in length gives access to several settlers, and was formed 16 ft. wide with metal 9 ft. by 6 in.

Auckland District.

Coromandel to Kennedy Bay Road (Coromandel County).—The major deviation on the Coromandel side of the Main Divide, which was formed to a width of 14 ft. last year, has been metalled this year over a distance of 1 m. 79 ch., thus completing the main section of the route connecting with the Kennedy Bay area.

Mercury Bay to Hahei Road (Coromandel County).—During the year this road was formed over a distance of 7 m. 50 ch., and 7 m. of this length has been metalled, thus providing all-weather access to a number of settlers who are dairying in the area.

Rangihau Road (Coromandel County).—A substantial concrete ford 13 ft. wide was constructed over the Waiwawa River to replace an old crossing. This will enable traffic to negotiate the stream at any time except when it is in heavy flood.

Stoney Creek Bridge, Coroglen to Whenuakite Road (Coromandel County).—A new reinforced-concrete bridge 100 ft. long has been erected over Stoney Creek, a stream which crosses the main route on the eastern side of the Coromandel Peninsula, and in which flood waters accumulate very quickly from the surrounding high country.

Batty's Road (Franklin County).—All-weather access was made available for four settlers by the metalling of 80 ch. of this road.

Bluff Road, Mercer (Franklin County).—The Department completed a total length of 3 m. of metalling, from which six settlers on this road will benefit.

Church Mission Block Road, Awhitu (Franklin County).—A length of 2 m. 40 ch. of road was metalled to give access to this block, which has been developed under the small-farm scheme and on which eight settlers are established.

Kaiau to Miranda Coast Road (Franklin County).—This road, which has been deviated away from the sea to avoid erosion, was formed and shelled for a distance of 75 ch., thus restoring direct road communication along the coast between Clevedon and Waitakaruru.

Moumoukai Valley Road (Franklin County).—During the period a length of 4 m. of this road was metalled by the Department, and all settlers in the valley are now provided with regular access.

Otau Road, Hunua (Franklin County).—Metalling over a distance of 3 m. 60 ch. was completed, thus giving an all-weather outlet for two resident settlers and access to two other holdings.

Pinnacle Hill Road (Franklin County).—A length of 69 ch. of this road was metalled to give all-weather access to four settlers.

Saddleton's Road, Waiau (Franklin County).—During the year surfacing was extended over a length of 54 ch., thereby providing two more settlers with metalled access.

Blind Bay to Kaitoke to Harataonga Road (Great Barrier Island County).—A length of 2 m. 13 ch. of metalling was completed by the Department during the year, and all-weather access is now available from Blind Bay to the last settler at Harataonga.

Kerepeehi to Awaiti Road (Hauraki Plains County).—2 m. 40 ch. of metalling has been completed during the year in extension of the work carried out during the last period.

Waiwarawara Bridge, Waitakaruru to Miranda Road (Hauraki Plains County).—During the year this bridge, consisting of one 25 ft. span, was erected in hardwood timber and rolled-steel joists.

Clevedon to Brookby Road (Manukau County).—By the metalling of 2 m. of this road an all-weather connection has been completed between Clevedon and Brookby.

Kawakawa Bay to Orere Coast Road (Manukau County).—A length of 30 ch. of heavy formation was completed to 14 ft. and 18 ft. widths and was metalled 10 ft. wide to give access to two properties and small coastal bays.

Sykes Road (Manukau County).—A length of 60 ch. of this road has been metalled to provide two dairy-farmers with metalled access.

Walsh's to Hunua Road (Manukau County).—During the period 1 m. of this road was surfaced and metalled access is now available between Clevedon and Hunua.

French Pass and Te Miro Roads (Matamata County).—In continuation of the work carried out last year, the Department has widened and metalled a further length of 2 m. 8 ch. A total length of 5 m. 30 ch. has been re-formed and metalled, and all settlers in the area are now provided with all-weather access.

Muirhead Road (Matamata County).—Work was commenced on this road last year and has been continued during the period just closed. 77 ch. has been re-formed and widened, and 1 m. 22 ch. of metalling has been completed.

Waotu South Road (Matamata County).—A length of 2 m. 40 ch. of metalling has been completed during the year. This is a blind road giving access to five settlers engaged in dairying and grazing.

Wawa Road (Matamata County).—During the year 5 m. of this road has been formed 18 ft. and 20 ft. wide, and 3 m. 46 ch. has been metalled with rhyolite. The road gives access to a sawmill whence it is anticipated that approximately 15,000 ft. of timber will be transported daily.

Harris's Road (Ohinemuri County).—1 m. 30 ch. of metalling has been completed to provide all-weather access for four settlers.

Hollis's Road and Group (Ohinemuri County).—The roads under this group provide access to a large area of good dairying land in the Waihi Plains and Waitawheta area. A total length of 2 m. 38 ch. was formed and 4 m. 37 ch. was metalled during the year.

Ngahape to Korokonui Road (Otorohanga County).—Formation over a length of 1 m. 9 ch. has completed the construction of this road.

Panetapu Settlement Roads (Otorohanga County).—Work on this estate which was settled under the Flock House scheme has been continued, and during the period 22 ch. of new road was constructed and 4 m. 62 ch. was metalled 11 ft. by 6 in. under contract.

Tapuae Road (Otorohanga County).—Work in hand consists of the widening and metalling of 4 m. 52 ch. of road giving access to eight settlers at present on a clay road. At the close of the period 4 m. of widening and 75 ch. of metalling had been completed.

Tauraroa Road (Otorohanga County).—A length of 1 m. 8 ch. of this road was re-formed and metalled during the year.

Turitea Road (Otorohanga County).—The work in hand on this road consists of re-forming, widening, and metalling over a length of 4 m. 72 ch. At the close of the period 2 m. 38 ch. of widening had been carried out. When completed the work will provide all-weather access for a number of settlers, and will also facilitate the collecting of cream and other produce.

Waiti Road (Piako County).—The work in hand last year was continued and completed during the period, 1 m. 40 ch. being formed and 2 m. 6 ch. metalled.

Grove's Road (Raglan County).—The work commenced last year was continued and a further 38 ch. of road was formed and 2 m. 68 ch. of metalling completed. In addition to providing all-weather access to twelve properties, the improved roading facilities will enable a very useful cream route to be established.

Rotowaro Bridge, Huntly to Rotowaro Road (Raglan County).—A new bridge, consisting of one 40 ft. span rolled-steel joist on hardwood driven piles, was completed.

Rotongaro to Rangiriri Road (Raglan County).—A length of 1 m. 10 ch. was metalled on this important through road. Further proposals have been prepared covering the completion of the metalling and providing for a through cream route.

Te Pahu Limeworks Road (Raglan County).—The work carried out during the period consisted of placing a top course of metal over a length of 3 m. 17 ch. of this road, the major portion of the improvements having been completed last year.

Waingaro Springs to Te Uku Road (Raglan County).—This road is an important connection between the Waingaro District and Te Uku. The work consisting of re-formation and metalling was commenced last year, and during this period a further 2 m. 36 ch. has been metalled. Further work is in hand.

Wairamarama to Kaawa Road (Bothwell's), (Raglan County).—The authorized programme is the widening and metalling of 8 m. 60 ch., and when completed all-weather access will be provided for eight settlers. During the year a length of 2 m. 12 ch. was widened to 16 ft. preparatory to metalling.

Waitetuna to Waipa Road (Raglan County).—On this road a length of 3 m. 44 ch. was re-formed and widened, and spalls have been collected ready for crushing.

Matakana to Whangaripo Road (Rodney County).—On this road, which is an important connecting-link between Matakana and the Wellsford to Pakiri Main Highway, a length of 3 m. 37 ch. has been formed and metalled. The work will assist considerably in the general progress of the district.

Omaha Flats Road (Rodney County).—2 m. 14 ch. has been metalled, and as a result twelve settlers have been provided with all-weather access to their holdings.

Pakiri River Bridge, Pakiri River Road (Rodney County).—The erection of a reinforced concrete bridge consisting of one 53 ft. span was completed.

Streamlands Swamp Road and Group (Rodney County).—Eighteen settlers will benefit by the metalling of the roads included in this group scheme, which lies between Warkworth Township and the Kaipara Flats Railway-station. During the year the Department completed 2 m. 54 ch. of new formation, re-formed and widened 4 m. 61 ch., and metalled 8 m. 7 ch., in addition to placing one 12 ft. timber bridge and necessary culverts.

Waiwhiu Mill Road (Rodney County).—Work completed during the period comprised the laying of a base-course of sandstone over a length of 2 m. 40 ch., thus providing all-weather access to all settlers on the road.

Whitmore's Road, Tahatu (Rodney County).—Metalling was extended for a distance of 1 m. 3 ch., and the road is now surfaced throughout.

Mangawai Kauri-gum Reserve Roading (Rodney County).—The Department has in hand the roading of this block, which is being developed under the small-farm scheme. During the year, in addition to clearing scrub and filling gum-holes, the following work was completed: 3 m. 40 ch. of drains widened and deepened; 5 m. 63 ch. of road formed; 1 m. 40 ch. of road metalled; and 892 lineal feet of culvert-pipes of various sizes placed.

Hikuai to Whangamata Road (Thames County).—3 m. 35 ch. was metalled in extension of the work carried out last year, thus completing the surfacing of this important route serving the East Coast of the Coromandel Peninsula and extending between Waihi and Mercury Bay.

Hikutaia to Whangamata Road (Thames County).—Approximately 1 m. of this road has been formed and 22 ch. metalled during the year.

Puriri to Neavesville Road (Thames County).—Improvements consisting of approximately 40 ch. of formation and 67 ch. of metalling have been carried out on this road.

Whangamata Wharf Road (Thames County).—This important connection between the Main East Coast Road and the Whangamata Wharf has been metalled over a length of 1 m. 20 ch.

Komokorau Stream Bridge, Piako Road (Waikato County).—A bridge consisting of one 24 ft. span timber structure on driven piles was completed during the period.

Pukewhau to Lake Road (Waikato County).—The work in hand on this road consists of the metalling of 6 m. 26 ch. to provide all-weather access to settlers on the eastern shores of Lake Waikare. During the year 50 ch. of metalling was completed.

Sedgwick Road Bridge (Waikato County).—One 22 ft. span timber platform bridge over the Mangawhara Stream was completed during the period.

Waikato River Bridge (Fairfield), (Waikato County).—This bridge, which spans the Waikato River a few chains north of the Hamilton Borough boundary, was completed under contract by the Waikato County Council. The bridge is a reinforced-concrete structure 457 ft. in length, consisting of three bowstring spans (one 30 ft. central span and two 128 ft. spans), also two end spans of 35 ft. each. The width of carriageway is 20 ft., and two 5 ft. footwalks are provided.

Waipuna Gorge Road (Waikato County).—Six settlers have been provided with much improved access as a result of the widening and metalling of 3 m. 76 ch. of this road.

Umutawa Road (Waipa County).—A length of 2 m. was metalled during the year, to the benefit of three settlers, who now have all-weather access to their properties.

Waimanu Road (Waipa County).—The metalling of 3 m. of this road has been completed, and all-weather access is now available between the Pukeatua and Arohena districts.

Coronation (Waitakere Ridgway) Drive (Waitemata County).—A major work is in hand on this scenic route, which traverses some of the most elevated parts of the Waitakere Ranges and affords good views of unique bush and landscape scenery. The authorized programme is the formation and metalling of 15 m. of roadway. The results for the period are—Engineering survey and completion of plans over the full length of 15 miles; the clearing of bush and scrub over 7 m. 53 ch. of road-line; the formation of 4 m. 73 ch. to minimum width of 24 ft.; the placing of 3,257 lineal feet of concrete-pipe culverts; and the laying of a foundation course of metal over 3 m. 48 ch.

Duck's Creek Road (Waitemata County).—Seven settlers who were previously dependent on a clay road for their outlet have now been provided with a metalled road over a distance of 1 m. 70 ch.

Old North Road, Waitakere (Waitemata County).—All-weather access for ten settlers has been provided by the metalling of 1 m. 70 ch. of this road.

Rapson's Road (Waitemata County).—Widening and metalling over a length of 1 m. 73 ch. was completed during the year, with the result that three settlers are now able to gain access to the railway by metalled road.

Ranums Road (Waitemata County).—The formation and metalling of this road is being carried out in conjunction with the reclamation of the Kukutango Mangrove Flats, and is progressing satisfactorily. 1 m. 40 ch. has been formed and 70 ch. metalled.

Royal and Colwill Roads (Waitemata County).—The County Council has completed the metalling of 1 m. 15 ch. of these roads, and twelve settlers in the area who are engaged in fruitgrowing will benefit by having all-weather access made available for the marketing of their produce.

Stoney's Road (Waitemata County).—Two settlers on this road have been provided with metalled access from their holdings out to Silverdale by the surfacing of 50 ch., the work being carried out by the County Council.

Taylor's and Old North Roads (Waitemata County).—During the period widening of 3 m. 50 ch. and metalling of 6 m. 74 ch. was completed. There are thirteen settlers on these roads, and they now have metalled access to Waimauku Railway-station and to their commercial centre at Helensville.

Huia to Whatipu Road (Waitemata County).—A camp has been established for the purpose of forming and metalling 4 m. 40 ch. of this coastal road which will give access to an area of country as yet poorly roaded. Good progress has been made, and during the period 2 m. 57 ch. was re-formed and widened and 2 m. 17 ch. of base-course metal was placed.

Tauranga District.

Waioeka Bridge, Redpaths, Wairata Road (Opotiki County).—A bridge 175 ft. long was completed during the period, and has already proved of great benefit to the settlers.

Campbell's Road, Reporoa (Rotorua County).—This is a road which gives access to a new settlement, and during the year a distance of 2 m. was re-formed and metalled.

Fulljamis Access Road (Rotorua County).—Formation and metalling was completed over a length of 50 ch., and a bridge 20 ft. long was erected.

Horohoro Block Access Roads (Rotorua County).—A large area of Native land is being brought into production largely as an experiment in pumice-land development by Natives. In order to assist the scheme, 20 ch. of formation, together with 2 m. 40 ch. of second-class surfacing, was carried out during the period as part of a more extensive programme.

Kaharoa Road (Rotorua County).—This is a route which when completely metalled will give all-weather access to twelve settlers. An additional length of 1 m. was metalled during the period.

Maniatutu Road (Rotorua County).—First-course metalling was completed over a length of 68 ch.

South Road (Rotorua County).—As part of an authorized programme for the betterment of this access, a distance of 2 m. 40 ch. was formed.

Broadlands Small Farms Settlement Road (Taupo County).—New settlers on an area subdivided under the small-farms scheme obtain their access by way of this road, which was formed and metalled over a distance of 30 ch. during the year.

Reporoa Road (Taupo County).—In view of the necessity for improvements on this settlement road, a distance of 4 m. 70 ch. was surfaced during the period.

Waiotapu Valley Road (Taupo County).—A length of 4 m. 25 ch. of surfacing was completed.

Esdailes Road (Tauranga County).—This is also a road giving access to settlement, and a distance of 1 m. 50 ch. was metalled before the close of the period.

Lindeman's Road (Tauranga County).—Metalling was completed over a distance of 1 m.

Matai Road (Tauranga County).—Progressive improvements have been made of recent years on this road, and during the period just closed a length of 1 m. 40 ch. was metalled.

Waerenga Road, Wharere Small Farms Access (Tauranga County).—This road gives access to new settlers on an area subdivided under the small-farms scheme, and during the period was raised and resurfaced over a distance of 4 m. 72 ch.

Hallett's Road (Whakatane County).—A length of 60 ch. was surfaced during the period.

Kirkbride's Bridge (Whakatane County).—One bridge 40 ft. long was erected and road approaches formed.

Murupara Small Farms Access Road (Whakatane County).—This is another road which has been improved to give access to a small-farms settlement, and during the year a distance of 2 m. 35 ch. was surfaced.

Murupara to Te Whaiti Road (Whakatane County).—This is a vital link in an important through road which is carrying an ever-increasing volume of traffic. During the year additional gravelling over a distance of 1 m. 35 ch. was completed.

Rotorua to Waikaremoana Road (Whakatane County).—Reconstruction involving the widening and metalling of this road to a standard required by modern motor transport is being carried out between Lake Waikaremoana and the Rotorua District. In this county engineering surveys have been completed over a length of 10 m. 18 m. 53 ch. of first-class formation, 18 m. of base-course metalling, and 10 m. of top-course metalling has been carried out during the period. In addition, 41,833 cubic yards of rubble and slips have been removed.

Waimana River Bridge, Ruddicks Road (Whakatane County).—A bridge 200 ft. in length was erected during the period.

Gisborne District.

Bushy Knoll Road (Cook County).—This road serves a backblocks area, and considerable improvement by way of metalling has been made of recent years. During the period under review an additional length of 1 m. 50 ch. was re-formed and 1 m. 25 ch. was metalled.

Manutuke to Wairoa via Mangapoike Road (Cook County).—Jex Blake's Bridge: A bridge 33 ft. long with a 12 ft. roadway was completed in reinforced concrete.

Manutuke to Reay Bridge Section: In continuation of the programmes carried out in former years, an additional length of 2 m. was re-formed and metalled to a substantial standard in two courses as a preparation for bitumen sealing. Culverting incidental to the work reached a total of 1,831 lineal feet.

Repongaere Soldiers Sett'ement Road (Cook County).—This road, as the name implies, gives access to a soldier settlement, and during the year a length of 60 ch. was formed and 40 ch. metalled.

Riverside Road (Cook County).—As a result of threatened erosion by the Waimata River protection work consisting of 300 lineal feet of concrete and timber revetment wall was completed.

Waimata to Arakihi Road (Cook County).—This road serves a backblocks settlement, and during the period a distance of 40 ch. was re-formed in readiness for metalling.

Wharerata to Opoutama Road (Cook County).—This route is now largely used as a service road for tunnel construction on the Gisborne to Waikokopu Railway, and a distance of 2 m. 64 ch. in this county was substantially metalled during the period. An additional length of 72 ch. was given a light coat of metal. At the close of the period work was still proceeding on the section in Wairoa County, a distance of only 45 ch. remaining to complete an all-weather connection between Wharerata and Waikokopu port.

Huanui (Waiapu Inland) Road (Uawa County).—An additional 1 m. length of this road was metalled during the period.

Kiore Road (Uawa County).—A programme of improvements on this road covering metalling over a distance of 3 m. 36 ch. was authorized several years ago, but owing to repeated unfavourable conditions increasing the initial difficulty in obtaining access to metal-supplies the scheme was not completed until the year now under review. The work makes a great improvement in the access to a large area of good land held by five settlers.

Tolaga to Arakihi Road (Uawa County).—Work was commenced during the period on an extension of the metalling of this road, which serves three settlers in a very productive area. Broken stone was laid over a distance of 30 ch., and in addition 1,180 cubic yards of stone spawls were collected and carted to the roadside ready for breaking and placing next season.

Ihungia to Mata to Waitahaia Road (Waiapu County).—A length of 3 m. 60 ch. was prepared for metalling, and during the period metal was placed over a distance of 1 m. 70 ch. 1,340 lineal feet of culverts were installed.

Jerusalem to Whareponga Road (Waiapu County).—400 lineal feet of culverts were placed on this road in betterment of the access to a large area of a partially developed country.

Makarika to Horehore Road (Waiapu County).—Metalling over a distance of 1 m. 40 ch. was carried out during the year.

Rangitukia to East Cape Road (Waiapu County).—This road was formed by the Native Department as an improvement in the access to a large area of Native-owned country, and during the year a total of 700 lineal feet of culverts were installed to preserve the formation.

Tokomaru to Mata Road (Waiapu County).—In furtherance of the scheme approved several seasons ago for the metalling of this important feeder road, a considerable advance was made during the year. 4 m. 40 ch. was metalled, and an additional distance of 2 m. 40 ch. of heavy formation was carried out in preparation for metalling. 908 lineal feet of culverts were installed.

Reporua to Mahora Road (Waiapu County).—This is a road which had previously been formed by the Native Department for the purpose of giving better access to a block of Native-owned land, and during the period under review some 600 lineal feet of culverts were placed.

Bruce's Road, Kanakanaia (Waikohu County).—A distance of 1 m. 40 ch. was metalled.

Rakauroa to Tahora Road (Waikohu County).—This is a road giving access to the railway for a large number of settlers, and during the period 3 m. 60 ch. of bottom-course metalling and 7 m. 40 ch. of top-course metalling were completed.

Tarndale Road (Waikohu County).—This is an entirely new road 21 m. long located on the dividing-ridge between the Waipaoa River on the one side and the Mangatu and Motu Rivers on the other. It is designed to replace the present extremely unsatisfactory river-bed access to all the farms in the Upper Waipaoa, Upper Mangatu, and Mangaotane Valleys. Operations were continued throughout the period at the south end by an average complement of eighty to ninety co-operative contractors until winter conditions at an altitude in some places of 2,500 ft. or over forced a cessation of work. At the northern end, which is difficult for co-operative contract methods, a length of 2 m. 46 ch. was let by public tender, and here the contractor made good progress, handling the work almost entirely with modern plant. Work completed during the year was—Formation for a distance of 7 m.; metalling, 2 m. 2 ch.; culverting, 1,436 lineal feet. Up till the present a total distance of 15 m. 47 ch. has been formed and 2 m. 2 ch. metalled.

Kokomuku Road (Matakaoa County).—A programme of widening on this backblocks road was completed to allow the use of wool lorries as far as the last settler's property.

Kopuapounamu River Bridge (Matakaoa County).—Plans and specifications of this structure were completed during the period, and tenders called for its erection in reinforced concrete.

Kopuapounamu Road (Matakaoa County).—A distance of 2 m. 12 ch. of metalling was completed.

Main East Coast Road (Matakaoa County).—Maddox Hill: After re-forming several portions of the length, metalling was carried out over a distance of 2 m., together with the installation of 318 lineal feet of culverts.

Potaka Junction to Whangaparaoa: The authorized programme of improvements on this road was directed towards the elimination of the clay gap between Gisborne and Opotiki, via Cape Runaway. Although the final series of contracts covering metalling operations were let early in the season, continued bad weather, and especially serious floods at the New Year, held the work up considerably and occasioned the removal of some 5,000 cubic yards of slips. Nevertheless, the whole work was finished before the end of the season, and comprised—Improved formation, 1 m. 5 ch.; base-course metal, 4 m. 25 ch.; top-course metal, 10 m. 45 ch.; removing slips, 5,000 cubic yards. Following the completion of the metalling the remaining length of this route was declared a main highway, and placed under control accordingly.

Potaka Junction to Waikura Road (Matakaoa County).—On this road, which serves a number of settlers on a large area of productive land, the Department undertook the formation of a deviation to avoid three treacherous fords in the Oweka Stream. A distance of 59 ch. was formed and 54 ch. was metalled, together with 172 lineal feet of culverts laid.

Otipi Block Access Road (Opotiki County).—Widening was carried out at various points preparatory to the metalling of a length of 1 m. 51 ch., which was also completed during the period under review.

TAUMARUNUI DISTRICT.

Erua Road (Kaitieke County).—A distance of 2 m. of second-class surfacing was completed during the period under review.

Kouturoa Road (Kaitieke County).—Second-class surfacing over a distance of 1 m. 20 ch. has been carried out.

Huia and Turoto Roads (Ohura County).—These two roads give access to a Crown settlement opened many years ago, and during the year 2 m. of second-class surfacing has been carried out in betterment of the access to the area.

Ohura Road (Toitoi–Nihoniho), (Ohura County).—A distance of 2 m. 45 ch. was surfaced.

Waikaka Road (Ohura County).—In order to give all-weather access to settlers and to provide a circuit route for cream-collection and mail-delivery, a distance of 2 m. was re-formed and surfaced.

Taumarunui to Taupo Road (Taringamotu to Mangakahu), (Taumarunui County).—2 m. was metalled during the period.

Taumarunui to Tokaanu Road (Taumarunui County).—This is a major work, and when completed will give direct access between Taumarunui and Lake Tokaanu. During the period under review 1 m. 75 ch. of formation has been completed, together with 3 m. of metalling. Fifty culverts totalling 610 lineal feet have been supplied.

Te Maire to Mangaohutu Road (Taumarunui County).—This road follows down the Wanganui River on the left bank, and it was metalled over a distance of 2 m. 19 ch. during the year.

Ellis Road (Waitomo County).—A distance of 2 m. 35 ch. was re-formed and metalled.

Hauturu to Putake Road (Waitomo County).—Conditions of access on this road have been difficult for a number of years, and in order to improve the position a distance of 4 m. 60 ch. has been metalled.

Ngatarawa Road (Waitomo County).—This road, which gives access to a large area of good country, was metalled over a distance of 6 m.

Patoto Road (Waitomo County).—2 m. 40 ch. of re-formation, together with 2 m. 5 ch. of metalling, was completed during the period. Thirty-two culverts totalling 1,100 lineal feet were supplied.

Te Marama Road (Waitomo County).—Metalling was carried out over a distance of 5 m. 20 ch.

Waitomo Valley Road, Lower (Waitomo County).—3 m. of re-formation and 1 m. 40 ch. of metalling was completed.

STRATFORD DISTRICT.

Clifton Road (Clifton County).—This road gives access to a settled area, and during the period a distance of 1 m. 23 ch. was metalled.

Mangaonga Road (Clifton County).—A length of 1 m. 15 ch. was metalled in extension of the work carried out in previous years.

Okau–Tongaporutu–Mangaroa Road (Clifton County).—This road gives access to a considerable area of settled country in Clifton County, and then continues over the boundary to provide access through Ohura County to the King country. In view of general roading and traffic development, it is considered that a direct all-weather connection between the two districts should be made, and a programme of improvements was authorized accordingly. During the year a distance of 1 m. 55 ch. of road was reformed and 204 lineal feet of culverts laid in preparation for subsequent metalling.

Uruti to Ngatoto Road (Clifton County).—Operations were continued on this road during the year, and at the close of the period an additional length of 2 m. 33 ch. had been formed and metalled and 554 lineal feet of culverts placed.

Parihaka Road (Egmont County).—A distance of 4 m. 77 ch. was formed, 1 m. 64 ch. metalled, and 666 lineal feet of culverts placed in part completion of a substantial programme of improvements authorized on this road.

Moeawatea Road (Eltham County).—This road is located in the ranges in the hinterland of Taranaki and gives access to a large area of sheep-farming country opened up by the Crown. A length of 4 m. of 6 ft. track was formed to give the settlers a means of taking their stock southwards to Waverley.

Wingrove Road (Eltham County).—This is another settlement road, and during the year a distance of 1 m. 66 ch. was formed and 307 lineal feet of culverts laid.

Tangahoe Stream Bridge, Tangahoe Valley Road (Hawera County).—As a result of damage sustained during floods, it was necessary to replace a bridge with a reinforced-concrete structure 103 ft. long, and this work was completed during the year.

Mangawhio Road (Patea County).—The programme of metalling improvements commenced during the previous year was continued over a distance of 60 ch.

Mangamahoe Road (Rangitikei County).—A commencement was made with an authorized programme consisting mostly of metalling improvements, and during the year a distance of 64 ch. of metal was laid and access roads constructed to the metal-pit.

Murimoto and Watershed Roads (Rangitikei County).—The metalling operations commenced during the previous year were continued over a distance of 1 m. 27 ch.

Taihape to Napier Road (Rangitikei County).—Considerably greater progress was made on this road this year than during the previous period, a distance of 7 m. 8 ch. having been metalled.

Matau Road Group (Stratford County).—The metalling being carried out on roads in the Matau district to give all-weather access to long-established settlers was continued during the year, and by the close of the period an additional length of 74 ch. had been metalled.

Makuri Road (Stratford County).—Further work, consisting of 3 m. 19 ch. of formation, 2 m. 74 ch. of metalling, and 214 lineal feet of culverting, was carried out during the period.

Mangapurua Valley Road (Waimarino County).—This road gives access to a soldier settlement in an area opened up by the Crown for settlement, and during the year an additional 54 ch., of metalling was carried out. The bridge known as Morgan's, a reinforced-concrete structure 112 ft. long, was completed during the period.

Oruakukuru to Karioi Road (Waimarino County).—The metalling commenced in the previous year was continued for a further length of 3 m. 46 ch.

Waipuna Ridge Road (Waimarino County).—This is a settlement road giving access to settlers who have been farming in the area for a very long time. 46 ch. was re-formed, 2 m. 58 ch. was metalled, and 483 lineal feet of culverts were laid in part completion of a more extensive programme.

Mangare Road (Whangamomona County).—Access along this road has been difficult for many years, and during the period additional metalling over a distance of 64 ch. was completed.

Rerekapa Road (Whangamomona County).—This road gives access to an area comprising patches of relatively good land, and during the year a distance of 3 m. was formed and 302 lineal feet of culverts laid.

Whangamomona Stream Bridge, Tahunaroa Road (Whangamomona County).—A new reinforced-concrete arch bridge 130 ft. long was completed.

Matahiwi to Ohotu Road (Wanganui County).—An additional length of 2 m. 40 ch. of formation and 841 lineal feet of culverting was carried out in continuation of the programme commenced during the previous period.

Napier District.

Cowper's Road Bridge, Tiratu Block (Dannevirke County).—One 20 ft. span reinforced-concrete bridge, with a deck width of 12 ft. between wheel-guards, was completed.

Tiratu Road Bridge, Tiratu Block (Dannevirke County).—A culvert replacing an old 60 ft. rimu truss span over a small creek was completed. 80 ft. of 5 ft. diameter concrete pipes were used, and the filling required 1,600 cubic yards of spoil, which was obtained by widening the road for a distance of 10 ch.

Napier to Taihape Road (Hawke's Bay County).—A distance of 3 m. 40 ch. of this road was metalled during the period under review.

Puhokio Stream Bridge No. 3, Waimarama to Te Apiti Road (Hawke's Bay County).—The erection of a reinforced-concrete bridge of two 40 ft. spans was carried out by contract.

Stoddart Road (Patangata County).—This settlement road was metalled over a distance of 60 ch.

Middleton's Road (Wairoa County).—The total length of this road 1 m. 5 ch. was metalled during the period under review.

Mohaka River Bridge, Willow Flat Road (Wairoa County).—A commencement was made during the year with the erection of a 181 ft. span suspension type bridge, the towers and anchorages having been completed.

Rotorua to Waikaremoana Road, Hopuruahine to Ruatahuna Section (Wairoa County).—This road is being reconstructed and metalled throughout its length from Lake Waikaremoana to its junction with the main highway at the Rotorua end. On the Wairoa County section an average of 127 men has been employed, and widening of 11 m. has been completed to a minimum width of 16 ft. A length of approximately 12 m. has been metalled and 1,650 lineal feet of new culverts installed. The work at this end of the road is now practically completed, except for clearing of some slips and a small amount of metalling.

Willow Flat Road (Wairoa County).—This road gives access to a large area of backblocks country, and a distance of 1 m. 56 ch. was metalled during the period.

Birch Road East (Weber County).—A length of 2 m. was metalled under contract, thus giving all-weather access to settlers who had previously contended with unsatisfactory roading-conditions.

Wellington District.

North Range Road (Akitio County).—This is a settlement road in a backblocks district, and during the year under review a distance of 70 ch. of formation and 1 m. 25 ch. of metalling was carried out.

Range Road (Akitio County).—This is another settlement road, and roading improvements completed during the year comprised 53 ch. of widening and 2 m. 50 ch. of metalling.

Waione Bridge (Akitio County).—A reinforced-concrete bridge, consisting of two 42 ft. spans with a 20 ft. roadway and approaches, was completed.

Waiowaka Road (Akitio County).—Improvements completed on this road during the year comprised 14·5 ch. of widening and formation, a deviation of 15 ch., with two small timber bridges of 7 ft. and 8 ft. spans, and 1 m. 40 ch. of metalling.

Sugar-loaf Road (Akitio County).—This road gives access to settlers in a backblocks area, and a distance of 3 m. 20 ch. has been metalled.

Mataikona Road (Castlepoint County).—This road gives access from Whakataki northwards along the coast to the Mataikona Soldiers Settlement, and metalling improvements have been in progress over a number of seasons. During the period under review an additional length of 40 ch. was metalled.

Alfredton to Tinui Road (Eketahuna County).—A programme of metalling improvements has been in hand, and during the year 6 m. 60 ch. of base-course metalling was completed, together with the construction of groynes and general protection work.

Waiwera Bridge (Eketahuna County).—Work is in progress on a reinforced-concrete bridge of two 35 ft. spans with an 11 ft. wide roadway.

Heights Road (Horowhenua County).—This road gives access to settlement land, and a distance of 55 ch. has been metalled.

Makowhai Creek Bridge (Manawatu County).—A reinforced-concrete bridge consisting of two 16 ft. spans with a 12 ft. roadway was erected during the year.

Evans Road Bridge (Masterton County).—Work was completed during the year on a timber bridge of five 25 ft. spans, with an 8 ft. wide roadway.

Kaiwhata River Bridge (Homewood) (Masterton County).—A reinforced-concrete bridge of one 20 ft. span with a 20 ft. wide roadway was erected during the year.

Langdale Bridge (Masterton County).—Work has been completed on a reinforced-concrete bridge of one 40 ft. and two 25 ft. spans.

Ruamahunga River Bridge (Opaki) (Masterton County).—Good progress has been made with the erection of a reinforced-concrete bridge consisting of three 80 ft. spans with a 20 ft. wide roadway. The handrails and approaches are still receiving attention.

Mangaone Stream Bridge (Oroua County).—Work was commenced on a reinforced-concrete bridge consisting of two spans of 43 ft. 6 in. and two of 15 ft. 6 in. The roadway will be 12 ft. wide, and by the end of the period the concreting of the piers and abutments had been completed.

Woodville to Ashhurst Road (Oroua and Woodville Counties).—This new road will give an alternative access between Ashurst and Woodville when the Manawatu Gorge Highway is blocked. At other times it will provide a much-needed stock route. During the period 2 m. of formation and 1 m. 40 ch. of metalling was completed, some 51,485 cubic yards of earthwork being involved. Concrete-pipe culverts varying from 9 in. to 36 in. in diameter are being installed.

Harris Culvert (Pahiatua County).—Work has been completed in connection with the installation of a reinforced-concrete culvert, with an 8 ft. by 8 ft. waterway, and 45 ft. long.

Haywards to Pahautanui Road (Hutt County).—The construction on this road was previously of only a poor settlement standard, and in order to give necessary improvement and safer access from the Lower Hutt Valley to Pahautanui on the west coast a programme involving the complete reconstruction of the road was authorized. In places the work involves major deviations, and during the year a length of 1 m. 76 ch. of formation 24 ft. wide has been completed. 2,230 ft. of concrete-pipe culverts varying in size from 12 in. to 72 in. in diameter have been placed in the new formation.

Western Hutt Road (Hutt County).—Previously this road did not give direct access on to the existing main highway at Silverstream, but it is now being greatly improved by widening, and a substantial bridge is being erected across the Hutt River at the northern end. The road will be greatly used by city motorists as a by-pass to the congested area of the Lower Hutt Borough. During the year 4 m. of formation and 3 m. 40 ch. of metalling has been completed. The formation on the western approach to the bridge at Silverstream is in progress, as is also the excavation of the river-bed to allow for more waterway under the new bridge, which will be a reinforced-concrete structure consisting of eight 62 ft. spans with a 22 ft. wide roadway and two 4 ft. wide footpaths.

Plimmerton to Paekakariki Road (Hutt County).—This road is being constructed as the future highway, taking the place of the present tortuous road over the Paekakariki Saddle. The work carried out during the year has consisted of the excavation, drainage, and filling of swamps, formation through sandhills, and formation in clay and rock. Three sections are in progress, the total length being approximately 3 m. 40 ch. 37,507 cubic yards of swamp soil has been excavated and spread over adjoining paddocks, while 24,000 cubic yards of clay and rock have been filled into the swamp excavations. A length of 1 m. 46 ch. of formation has been completed and 1,419 lineal feet of concrete-pipe culverts ranging from 12 in. to 48 in. in diameter have been placed. Foundation tests have been made for the overbridge which will connect up with the present main highway at Paekakariki. Camp accommodation is being provided for 250 men.

Thorndon Overbridge (Wellington City).—In view of the difficult approach to Wellington City by way of Thorndon Quay and the necessity for facilities enabling the full use of the wide highway along Waterloo and Taupo Quays, an overbridge is being erected at Thorndon to carry traffic over the several railway-lines at that point. The overbridge will have a 44 ft. wide roadway with a 10 ft. wide footway. The crossing will be in reinforced-concrete, and will be approximately 690 ft. long. Work carried out so far is on the erection of retaining-walls, excavation, and pile-driving.

Nelson District.

Grey Valley Road (Awatere County).—This road provides communication between the Wairau and Awatere Valleys and is mainly used as a stock route. Improvements over various short stretches and widening on rock bluffs have been carried out over a total distance of 11 m.

Ure River Road, Access to Palmers (Awatere County).—Work on this access road was commenced during the year, and 1 m. 8 ch. of 12 ft. formation has been completed, together with 198 ft. of concrete-pipe culverting. An extension of the improvements over a distance of 1 m. 46ch. has been authorized and work is continuing.

Fifteen-mile Creek Bridge (Collingwood County).—Plans and specifications for a three-span cantilever bridge in reinforced concrete, 100 ft. overall length, with 10 ft. wide roadway have been prepared. Tenders have been called three times without satisfactory results, and arrangements are being made for the Department to carry out the work.

Pakawau to Mangarakau Road (Collingwood County).—This work which is nearing completion will give dry all-weather access to a large area of pastoral, milling, and mining country south of the Westhaven Inlet. A length of 5 m. 14 ch. of formation and 920 lineal feet of concrete-pipe culverting has been completed during the year, and with the progress made during the previous year brings the completed formation up to 9 m. 43 ch. out of a total length of 11 m. 25 ch. Stone-pitching of banks across the various tidal arms has been carried out by means of a punt specially constructed for the purpose. One bridge of five 25 ft. spans consisting of New Zealand timber carried on reinforced-concrete piers and abutments has been completed at Muddy Creek. The metalling of the new formation is to receive attention during the coming summer season.

North Bank Road, Top Valley to Patriarch (Marlborough County).—The County Council has carried out the formation of 1 m. 40 ch. of road which gives access to settlers on the north bank of the Wairau River.

Tunakino Valley Road (Marlborough County).—This road has been constructed by the County Council on higher levels than the previous access in order that the settlers in the valley might be given a safer and better access to their properties. 1 m. 16 ch. has been formed 14 ft. wide, metalling has

been completed, and 26 concrete-pipe culverts of a total length of 502 ft. have been placed, together with two single-span bridges on concrete abutments, with New Zealand timber superstructure.

Buller River Road (Right Bank), (Access to Burts), (Murchison County).—A new road is being constructed to give an improved connection between the settlers' access road and Blenheim to Hope Junction Main Highway. The work consists of 6 ch. of formation and metalling, the provision of turnoffs in two directions on to the Main Highway, and the installation of a concrete-pipe culvert 20 ft. long.

Hutchings Creek Bridge (Murchison County).—A contract has been let covering the erection of a reinforced-concrete bridge consisting of two 35 ft. spans with 10 ft. wide roadway. The work is practically completed.

Longford to Raits Road (Murchison County).—Work is in hand on this road, and the completed proposals will involve 1 m. 40 ch. of re-formation and metalling, together with necessary culverting.

Maruia River Bridge (Access to Bruce), (Murchison County).—This work comprised the erection of a light suspension bridge carried on the old piers of a former structure. The bridge consists of two 81 ft. suspension spans, and two end spans of 20 ft. and 25 ft. respectively, with 3 ft. roadway, and provides foot access to settlers on the western bank of the Maruia River in the Lower Maruia Valley.

Maruia River Road (Western Bank), (Nalders to Roberts), (Murchison County).—The County Council has carried out 2 m. 46 ch. of re-formation and metalling of this backblocks access road.

Nuggetty Creek Road (Murchison County).—A contract was let during the year covering the formation of 1 m. 40 ch. and the metalling of 40 ch. of this road which gives access to several settlers in the Nuggetty Creek area. Access has been difficult for several years as a result of damage sustained during the Murchison earthquake of 1929.

Pea Soup Creek Bridge (Maruia River Road, East Bank), (Murchison County).—The construction of a reinforced-concrete bridge of one 45 ft. span with a 10 ft. wide roadway was commenced during the year.

Shenandoah Road (Murchison County).—Contracts were let covering the metalling of 5 m. 16 ch. of this road, and on completion of the work access to Reefton and to the south will be greatly improved. The route will eliminate the tortuous Maruia Saddle, and will eventually form part of the Murchison to Christchurch Highway via the Lewis Pass.

Hakana Bay to Jerdan's Bay Track (Sounds County).—A contract covering the formation of 1 m. 27 ch. of track 4 ft. wide has been let, and upon completion of the work the isolated settlers in the Port Underwood district will have the benefit of a reasonable form of access.

Roads and Tracks in the Kenepuru Road District (Sounds County).—Consequent on the constitution of the new Kenepuru Road Board the Government agreed to undertake a programme of restoration work on the previously constructed roads, tracks, and bridges. During the period 4 m. 50 ch. of road was re-formed and generally reconditioned, and 28 m. of track received attention. The position now is that a total of almost 46 m. of track and 8 m. 50 ch. of road has been given attention, together with numerous small bridges throughout the district. A small bridge is still under construction at Waitaria Bay, and work is proceeding on a suspension stock bridge of one 60 ft. span at Kenepuru Head.

Go-Ahead Creek Bridge (Takaka County).—The Council submitted proposals covering the reconstruction of this bridge in timber, and consequent on representations made by the Department has now reconsidered the position, and is preparing further plans for a crossing in permanent materials.

Wainui River Bridge (Takaka County).—A reinforced-concrete bridge consisting of three 35 ft. spans with a 10 ft. roadway was erected to replace an old suspension bridge. The work was carried out by the County Council, which also gave attention to 5½ ch. of formation and metalling work on the approaches.

Little Pokororo River Bridge, Motueka River Road, Left Bank (Waimea County).—A contract covering the construction of one 30 ft. span bridge in reinforced concrete with 12 ft. roadway, together with formation and metalling of 6 ch. of approaches, has been let by the County Council. At the present time the ford interferes with traffic during floods, and the bridge will greatly improve the position.

Maitai River Bridge, Maitai Valley Road (Waimea County.)—A new bridge is to be erected over a troublesome ford in the upper Maitai Valley, and it will consist of two 35 ft. spans with 10 ft. roadway built in reinforced concrete. A contract has now been let, and the interested settlers are contributing by assisting with the labour and providing some of the materials for the bridge and approaches.

Motueka River (Peninsula) Bridge, Ngatimoti (Waimea County).—The reconditioning of this bridge has been completed during the period. The crossing consists of one 192 ft. suspension span with end spans of 45 ft. and 36 ft. The towers were renewed in reinforced concrete, tension-blocks for anchor-rods were replaced, and the whole of the superstructure was renewed in mixed Australian hardwoods, with New Zealand timber decking. The bridge is one of the main outlets for settlers on the west bank of the Motueka River.

Moutere Clay Road (Waimea County).—This road gives access to orchards in the Moutere district, and during the period under review a distance of 64 ch. has been metalled under contract.

Riwaka to Sandy Bay Road (Waimea County).—An extensive programme of widening, metalling, and general improvements to alignment and grades has been carried out over a distance of 7 m. 40 ch. from the point where the road leaves the Richmond to Collingwood Highway at Riwaka to the holiday resort at Kaiteriteri Inlet. There is now a safe two-way road between these points, and beyond Kaiteriteri improvements have been made consisting mainly of widening on corners. It has also given greatly improved access to the settlers in the Sandy Bay and Marahau districts.

Riwaka Forks Bridge, Riwaka Valley Road (Waimea County).—The County Council let a contract for the construction of a bridge in reinforced concrete to give access to settlers in the South Branch Valley of the Riwaka River. The work in connection with this bridge of two 35 ft. spans with 10 ft.

roadway consisted also of 9 ch. of approach formation and metalling with necessary protective work and stop-banking.

Tadmor to Glenhope Road, Kaka to Glenhope Section (Waimea County).—An unmetalled gap in this road 2 m. 8 ch. in length has been attended to by the Council under contract.

GREYMOUTH DISTRICT.

Karamea to Collingwood Track via the Heaphy River (Buller County).—This track gives access from Karamea along the coast and through the Heaphy Valley to Collingwood, and during the year the Buller County Council restored a length of 10½ miles in its territory.

Cascade Road (Buller County).—Construction work on this road, which is to give access to the Cascade Coal-mining Co.'s property, was commenced by the County Council, but was later taken over by the Department. During the year an additional length of 53 ch. of difficult formation was completed.

Access to Pakihi Lands, Sergeant's Hill (Buller County).—Several areas of pakihi land in this locality are being developed by the Lands Department in co-operation with the Cawthron Institute, and the necessary roading is being carried out to give full assistance to the scheme. During the year a length of 1 m. 19 ch. of formation and 1 m. 39 ch. of metalling has been completed, together with the placing of twenty concrete-pipe culverts, totalling 363 lineal feet.

Big River to Rough River Road (Grey County).—Work on this access road, which will also provide an alternative route between Blackball and Ikamatua, has been continued during the year, and the construction of a length of 3 m. 20 ch. in this county completes this section of the route. Further work is continuing in the Inangahua County.

Rough River Bridge, Big River to Rough River Road (Grey County).—Work has been commenced on the erection of a reinforced-concrete bridge 550 ft. in length and consisting of eleven 50 ft. spans.

Brown Grey River Bridge, First Crossing (Grey County).—This bridge consists of two 50 ft. rolled-steel-joist spans on hardwood timber piers and abutments. It provides access to settlers on the Grey Valley to Maruia Road, and was completed during the period under review.

Brunner to Blackball Road (Grey County).—The construction of this road, 7 m. 48 ch. in length, providing direct access between Brunner and Blackball, has been completed with the exception of two small bridges. The progress made during the year included 1 m. of new formation, 3 m. 50 ch. of widening, 3 m. 46 ch. of metalling, and placing of eight culverts totalling 224 ft. in length.

Craigieburn Creek Bridge (Grey County).—The Council completed the erection of this bridge, which consisted of four 30 ft. rolled-steel-joist spans. Owing to damage resulting from a severe flood, however, it was found necessary to add additional spans on the approaches, and this work is now in hand.

Access to State Mine (Grey County).—An access road 1 m. 3 ch. in length from the Westport to Greymouth (Coast Road) Main Highway was constructed during the year.

Alexander Mine Road, via Snowy River (Inangahua County).—Work was commenced during the year on the construction of an access road to the Alexander Mine. The new road will extend over a distance of 7 m. 60 ch., and during the year clearing and formation of 2 m. 67 ch., first-coat metalling over 1 m. 84 ch., and second-coat metalling over 25 ch. was completed, together with the installation of thirteen culverts totalling 308 lineal feet.

Big River to Rough River Road (Inangahua County).—This is a continuation of the road commencing in the Grey County, and completes the alternative access from Blackball to Ikamatua. The progress made during the year consisted of 4 m. 20 ch. of formation and metalling (3 m. 20 ch. of which was in Grey County) and 168 ft. of culverting. With the exception of the formation of approaches and the construction of the bridge over the Rough River, the work is now completed.

Waiau to Maruia, via Lewis Pass Road (Inangahua County).—This is the Lewis Pass Road, which will give a new and direct access between the northern and middle portions of the West Coast and Canterbury. The formation on the Westland side is practically completed. One reinforced-concrete bridge at 2 m. 58 ch. is nearing completion, and work has been commenced on the erection of a concrete-arch bridge of 64 ft. span at the 3 m. 2 ch. point. There is not a great deal of additional work to be done on this road, and it should be opened to traffic in a few months.

Arahura to Milltown Road (Westland County).—Additional widening work over a distance of 43 ch. completed the construction of this 6 ft. track, which covers a total distance of 2 m. 28 ch. The Westland County Council has let a contract for widening the track to road width, with subsequent metalling.

Gillespies Road (Westland County).—The formation of this road, which will give access to dredging-claims and to settlers at Gillespie's Beach, was commenced during the year. The route is 7 m. 4 ch. long, and during the period under review formation has been completed over a length of 4 m. 7 ch.

Main South Road (Westland County).—Weheka to Bruce Bay Section: Work on this road, which will when completed form part of the main road from Westland to Otago, has been in progress during the year. Of the section between Weheka and Bruce Bay a deviation 8 m. in length, which was constructed some years ago, has been reconstructed and metalled. In addition, a length of 5 m. 57 ch. has been completed, which brings the total formed road on this section to 13 m. 57 ch.

Bruce Bay Section: Work has been in hand on formation work from the Bruce Bay headquarters, working northwards towards Weheka. Various lengths have been completed, which make a total of 3 m. 10 ch. of completed road.

Fox River Bridge: The construction of a steel suspension bridge 360 ft. span, with concrete deck, is now nearing completion.

Cook River Bridge: Work is proceeding on the erection of a 264 ft. span steel suspension bridge, with concrete deck. Pier foundations have been completed, temporary towers erected, and the construction of anchor-blocks is well in hand.

Malfroy's Bridge (Westland County).—This bridge was erected many years ago, and now gives access to a sawmill and to settlers. Two spans were added last year, and another 60 ft. truss in hardwood timber, with steel bottom chord, added this year has placed the bridge in a sound condition.

La Fontaine Road (Westland County).—This new road will give access to a sawmill at the mouth of the Wanganui River and will be of use for settlement purposes when the milling-timber has been extracted. Up till the present time a distance of 2 m. 30 ch. has been completed.

Christchurch District.

Hossack Road (Amuri County).—This is a road giving access to a backblocks grazing-run, and during the period under review an additional length of 1 m. 40 ch. of formation and metalling was completed.

Lewis Pass Road (Amuri County).—This new route will give a direct access from North Canterbury to the northern and middle sections of the West Coast area. Unfavourable weather conditions have caused stoppages which have delayed the completion of the work, but it is nevertheless expected that the route will be opened to traffic in the course of a few months. During the year 9 m. of formation was carried out, including a length of 11 ch. in rock sidling, where the batters vary in height from 40 ft. to 80 ft. A length of 10 m. has been metalled, and it is expected that both formation and metalling will be completed by the month of October. Reinforced-concrete bridges have been erected over four small streams, and there yet remains ten of these crossings to be built. It is not intended to construct permanent bridges over the Hope and Boyle Rivers immediately, as the temporary structures of 333 ft. and 116 ft. respectively, erected during the last period, will give satisfactory access for some time. Reinforced-concrete pipe culverts, totalling 3,000 ft. long, have been laid in the formation.

Maronan to Ealing Road (Ashburton County).—A distance of 2 m. has been formed and metalled on this road during the period under review.

Crystal Brook Bridge, Brophy's Road (Cheviot County).—A bridge 52 ft. long has been erected to eliminate a very unsatisfactory ford and to give all-weather access to several settlers.

Hurunui Valley to Blythe Valley Road (Cheviot County).—This new road is now under construction, and will give necessary and improved access to five settlers. The total length is 2 m. 60 ch., and formation carried out during the year covered a length of 60 ch.

Summit Road (Dyer's Pass to Gebbie's Pass), (Halswell, Heathcote, and Mount Herbert Counties).—This scenic road along the hills surrounding Christchurch City is a continuation of the Summit Highway. Widening to 20 ft. has been completed over the whole length of 8 m. 40 ch., and metalling will be undertaken as soon as the men and plant are available from the work which is also being carried out on the Summit Highway.

Puhipuhi Road Bridge (Kaikoura County).—Construction work on the approaches is well in hand, but although a contract has been let for the erection of the bridge it is found that the work is being held up by the delayed arrival of the Australian hardwood timbers.

Askin's Road (Mackenzie County).—A distance of 1 m. 74 ch. has been reformed and metalled during the period to give improved access to an isolated area of settlement country.

Glen Lyon Access Road (Mackenzie County).—The work commenced in previous years has been continued, and the formation and metalling carried out over a length of 11 m. during the year has completed the whole programme on this backblocks access road.

Lake Ohau Road (Mackenzie County).—This is a road giving access to several back-country runs, and on which 3 m. of formation and 8 m. of metalling has been completed during the year.

Lake Coleridge to Lake Lyndon Road (Selwyn County).—This road extends over a distance of 8 m. 60 ch., and during the year a length of 4 m. was re-formed and metalled. The route will be extensively used in connection with the erection of the Lake Coleridge to West Coast transmission-line, besides giving southern travellers a more direct route to the West Coast.

Dunedin District.

Clarendon to Berwick Road (Bruce County).—Formation was completed to a width of 14 ft. over a total distance of 2 m. 70 ch. Metalling was also undertaken, but a distance of only 1 m. 31 ch. was completed during the period.

Salmonds Creek Bridge (Bruce County).—A reinforced-concrete bridge, 8 ft. wide between wheel guards, and consisting of three 17 ft. spans, was erected, and 5 ch. of approach filling and gravelling was completed.

Long Point Road (Clutha County).—The widening and metalling improvements commenced during the previous year were completed during the period under review.

Sharks Creek Road (Clutha County).—This route is 1 m. 13 ch. in length, and was widened to widths varying between 14 ft. and 16 ft. Culverting and metalling was completed. The road forms a connecting-link between two other settlement routes and will enable a mail-service to operate more conveniently, besides giving metalled access to three settlers.

Centre Road, Maclennan (Clutha County).—An unmetalled gap of 67 ch. between Maclennan and Stuarts Siding was widened and metalled.

Bald Hill to Hummock Runs Road (Taieri County).—A distance of 6 m. was gravelled.

Lee Stream School to Hindon Road (Taieri County).—Gravelling was carried out over a length of 3 m.

Top Road, Strath Taieri (Taieri County).—Gravelling was completed over a distance of 7 m.

Shanks Road (Tuapeka County).—Formation 16 ft. wide was completed over a distance of 1 m. 58 ch., and one reinforced-concrete bridge of 45 ft. span, with a width of 12 ft. between wheel guards, was erected.

Lime Kiln Road (Waihemo County).—1 m. 24 ch. was widened on this road.

Lower Harbour Road (Waikouaiti County).—A sea-wall 20·5 ch. long was constructed as a protection against erosion by waves and tides.

Makarora to Haast Road (Vincent County).—This new road will give a connection between the Otago District and the mouth of the Haast River in South Westland, where it will meet the road now being constructed southwards from Weheka. Although much unfavourable weather was experienced, good progress has been made. Bush was cleared over a distance of 4 m., 5 m. 60 ch. of formation was completed, and 3 m. 50 ch. of first-coat gravel was laid.

Kyeburn River Bridge, Youngs, Naseby to Danseys Pass Road (Maniototo County).—A reinforced-concrete bridge consisting of four 45 ft. spans was erected during the year.

Invercargill District.

Lawson and Hodgson Road (Southland County).—During the year a distance of 5 m. of this settlement road has been gravelled.

Little Waikaka Stream Bridge (Waikaka to Maitland Road), (Southland County).—A reinforced-concrete bridge consisting of one 35 ft. span has been erected, and 15 ch. of formation and gravelling completed.

Makarewa Stream Bridge (Brookdale Road), (Southland County).—During the year a bridge 52 ft. long, comprising two 16 ft. and one 20 ft. spans, with hardwood piles, stringers, and deck, was erected.

Miller Road (Southland County).—A distance of 1 m. 65 ch. of first-class formation was carried out during the period.

St. Ronans to Morton Mains Road (Southland County).—Gravelling was carried out over a distance of 1 m. 8 ch.

Waikawa Stream Bridge (Manse Road), (Southland County).—A bridge in reinforced concrete, and consisting of two 40 ft. spans with rolled-steel joists, was erected, and the approach roads totalling 8 ch. were completed.

Golden Bay Stone Wall (Stewart Island County).—A stone wall 183 ft. long was erected as protection from wave and tide action on the foreshore.

Horseshoe Bay to Brooklands Road (Stewart Island County).—A distance of 14 ch. of formation and metalling was carried out during the year.

Edginton and Minty Road (Wallace County).—The formation carried out during the year covered a distance of 1 m. 26 ch., and new gravelling over a length of 38 ch. was also completed.

Kaka Road (Wallace County).—This road was gravelled over a length of 1 m. 24 ch.

Key to Whare Creek Road (Wallace County).—A distance of 1 m. 18 ch. was formed and 58 ch. gravelled.

Otautau to Pourakino Road (Wallace County).—New formation and gravelling was completed over a length of this road, and 400 lineal feet of culverts were placed.

Hollyford to Okuru Road, via Lake McKerrow (Lake County).—This is a new work on which construction was commenced during November. Some 114 men are now employed, and up till the present time bush work has been completed over a distance of 1 m. 70 ch. Formation is in hand over the first length of 1 m 40 ch., where a considerable amount of heavy rock work is being encountered. Operations are progressing satisfactorily and will be continued.

LANDS IMPROVEMENT.

Whangarei District.

Mangrove and Harbour Flats Reclamation (Rawene Area).—65 ch. have been cleared; 39 ch. of drain have been completed; 39 ch. of stop-bank 4 ft. wide have been completed.

Kelly's, Tullock's, Omanaia Left Bank, and Motutoa Areas.—Maintenance work was carried out.

Uretiti Drain.—Deepening of drain and cutting out of heavy timber over a distance of 36 ch. was carried out.

Ruakaka Block Drainage.—Ruakaka – Marsden Point Drain: 1 m. 30 ch. of outlet were deepened and widened.

Motuti Water-supply.—The original programme for water-supplies to the Motuti Native Settlement has been completed. Two concrete reservoirs and two 400 gallon tanks have been installed, including 5¾ m. of main pipe-line and a further 12,000 ft. of ¾ in. reticulation laid to the sections and the schoolhouse. An extension reticulation scheme lately approved is in progress.

Ruakaka K.G.R. No. 3 Drainage.—30 ch. of drain were cut at the outlet to the Ruakaka River. Heavy timber was removed for a distance of 9 ch.

Sand-dune Reclamation.—Kaitaia Area: 767,000 spots of marram-grass have been planted over an area of 69 acres.

Ruakaka Area: Blanks in the marram plantations were replanted over a total area of 20 acres.

Te Kopuru Area: 518,700 spots of marram-grass were planted and 16,000 spots of lupin over an area of 299·7 acres.

Auckland District.

Taupiri Drainage Scheme.—Drainage work under this major scheme was continued for the fourth successive year over an area embracing 146 square miles of flat land and 88 square miles of hill country. Operations during the period were carried out over 83 m. 20 ch. of drains on which widening and deepening has been undertaken in the various stages. Four drag-line machines were

employed in excavating a total of 183,796 cubic yards, and ten bridges comprising a total length of 208 ft. were constructed. Continuous wet weather has hampered operations to some extent, but progress generally has been fairly good, and it is anticipated that the original programme will be completed towards the end of this year. The total length of drains over which improvement works have been carried out since the commencement of the scheme in 1933 is 123 m. 48 ch., and to date 72 m. 79 ch. of drains have been handed back to the Taupiri Drainage Board for future maintenance. In addition to the above, a considerable amount of work in the nature of clearing snags and growth from existing drains has been undertaken. The areas adjacent to the completed drains have been particularly free from flooding, and the channels generally are functioning very satisfactorily.

Te Kawa Drainage Scheme.—Drainage-work under this scheme was recommenced during the year with unemployed labour, but, as in the previous year, operations were considerably hampered owing to the exceptional amount of wet weather experienced during the period. The work carried out since December, 1936, consists of the widening and deepening of 4 m. 76 ch. of drains and the work in hand is now nearing completion. Despite the heavy rainfall experienced during the year, the completed drains were entirely free from flooding.

Paewhenua Drainage Scheme.—The purpose of this scheme, which was put in hand last year, is for the draining of an area of approximately 2,133 acres already under settlement. The programme in hand provides for the construction of approximately $10\frac{3}{4}$ m. of drains all of which are now practically completed. During the period 9 m. 4 ch. of drains were constructed, making the total to date 10 m. 45 ch. There remains only about 20 ch. of draining to complete the scheme.

Upper Waihou River Clearing.—The work of clearing the river was continued and during the year both banks of the stream over a length of 5 m. 32 ch. were cleared of large willows, &c., and heavy snags were removed from the waterway. All timber and rubbish was stacked and burned.

Ohinemuri River Stop-banks.—The raising of both stop-banks was completed during the period, and the area should now be safe generally from flooding, even from such record floods as that of February, 1936.

Waihou and Ohinemuri Rivers Improvement.—Maintenance: The flood waterways have been kept free by the clearing and burning of gorse and blackberry from the banks and berms. A start has been made with the dredging of sandbanks in the river-channel. On the Ngahina–Netherton Lower Waihou Section toe drains have been constructed on the inside of the stop-banks, and the excavated soil has been placed to stiffen the banks. The stop-banks on this section have also been raised to conform in grade with the remaining stop-bank system.

Waitoa River.—Clearing: During the year the clearing of willows, &c., from both banks of the river was carried out in sections over a total length of 6 m. 16 ch. The waterway has also been cleared of snags over a length of 3 m. 9 ch. All timber and rubbish is being stacked and burned as the work progresses.

Sand-dune Reclamation.—South Kaipara Heads: About 1,400 acres of South Head are planted in marram, and it is making rapid headway as a result of the favourable season. Lupin has also been successfully established over a large portion of this block. After this season it is considered that plentiful local supplies of both marram and lupin seed should be assured without the necessity for large and costly pack trains. During the period 1 ton of lupin-seed was planted amongst the marram; replanting of marram was carried out over 220 acres; and 100 acres of new marram have been planted. Also along the Muriwai Beach, towards South Head, 100 acres of marram nurseries have been established and are making very good headway.

Woodhill-Muriwai-Helensville: The planted areas of both marram and lupin have made particularly good growth during the period, and the latter has reached the stage where it is now providing good shelter for the young trees which have been planted out. During the period, 250 acres were planted in marram, making the total area of marram to date 8,540 acres. In addition 1,070 acres have been replanted; $4\frac{1}{2}$ tons of lupin-seed were collected and sown, and this is making a fair cover over an area of 3,250 acres. During the period, 738,960 young trees of various species were planted over an area of 620 acres, and to date 762,960 trees have been planted over an area of 640 acres.

Pakiri Sand-dune Reclamation.—Two nurseries have been established in this area, and the marram in both cases is making good progress, but there will not be any quantity available for planting elsewhere until lupin is established to provide the necessary shelter for the marram. About 250 lb. of lupin-seed have been sown in the nurseries, and it is coming away satisfactorily. It is anticipated that sufficient marram-plants will be available to enable the planting operations to be extended during next winter.

Waikato Heads and Kariotahi.—Reclamation work which was started in this area in the 1932–33 season was carried on with vigour during the period as in previous years. The total area over which marram has been planted now exceeds 3,000 acres, and lupin has been established over nearly half of that area. Pine-trees of several varieties have been planted on about 250 acres. Seedlings lined out and on order for the 1937 planting-season number nearly one million of mixed pines.

Taumarunui District.

Mokau Willow-clearing.—During the year the whole of the cleared length from the 8 m. Junction (Te Kuiti National Park Main Highway) to a point 10 ch. west of the Mapiu Stream, distance 16 m. 50 ch., was retreated, and all recrudescence and intermediate second growth between stumps poisoned and destroyed. A considerable proportion of this work was caused through the permanent lowering of the water-level of the Mokau Stream from 5 ft. to 6 ft., thus enabling further treatment to be undertaken.

There still remains 5 m. to be treated.

Mokauiti Willow-clearing.—A total of 385 ch. on the Mokauiti Huiateko and Mangawhero streams have now been ring-barked and poisoned and the preliminary programme completed.

The work of falling and clearing of the willows will be undertaken this season.

Stratford District.

Development-work is being carried out on two schemes in this district. Details of the work done during the year are as follows:—

Okahune Scheme.—Logging and burning, 467 acres; stumping, 184 acres; burning (previously stumped and logged), 482 acres; fencing, new, 375 chains; fencing, repairs, 593 chains; ploughing, 152 acres; cultivation, 166 acres; sowing grass-seed, 182 acres; stock bridges erected, 7; creeks cleared, 114 chains.

Raetihi Scheme.—Logging and burning, 218 acres; stumping, 245 acres; burning (previously stumped and logged), 98 acres; logging only, 43 acres; fencing, new, 1,083 chains; fencing, repairs, &c., 400 chains; road formation, 128 chains; clearing streams of logs, 62 chains; drains, new, 235 chains; drains, clearing, 40 chains; ploughing, 193 acres; cultivation, 117 acres; sowing grass-seed, 117 acres; sowing oats, 57 acres; sowing swedes, 43 acres; clearing (final) for ploughing, 45 acres; reaping and stacking oats, 10 acres; logging hillsides, 103 acres.

Napier District.

Kumeti Drain.—Plans were prepared for renewing Thorburn's Road Bridge, which had been washed away by flood, and for extending the flood-protective works, such as stone and netting weirs, and groynes, and stop-banks, upstream from the bridge into Section 7, Block XII, Norsewood Survey District.

The work completed up to the end of March, 1937, was as follows: Reinforced concrete chute and drop weir 9 ft. deep and 16½ ft. wide and 67 ft. long was constructed at the site of Thorburn's Bridge so as to connect up with the old reinforced concrete chute. The new bridge spans the chute and is 28 ft. long. The approach fillings on each side of the chute were practically finished. 205 cubic yards of stone and netting gabion work was placed in position at the bridge-site to prevent lateral erosion. 3½ ch. upstream from the bridge a stone and netting weir, 35 ft. on the crest and 5 ft. high, was constructed. A second weir of similar dimensions is to be built 7 ch. upstream from the bridge. Two stop-banks up to 6 ft. in height and requiring 1,200 cubic yards of spoil were practically completed.

Ngaruroro River-control Scheme.—This scheme, which is being carried out by the Hawke's Bay Rivers Board, was approved of in July, 1936, the estimated cost being £180,000—the Labour Department finding £60,000, the Hawke's Bay Rivers Board finding £60,000, and the Public Works Department finding £60,000. Work was commenced in July, and gangs of men were put on clearing and forming banks. Both sides of the river from Fernhill have been cleared ready for earthwork for a distance of 4 m., and some clearing has been done in the Overflow Channel.

Earthwork was commenced in October, 1936, and up to June, 1937, 152,415 cubic yards have been shifted.

96 ch. of drains have been excavated, and 676 ch. of fencing have been erected. 10 ch. of willow groyne have been put in, and four culverts and one temporary spillway constructed.

Tutaekuri River-control Scheme.—Work on this scheme, which is also being carried out by the Hawke's Bay Rivers Board, is nearing completion.

All stop-banks have been completed, and the groyne at the mouth of the river is now in place.

The total quantity of earthwork in the stop-banks is 746,000 cubic yards.

For the construction of the groyne and the protection of the stop-banks near the mouth, 1,342 cubic yards of concrete were used.

Sixty-one chains of permanent fencing were completed during the year, and 170 chains of planting were done inside the stop-banks.

The Brookfields Bridge, a reinforced-concrete structure 920 ft. long, was completed. This new structure spans between the stop-banks of the new flood channel of the river.

The total cost of the flood-control scheme to date is £95,000, of which the Public Works Department found £35,700, the Labour Department £22,300, and the Hawke's Bay Rivers Board the balance of about £37,000.

Wellington District.

Hokio–Manawatu Rivers Sand-dunes Reclamation.—72,780 trees have been planted out, covering 82 acres, and 4,400 trees have been planted to blank up last year's work. 4,300 trees have been given in compensation for marram-grass. 332½ acres have been planted with marram-grass. Flax-fans have been planted, lupin-seeds sown, and sand-arresting and boundary fences have been erected.

Hutt River Estuary Reclamation.—323,243 cubic yards of spoil from quarries and river-bed have been dumped in the reclamation, giving 26 acres of reclaimed land to date.

Otaki River Diversion.—At a point about 3 m. upstream from Otaki Borough the river has been successfully diverted back to its old course by means of a groyne constructed with rail piles and netted boulders and boulder gabions.

Paraparaumu Camps.—The useful work of draining, clearing, stumping, &c., has been carried out by single men from three camps. Two of the camps closed down during the year; the work is still being carried out by the remaining one (Beach Road Camp).

Ruamahanga River Protection.—At Ahiaruhe and Ti Whiti Settlements protective work has been carried out in the nature of boom groyne construction, bank battering and thatching, and construction of stop-banks.

Nelson District.

Clarence River Protective Works.—Repairs to this stop-bank have been carried out during the year.

Motueka River Survey.—A survey of this river from the point where it enters the plain to the sea, a distance of approximately 4 m. has been carried out with a view to designing a scheme for the protection of the Motueka Borough, the State highway, and the valuable farm lands in this area. The scheme will probably consist of stop-banking and protective works. The survey plans and reports have been finalized by the contractor and have been submitted to this Department for inspection and check. The survey has been carried out by the Motueka River Board by contract under a Government subsidy.

Picton Foreshore (Reclamation).—Proposals for the reclamation of approximately 1 acre of the foreshore of Picton Harbour have been put forward by the Picton Borough Council as part of a reclamation scheme in this locality. The scheme is designed to beautify the foreshore and to provide increased recreational facilities for visitors to this popular resort. Permission has been given to the Council to carry out the work by day labour, and the job is now in progress.

Wairoa River, Brightwater (Protective Works).—Practically no construction work has been carried out during the year, but survey operations over the whole area from Wairoa Gorge to the sea have been pushed forward, about 20 m. of traversing and levelling have been completed, and numerous sections have been taken across the river. The field-work is now practically completed, and plans and report for a comprehensive scheme are now well advanced.

Fireblight-prevention.—All camps were closed down towards the end of last year, and no further work has been carried out under this heading during the current year.

Canterbury District.

Ashburton and Hinds Rivers: Flood Control Survey.—During the year extensive surveys have been completed on the Ashburton and Hinds Rivers. These surveys will enable a proper scheme of control to be laid out so that all improvement work undertaken in future will fit in with a comprehensive long-range plan.

Ashley River Control Works.—During the year the extensive programme of control work has been actively pursued, and the work is now in hand in a well-advanced state of completion.

In view of the experience gained during the flood of March, 1936, the embankments and groynes have been raised above the previously designed heights.

The work completed during the year is as follows:—

Formation: North stop-bank, 3½ m. raised and completed. South stop-bank, 6¾ m., raised and completed. The total earthwork involved is 261,500 cubic yards.

Stone Gabions: 5,000 cubic yards of stone gabion work have been built at the various groyne heads.

Willow Planting: 131 acres of planting have been done in an orderly manner to prevent erosion and add security to the work.

Channel-clearing: 58 acres of channel have been cleared to give improved waterway where it is required. Other works comprise 26 acres of grassing, eight culverts, and 14 m. of fencing.

Kowhai River Protection.—A small groyne was constructed to prevent local erosion.

Opihi River Flood Control.—Protective works were established near the Levels Irrigation Scheme intake to fit in with future work when undertaken on that river.

Tuahiwi Drainage Scheme.—This work was carried out in the Native Reserve under the No. 5 Scheme, employing Kaiapoi Natives. 171 ch. of drains have been completed, and, although this is only portion of the scheme, the benefits are already apparent.

Greymouth District.

Karamea River Control.—The lower reaches of the Karamea River have become silted to such an extent that almost continual flooding of the Karamea Township adjacent land has occurred, and the control of the river became an urgent matter.

This silting was caused by large quantities of coarse granite sand being brought down from extensive slips that occurred in the upper watershed during the Murchison earthquake and partially filling the river-channel.

The remedial measures comprise the construction of a rock wall at the entrance and at Otumahana Bend for confirming and training the river, and general stop-banking of the Karamea River flats.

The work was authorized in August last, and the amount completed to date is 2 m. of tram-line, 2,100 lineal feet of trestle-work, 10,000 tons of stone training-wall, and 49 ch. of stop-bank formation, or approximately 14 per cent. of the total.

Hokitika River Protective Work.—A large gabion protection was constructed to close a dangerous flood overflow channel at Camelback, which threatened a large area of pastoral land at Koterangi.

SMALL-FARMS SCHEMES.

Auckland District.

Mangawai Kauri-gum Reserve.—During the year good progress was made with the development of this block in continuation of the work carried out last year. In addition to roading, which has been reported elsewhere, 610 acres were cleared of scrub; gum-holes were filled in and moulds levelled over an area of approximately 300 acres, 145 acres were worked up and sown in grass, and a further 80 acres have been ploughed. The main drain through the block, which is 18 ft. by 15 ft., has been deepened 6 ft. over a length of 1 m. 54 ch., 7 m. 35 ch. of interior drains averaging 3 ft. by 3 ft. 6 in. were excavated, and 2 m. 65 ch. of standard fencing erected. The work is being carried out by this Department with unemployed labour.

Kaipara Harbour Mangrove Reclamation.—The whole of this block, embracing 730 acres, was dewatered in October last, all boundary and lateral drains have been constructed, and the area is drying out well; considerable planting of buffalo-grass on stop-banks has been carried out, and during the coming spring it is intended to proceed with the clearing of mangroves, the construction of spider drains, and metalling of access road. During the period 27 ch. of stop-bank and drain of equal length were constructed, making the total length completed to date 4 m. 36 ch. The stop-bank has been strengthened and stone-faced over that portion which is subject to seawash.

A total of 24,917 cubic yards were excavated during the period, covering a length of 9 m. 48 ch. of drains of various dimensions.

Blocks V, VI, X, and IX, Maungatautari Survey District (Ellicott's Block).—The development of this block of 2,900 acres was continued during the year, and good progress was made. In addition to maintaining the farming operations of the area previously developed and stocked, a further 485 acres were ploughed and 257 acres reploughed, 305 acres were permanently grassed, 600 acres harrowed and top-dressed, 606 acres cleared of scrub and fern; 12 m. 78 ch. of new fences erected; 176 acres cultivated in turnips and swedes, and 225 tons of hay cut and harvested; 1,000 pine-trees planted. Fencing-materials were cut and split as under: Battens, 51,200; posts, 9,690; strainers, 235; stockyard rails, 350; stays, 230. In addition to the above, the following buildings were erected during the year: Three permanent milking-sheds, six store-sheds, and two sheep-yards.

Section 25s, Blocks XI and XV, Maungatautari Survey District (late Property of W. L. Foss).—Good progress has been made with the further development of this property of 438 acres, and during the year 113 acres were cleared of scrub, 37 acres stumped and cleared, 73 acres ploughed and 101 acres reploughed, 216 acres cultivated, 36 acres sown in turnips, and 60 acres in permanent grass, 2 m. 64 ch. of permanent fences erected, 35 acres of pastures harrowed and top-dressed, and boring for water-supply to a depth of 240 ft. was carried out.

Lot 2 of Section 1, Block XV, Maungatautari Survey District (late L. S. Langdon's Property).—The work of developing this block of 456 acres was continued during the period, and a successful programme has been carried out. Ragwort was treated over an area of 89 acres, 116 acres of heavy and light scrub stumped and cleared, 38 acres ploughed and 115 acres were reploughed, 25 acres cultivated, 40 acres sown in turnips and temporary grass, 65 acres permanently grassed, and 20 acres of pastures harrowed and top-dressed. In addition, 10 ch. of rabbit-proof fences and 198 ch. of standard seven-wire fences were erected.

Section 8, Block VII, Wharepapa Survey District (late P. Anderson's Property).—In addition to the work previously undertaken, considerable work of a developmental nature has been carried out on this block of 383 acres. During the year 86 acres of scrub and light bush have been stumped and cleared, 51 acres of heavy stumping and clearing, 67 acres ploughed and 76 acres cultivated, 10 acres sown in turnips, 14 acres permanently grassed and 14 acres of pastures harrowed and top-dressed, 10 chains of standard seven-wire fences erected, and two farm bridges were constructed. 430 fencing-posts, 28 strainers, and 500 battens were cut and split on the property.

Taumarunui District.

O'Keefe's Block.—The development of this block has been in progress for eighteen months, and the following work has been done: 325 ch. new fences erected, 49 ch. old fences repaired, 7,000 battens were split and used in fencing; 76 acres land cleared, 60 acres ploughed, 76 acres cleared of ragwort, 75 acres has been sown in permanent pasture and 30 acres cropped, 180 acres have been top-dressed. 32 ch. of new drains dug and 50 ch. of old drains repaired.

Larsen's Block.—Good progress has been made on the development of this block. 416 ch. of fencing has been erected, 91 ch. of shelter-belts have been planted, 103 acres have been stumped, 132 acres ploughed, 25 acres sown in permanent pasture, 55 acres cropped, and 240 acres have been top-dressed.

Cruickshank's Block.—The following work has been completed on this block: 412 ch. fencing erected, 170 ch. shelter-belts have been planted, 110 acres cleared, 80 acres have been ploughed, 87 acres have been sown in permanent pastures, 33 acres have been cropped, and 120 acres have been top-dressed.

Metcalfe's Estate.—This scheme will shortly be completed as far as the development-work is concerned. The operations to date comprise 162 ch. of new fencing, 12 ch. of shelter-belts planted, 53 acres of swamp land have been cleared, 95 acres of land has been ploughed, 61 acres sown in permanent pasture, and 22 acres cropped. A water-supply has been laid for 374 yd. 320 acres of pasture was top-dressed, 25 ch. new drains completed, and 413 ch. of old drains were repaired.

Lee's Property.—The development of this block is nearing completion. The following work has been carried out: 851 ch. of fencing has been erected, 38 ch. of shelter-belts have been planted, 600 posts and 5,000 battens were split for the erection of fences on this block. Road-construction was continued for a further 100 ch. 64 acres of bush has been felled, 177 acres stumped, 176 ploughed, 200 acres grassed, and 75 acres cropped. 1,848 yd. of water-supply have been laid. 600 acres have been top-dressed, 294 ch. of new drains dug, and 192 ch. of old drains repaired.

Hill's Block.—Work on this block has been satisfactorily carried out during the past year. 204 ch. new fencing has been erected, 185 ch. fences repaired, 106 acres of fern and gorse has been cleared, 146 acres have been ploughed, of which 61 acres were sown in permanent pasture and 66 acres cropped. 350 acres pasture was top-dressed. 1,386 yd. of water-supply has been installed. 20 ch. of drains have been cleared. Formation of an access road of 37 ch. has been completed.

Piu Settlement.—Since the commencement of operations on this scheme in June, 1936, the progress of developmental work is as under: 341 ch. new fencing erected, 405 ch. old fencing renewed, 515 acres of fern was cleared of which 114 acres have been ploughed. 45 acres have been top-dressed, 57 acres have been sown in permanent pasture, 40 acres have been cropped. 220 ch. of new drains were dug. 94 ch. of road formation and metalling has been completed.

Owen Block.—Working operations for the development of this block have been carried out by approximately thirty single men since the inception of this scheme. 566 ch. of new fencing has been erected, 524 acres of fern and ragwort has been successfully cleared, 295 acres has been ploughed, 314 acres grassed, 62 acres planted in turnips, 248 acres of old pasture has been top-dressed. 34 ch. of new drains were dug. Road formation to an extent of 280 ch. has been completed, of which 160 ch. has been metalled.

Ngatamahine Block.—This block is opening up very well, and with the work carried out during the last year there is now completed 1,716 ch. fencing, 328 ch. old fences repaired, 120 ch. of shelter-belts planted, 57,000 battens has been split on the scheme for fencing. 790 acres of land has been cleared, 372 acres ploughed, 516 acres sown in permanent pasture, and 242 acres have been cropped. A water-supply of 1,800 yd. has been laid on. 2,200 acres of permanent pasture has been top-dressed. Draining, which is a big problem in this farm scheme, has received much attention, 510 ch. of main and subsidiary drains being completed and 156 ch. old drains opened up. Access roads are now practically completed, a total of 213 ch. being metalled and formed to date.

Pururu Block.—Much progress has been made in the development and opening up of this block. 2,063 ch. of boundary and subdivisional fencing has been completed. 20 ch. of shelter-belts were planted, and 750 posts and 40,000 battens have been split and used on this farm scheme. 900 acres have been cleared, 879 acres ploughed, 564 grassed, 399 acres cropped, and 477 acres of permanent pasture has been top-dressed. 134 ch. of new drains were excavated. 2,200 yd. of water-suply has been laid on to nearly all the cottages, cow-bails, and watering-places on the farm. 162 ch. of road has been formed and metalled.

Waitanguru Block.—Settlement work is still being carried out on this block, and to date 1,940 ch. of new fencing has been erected and 571 ch. of existing fences repaired, 49 ch. of shelter-belts have been planted. 750 posts and 52,500 battens were split and used in the fencing of this block. 258 acres have been felled, 532 acres stumped and cleared, 281 acres ploughed, 691 acres sown in permanent pasture, 220 acres cropped, and 820 acres of pasture has been top-dressed. 210 yd. of water-supply has been laid on. 42 ch. of formation and metalling of access roads has been completed. 151 ch. of new drains were excavated and 115 ch. of old drains repaired.

Kihikihi Block.—Work has only recently been commenced on this block.

Kaiteringa Block.—Access roading has been commenced on this block, 1 m. 30 ch. of formation being completed.

Patoto Block.—Three miles of access roading has been re-formed and metalled, and a commencement made on the development-work, 100 acres of scrub being cut.

Napier District.

Ahuriri Lagoon Reclamation.—The reclamation of the Ahuriri Lagoon, comprising 7,500 acres of land, formerly part of the sea-bed, besides being the largest undertaking of its kind in the Dominion, is of particular interest because of its close connection with the Napier earthquake of 3rd February, 1931. When that took place the whole bed of the lagoon which was then a shallow arm of the sea, was raised 5 ft. in the space of a few seconds, causing the greater part of the water to rush through the outlet to the sea, leaving approximately half the bed dry and the remainder covered by shallow pools.

The Napier Harbour Board, in whom control of the lagoon was vested, eventually entered into an agreement with the Small Farms Board with the object of having the land reclaimed and settling thereon unemployed men and their families.

The Public Works Department was entrusted with the drainage-work, which was commenced in June, 1934. Efforts were at once concentrated upon the construction of the eleven miles of stop-bank necessary to control the water draining from the 16,000 acres of rugged hill country behind the lagoon, and this has now been completed with the exception of making up a small amount of subsidence.

Provision was also made for two electric pumping-stations to drain the flat land enclosed by the stop-banks, and they were completed simultaneously with the stop-banks and put into operation during the past year. The total capacity of the three pumps in the north station is 28,000 gallons per minute and that of the two in the south station 2,800 gallons per minute. The areas drained by each station are 5,000 acres and 600 acres respectively.

To bring the land to a state of productivity the first and most essential step was to rid it of excessive salt left there by the sea. In the present undertaking this is being achieved by a system of close drainage, which comprises small drains 3 ft. deep and 12 in. bottom width dug in parallel lines 2 ch. apart over the whole area. To date, 207 m. of these drains have been completed. By periodical analysis of soil samples under the supervision of the Department of Agriculture valuable information has been obtained regarding the reduction in salt content and other soil changes resulting from the drainage-work. The indications so far are that the drains are bringing about a very rapid and marked improvement. The results of the last two sets of samples taken in April and August of 1936 show an average reduction in salt and magnesium of about 50 per cent. during the intervening four months. The maximum reduction in that time was at the rate of 9 tons of salt per acre.

A section of the block comprising 2,000 acres has now been completely drained and over a further 2,000 acres of this work is well advanced.

Thirteen miles of fencing have been completed at the southern end of the block, and approximately 400 acres were cultivated and sown down in pasture last autumn, the soil tillage and sowing being under the control of the Lands Department. A flock of 1,000 breeding-ewes has already been drafted on to the block, and 100 head of cattle will follow shortly.

An average number of 177 married men have been employed during the year, and all have been recruited from the unemployed of Napier and surrounding district.

Details of progress are as under:—

	Work done Year ended 30th June, 1937.		Work done to Date.	
	Miles.	Ch.	Miles.	Ch.
Stop-banks	1	8	11	0
Main drains	4	12	7	25
Subsidiary drains	5	1	13	69
Lateral drains—				
Excavated	128	65	207	46
Cleaned out	24	57	79	41
Filled in	18	77	18	77
North pumping-station	Completed.			
South pumping-station	Completed.			
Concrete pipe culverts—	Lin. ft.		Lin. ft.	
12 in. diameter	36		117	
18 in. diameter	407		651	
24 in. diameter	90		90	
30 in. diameter	..		140	
42 in. diameter	..		48	
Water drive, 4 ft. by 6 ft.	..		174	
Bridges, concrete: 30 ft. to 40 ft. single spans	Two completed.			
Concrete floodgates—				
North gate	Completed.			
South gate	Completed.			
Roading—	Cub. yd.		Cub. yd.	
Formation	45,630		58,590	
Metalling	..		2,060	
Implement shed, 24 ft. by 48 ft.	Completed.			
	Miles. ch.		Miles. ch.	
Fencing, seven and eight wire	13 18		13 18	
	Acres.		Acres.	
Swamp ploughing	1,000		1,000	

HARBOUR WORKS.

Mangonui Wharf.—A commencement was made with the erection of a reinforced concrete wharf 135 ft. long. All the piles have been cast and driving is in hand.

Kerikeri Wharf.—A report was prepared on a wharf proposed to be erected by the Bay of Islands Harbour Board.

Te Hapua Wharf.—A reinforced concrete wharf 104 ft. long was erected.

Awanui River Dredging.—A report on a scheme of dredging to improve conditions at this port was prepared and the work is now in hand, a Sauerman dragline being used.

Westport Harbour.—The average of monthly mean depths on the bar at low-water ordinary spring tide was 16 ft. 3 in., a considerable improvement on 14 ft. 4 in. for the previous year, and 14 ft. for 1934–35. In April the mean depth on the bar was 14 ft. 3 in., and from then a gradual increase was maintained until October, when a mean depth of 17 ft. 4 in., the highest for the year, was reached.

However, from this date a steady shoaling on the bar commenced. This continued until the end of the period, when the mean depth had fallen to 15 ft., though this average was a little better than at the commencement of the year.

During the period under review the average working depth on the bar at high water was 22 ft. 8 in. This is a substantial increase on 20 ft. 10 in. for the preceding comparative period and 20 ft. for 1934–35.

The average working depth in the river at high water was 24 ft. 6 in., as against 23 ft. 6 in. for 1935–36 and 24 ft. for 1934–35. This increase in depth followed the general trend of improved bar conditions for the first half of the year, but, whereas definite shoaling occurred on the bars, the improvement in the fairway was maintained. A factor of definite effect in this connection, however, was that 216,434 cubic yards of material were lifted during the year by the "Eileen Ward" from the lower river fairway—(*i.e.*, from the crane wharf to the bar)—as against 97,277 for the preceding year, whilst the amount lifted during 1934–35 was 134,939 cubic yards.

Dredging operations were confined to the suction dredge "Eileen Ward," the bucket dredge "Maui" and the suction dredge "Rubi Seddon" still remaining out of commission.

The Eileen Ward" worked on 158 days, and dredged a total of 535,105 cubic yards, of which 267,687 were taken from the bar, 216,434 from the lower river, 38,073 from the berthages, and 12,911 from the floating basin.

This dredging was carried out at a cost of 4·83d. per cubic yard, which is less than the unit cost per yard for the previous two years.

The favourable cost of the dredging was accounted for by the fact that the dredger was not docked during the year, in which case there would have been increased costs and smaller output.

The " Eileen Ward " was well maintained throughout the year, and a large amount of reconditioning was carried out during the period the vessel was under survey and overhaul.

A comparison of the shipping entering the port during this year as against the previous two years shows very little difference, and amounted to 257,506 tons.

For the twelve months under review eighteen large overseas vessels worked the port, as against sixteen for the previous period and fourteen for 1934–35.

Rain fell on 229 days, an exceptionally large number, and 90·71 in. were recorded on the harbour gauge. This was the wettest year since 1931–32, when 114·55 in. fell.

The reticulation of the main beacons, signal-station, and the two signalmen's cottages was put in hand during the year, the work being completed shortly after the close of the period. This work involved erection of 3½ m. of transmission-line, nearly 3 of which is high-tension line.

All plant and buildings have been kept in good repair.

No major construction work was carried out during the year, but repairs to the breakwater and river-protection work have been authorized. Preliminary work in the clearing of the Cape Foulwind line for the resumption of quarrying-work and repairs to the Organ's Island Bridge have been put in land.

Little Wanganui Harbour.—This port was maintained in a satisfactory working-condition through the year.

The beacon marking the rock edge at the south side of the entrance was re-erected. This beacon is an iron tripod bolted to concrete footings on the rock. It has previously been wrecked by heavy weather.

A new row-boat was supplied for the use of the Port Pilot.

The matter of extending down-stream the port wharf so as to permit of greater facility in handling and loading timber was investigated, and a preliminary proposal approved. Detail plans have now been prepared.

Tokomaru Bay Wharf.—Proposals for the reconstruction of wharf and approach viaduct submitted by the Tokomaru Bay Harbour Board, have been reported on for the Local Government Loans Board.

Waikokopu Harbour.—The operations at this harbour have been carried out by the Wairoa Harbour Board on behalf of the Public Works Department.

During the year eighty-six coastal vessels worked the port and handled 5,932 tons of general cargo and 392,226 square feet of timber. In addition seven overseas vessels worked the port and lifted 1,350 quarters of beef, 50,678 carcasses of lamb, 1,261 carcasses of pork, 2,417 packages of sundries, 670 bales of wool, 81 bags of hides, 29 casks of tallow, 500 cases of jellied veal, and 104 tons of general cargo.

Exports are well below those of the previous year on account of the difficulty experienced by the freezing companies in obtaining shipping space.

Necessary repairs have been carried out to wharf and buildings. Soundings show no appreciable change in depth.

New Plymouth Harbour.—A report has been submitted on a proposed loan for harbour works.

Whangapara Wharf, Great Barrier Island.—Plans, &c., in connection with the above wharf have been approved and a contract let for same. The contractor has ordered materials, but so far none has come to hand, and no work has been done on the site.

Elmslie Bay Wharf, French Pass.—The new wharf in Australian hardwood, with a tee 75 ft. long by 32 ft. wide, with 132 ft. of 8 ft. wide approach spans, has been completed, together with the erection of a shed for storage and two sets of launch-steps. The formation of track approaches to the wharf has also been completed.

Torea Wharf, Queen Charlotte Sound.—Repairs of a minor nature have been carried out.

Portage Wharf, Kenepuru Sound.—General repairs have been carried out, the main items being the resheathing of the piles and renewal of major portion of the decking.

Onahau Bay Wharf, Queen Charlotte Sound.—An addition to this wharf has been made by the erection of a tee 15 ft. by 5 ft. on 53 lb. steel-rail piles.

Waitaria Bay Wharf, Kenepuru Sound.—Extensive repairs have been completed, including the replacement of single caps with double caps, the renewal of practically all the decking, and renewal and repair of handrail.

Thames Harbour.—A small channel was previously dredged out over a distance of 226 ft. beyond the edge of the wharf. Dredging operations this year were extended another 334 ft., and the channel was excavated to a width of 50 ft., and a depth of 7 ft. at low water. Operations ceased when the dredger was submerged during the stormy weather, and have not been resumed. The total work carried out is—Berthage, 277 ft. long by 60 ft. wide by 9 ft. deep at low water; channel beyond the wharf 660 ft. long by 50 ft. wide by 7 ft. deep at low water.

Okarito Harbour.—The Okarito Harbour Co. has not carried out any further work during the year, but has been watching developments at the entrance.

Continued northerly weather caused considerable erosion of the beach during the greater part of the year, but during the past theee or four weeks southerly winds have caused a considerable building-up south of the present outlet.

During the year the outlet channel has moved a considerable distance southwards, and is now approximately midway between its position in 1934 and the north training-wall.

Jackson's Bay Harbour.—During the year a survey of the harbour-site has been carried out and a contour plan of the bottom prepared for the purpose of locating a wharf-site.

Lighthouses.

Godley Head Fog Signal.—The fog-signal machinery has been overhauled and new parts supplied where necessary. The signal was dismantled and cleaned and new parts made and fitted.

Akaroa Lighthouse.—A new steel staircase for the landing-stage has been designed, and is now n the course of manufacture.

Tiritiri Fog Signal Station.—New handrailing has been fitted in the engine-room. A full-way 6 in. valve has been incorporated in the main air-pipe line to the diaphone in place of the original 6 in. screw-down valve. A small hillock of earthwork has been excavated away from the site immediately under and extending outwards from the sound-projecting horn to improve the range of the signals.

Milford Sound Lighthouse.—A new reinforced-concrete lighthouse has been erected on Anne Point, Milford Sound, complete with steel tower and fourth order flashing light in 300 mm. dioptric lens. A crane has been erected at the landing and the bush cleared around the light. A new track has also been formed from the landing-point to the lighthouse.

Pearl Island Lighthouse.—A new flashing light in 140 mm. dioptric lens has been erected on a steel tower at Pearl Island, Port Pegasus, Stewart Island.

Akers Point Light.—Action has been taken to procure a substitute flasher for the lighthouse at Akers Point.

Ponui, Moko Hinau, Cuvier Island, North Cape, and Cape Maria Van Diemen Lighthouses.—In order to improve the transport conditions on the above stations, the Department has arranged for the manufacture and delivery of power winches to take the place of the present hand-operated outfits. The foundations and anchorage for the cableway at Chicken Island have been put in, and it is hoped to have all the winches installed during the coming year.

French Pass Beacon.—Considerable damage was done to this beacon when it was struck by one of the Anchor Shipping Co.'s steamers. A ring of reinforced concrete has been placed round the base of the beacon, and attention to a few minor details will complete the work. This work was hampered, as it could only be carried on during some spring tides.

Kahurangi Point Lighthouse.—On account of sea erosion during spring tides the lightkeeper's residence and store were endangered, and it was found necessary to remove the building 120 ft. to a safer position.

Baring Head Lighthouse.—The necessary equipment for a modern radio direction-finder has been ordered, two 75 ft. steel masts have been fabricated and delivered, and it is anticipated the direction-finder should be in operation early in the New Year.

This direction-finding apparatus will be operated from the existing Diesel power supply, but a new 250 amp 110-volt battery has been installed in place of the smaller one originally provided. This new battery will have ample capacity to meet the existing services as well as the additional load.

Cape Campbell Lighthouse.—It is now proposed to electrify this light and also to provide a radio direction-finder. The direction-finding apparatus and duplicate units of 18 kw. Diesel-engined generating-sets have been ordered. Plans have been prepared for the power-house and radio quarters. Arrangements are being made to ship the necessary material to Cape Campbell, and the erection of power-house, masts, generating-sets, &c., will be carried out by the Public Works staff, and the aerial and radio direction-finder by the Post and Telegraph Department.

The necessary apparatus for converting this light from an incandescent oil-burning one to electric operation has been ordered, and the conversion should be completed during the coming year.

The generating-sets, the revolution of the lens to give a flashing characteristic, and the emergency lamp-changer will be automatically controlled electrically, and will function with a minimum of attention.

Stephens Island Lighthouse.—This light is also to be converted to an electric one in an exactly similar manner to Cape Campbell, and a direction-finder installed. The radio apparatus, generating-sets, &c., have been ordered, and arrangements are in hand for the erection of masts, aerial, and power-house.

General.

A number of applications were received from local bodies and private people for approval of works involving marine interests. Among the various applications were the following:—

Foreshore Licenses.—Port Hardy, D'Urville Island; Maungawhare, Northern Wairoa; Wade River; Whangawa Harbour; Tauranga Harbour; Rangiora, Hokianga Harbour; Half-moon Bay, Parengarenga Harbour; Picton; Mangarama, Northern Wairoa; Okuru River, South Westland; Heathcote Estuary, Sumner; Braggs Bay, Stewart Island.

Protective Groynes.—South Beach, Greymouth.

Wharves and Jetties.—Whakatane; Lyttelton; Oyster Wharf, Bluff Harbour; Bowen Pier, Port Chalmers; Motutapu Island, Auckland; Birch Street Wharf, Dunedin; Training Wharf, Calliope Dock, Auckland Harbour; Picton; Mangonui Wharf; Kerikeri Wharf, Bay of Islands; Purerua, Bay of Islands; Okuru River, Tokatoka, Northern Wairoa River.

Boatsheds and Skids.—Evans Bay, Wellington; Half-moon Bay; Otago Harbour; Port Nelson; Manakau Harbour.

Slipways.—Bluff Harbour; Otago Harbour; Greymouth.

Bridges.—Makarau River, Kaipara Harbour; Waiarohia Stream, Whangarei.

Reclamation.—Freeman's Bay, Auckland; Manakau Harbour; Tokomaru Bay, Picton; St. Mary's Bay, Auckland.

General.—Sewage outfall, Chelsea Bay, Auckland Harbour; transmission-line, Northern Wairoa Bridge; Harbour-works, Okarito.

ESTABLISHMENT OF AERODROMES AND LANDING-GROUNDS.

During the year very satisfactory progress has been made in the establishment of aerodromes and landing-grounds. The Government's policy has been to concentrate on the establishment and extension of main-trunk routes, but not to lose sight of the possibility of feeder services to the main stopping-places on these routes. As a result, rapid development of flying-fields is continuing simultaneously all over the Dominion.

During the period under review eleven new aerodromes have been licensed; and several more are completed and awaiting growth of grass and consolidation of surface before they are placed in service. Development work is in hand on fifteen new grounds, and extensions are under construction on a further twelve existing aerodromes. Surveys are in hand on thirteen proposed sites, and preliminary investigations have been made in many localities all over the country.

Close co-operation has been maintained between this Department, Air Department, and Royal New Zealand Air Force in the design and construction of Air Force Bases in the three selected centres at Christchurch, Ohakea, and Auckland. A very comprehensive programme of work is running well up to the proposed schedule. In this work the Department's operations have been extended to the design, supervision, and construction of buildings, roading, sewerage, water-supplies, and electrical reticulation and installation, as well as handling and giving expert technical advice on all problems that are related to the sound establishment of aviation.

A marked change in construction methods has been made during the year. Where previously all construction was undertaken by slow and laborious hand methods, now every possible phase of the work is undertaken by modern mechanical means, and much of the work is let to private contractors at competitive prices arranged by invitation of public tenders. This method has resulted in a saving to the country on every work undertaken, and in some cases costs have been reduced to as low as a quarter of the probable cost by hand work.

Radio Aids to Air Navigation.—The Aeradio Committee has been set up during the year. This is composed of officers from Public Works Department, Post and Telegraph Department, Air Department, and Meteorological Department, and is giving consideration to every side of the question of radio aids in air navigation. As the result of the work of this Committee radio transmitting and receiving stations are in hand or completed at six strategic points throughout the system of air-ways, a further six are proposed and will be in hand at an early date. The development of radio aids to blind flying, approaching, and landing, in overseas countries is being watched carefully with the object of early installation of the most efficient equipment suited to New Zealand conditions.

Removal of Obstructions in Aerodrome Localities.—A definite attitude has been taken in connection with obstructions in the neighbourhood of aerodromes which may be a source of danger to aircraft. Many grounds are obstructed to a greater or lesser extent by power and telephone lines, trees, and wireless masts. Legislation has been framed to deal with these, and the Department now has power to remove all obstructions above a predetermined grade all round aerodromes, and to prevent the building of new structures above this grade. A commencement has been made with this work.

Air Pilot and Notice to Airmen.—This guide-book has proved to be a great value to airmen, and it is kept up to date by monthly inspections of each aerodrome by departmental officers. A service has been arranged so that holders of the *Pilot* receive amendments at regular intervals. Careful watch is kept on all aerodromes, and developments of a nature which may be dangerous to aircraft are made the subject of printed notices which are issued to all airmen by the Air Department.

Strip Maps.—Working in conjunction with the Lands and Survey Department, the Department has proceeded with the compilation of these maps. The first is already available, and the rest are in the hands of the Government Printer. A large amount of work has been put into these maps to ensure accuracy of detail and the production of an article which will be of the greatest possible use to airmen.

Details of aerodrome works in hand are as set out in the following list:—

Royal New Zealand Air Force.

Auckland District: Hobsonville Air Base.—During the year the flying-field has been extended and improved. The extended grading operations, covering an area of 90 acres, are almost complete. 87,500 cubic yards of material have been excavated during the period, bringing the total to date on this work up to 217,000 cubic yards.

Excavation and reclamation for additional seaplane-hangar accommodation have been completed. This work involved 27,000 cubic yards of excavation and the construction of a stone breastwork 10·3 chains long, containing 1,330 cubic yards of spalls.

Surface drainage of the flying-field is in hand; 2 miles 69 chains of field tile and scoria drains have been constructed.

Returfing has been completed over 31 acres, making a total to date of 51 acres.

Water-supply and fire-fighting facilities have been improved by the construction of an elevated 20,000-gallon reinforced-concrete water-tower.

Wellington District.—As a result of further investigations, the proposed site for an Air Force Station at Woodbourne, Blenheim, has been abandoned, and a more suitable site has been acquired at Ohakea, near Palmerston North. Preliminary investigations have been carried out, and it is proposed to commence the detailed engineering survey immediately.

An alternative site at Rongotea was also investigated.

Christchurch District: Wigram.—All uneven and unfinished portions of the field have been completed and grassed. Marking circle and identification name have been placed. Roading is in hand. A 25-yard rifle range and machine-gun butts are completed, and five wireless masts have been erected.

The workshops block has been completed.

Two dormitories and a community block have been erected and are accommodating eighty men.

A 5,000-gallon fuel installation has been completed.

Water-supply, sewerage, and electrical reticulation are in hand.

Proposed Royal New Zealand Air Force Base: Auckland District.—Preliminary investigations for the establishment of a Royal New Zealand Air Force Base have been carried out at the following localities: Kumeu, 500 acres; Whenuapai, 450 acres; and Mangere Central, 900 acres (comprising two areas). No site has yet been adopted.

CIVIL AERODROMES AND LANDING-GROUNDS.

Whangarei - North Auckland District.—Preliminary investigations have been carried out at Onerahi (Whangarei), Waitangi, Rawene, Kaikohe, Dargaville, and Kerikeri.

Engineering surveys have been undertaken at the following sites: Onerahi (Whangarei), Kaikohe, Dargaville (alternative site), and Waipapakauri (extensions).

Proposals have been completed at Onerahi (Whangarei) and Waipapakauri (extensions).

Construction work has been put in hand over an additional 34 acres on Waipapakauri Aerodrome.

Auckland District.—Preliminary investigations for sites are in hand at Point England, Kawhia, Raglan, and Kaawa Valley. Surveys have been undertaken at Ngaruawahia and at Great Barrier Island.

Construction has been carried out at the following grounds:—

Great Barrier Island (Kaitoke): Construction work is well in hand by modern-plant methods.

Mangere Aerodrome: Extensive enlarging and regrading has been carried out over 83 acres, involving excavating 96,000 cubic yards for the year, and making the total to date 177,000 cubic yards; 24 acres have been returfed and 6 acres sown in grass; 12,000 cubic yards have been excavated for buildings area and construction of 3,300 square yards of permanently surfaced aprons. The erection of radio transmitting station is in hand. The field is in use by Union Airways as the Auckland terminal of Auckland–Wellington daily service.

Ngaruawahia Emergency Landing-ground: This ground has been ploughed, levelled, and sown with grass, and is fit for use.

Thames Aerodrome: An area of 95 acres has been acquired, stop-banked, and ring-drained, and is ready for final surfacing. Earthwork during the year amounts to 26,000 cubic yards.

Tauranga - Bay of Plenty District.—Preliminary investigations have been carried out at the following sites: Te Teko and Whakatane. Engineering surveys were completed at Tauranga, Opotiki, Atiamuri, and Galatea.

Construction is in hand as follows:—

Atiamuri—Emergency Landing-ground: 70 acres have been cleared and grubbed. Levelling of surface is in hand.

Galatea—Emergency Landing-ground: This ground is in good order, and improvements are in hand.

Opotiki Aerodrome: Construction has been commenced, and drainage of the field is in hand.

Rotorua Aerodrome: 115 acres have been levelled and sown in grass, and work is nearing completion. 62,000 cubic yards of earthwork have been shifted during the year.

Taupo Aerodrome: 52 acres have been ploughed and grassed, and the area has been surrounded with rabbit-proof fence.

Tauranga Aerodrome: 68 acres have been cleared and stumped, and an access road has been formed and partly metalled. Proposals are in hand to construct this aerodrome by contract.

Gisborne - Poverty Bay District.—Investigations have been carried out at Motuhora, Ruatoria, and Rakauroa.

Engineering surveys have been undertaken at Gisborne for extensions and at Opoutama.

Gisborne Aerodrome: Levelling and surfacing of 50 acres have been completed during the year by plant methods, and the field is again in use. Proposals are to be prepared for additional extensions.

Opoutama—Emergency Landing-ground: Work has commenced on the preliminary development of the ground.

Taumarunui - King-country District: Preliminary investigations have been carried out at Chateau Tongariro, Taumarunui, and Te Awamutu. Construction work is in hand on only one aerodrome.

Te Kuiti Aerodrome: The preliminary development has been completed during the year, and the aerodrome has been in use since October, 1936. Extensions have been surveyed and construction on these is in hand.

Stratford-Taranaki District.—Engineering surveys have been undertaken at Karioi and New Plymouth extensions.

New Plymouth (Extensions): The original area is in good order, and is in use by transport and club aircraft. Work is in hand on the development of a further 120 acres, involving the deviation of Te Arei Road and heavy earthwork in the regrading of this new area. A radio transmitting station is being constructed.

Stratford Aerodrome: The development of this aerodrome has been completed, and the ground is in good order and is in use. The work entailed heavy stumping, draining, regrading, and reclamation of former swamp, and has been remarkably successful; 40 chains of access road were formed and metalled.

Hawera Aerodrome: All work with the exception of removal of obstructing power-lines has been completed on this aerodrome; 100 acres in all have been graded and returfed. The ground is in good order, and is in use.

Wanganui Airport: Work on this aerodrome under the control of the Wanganui City Council has been completed, and the ground is in use. Extensions at the northern end are in hand.

Napier - Hawke's Bay District. Preliminary investigations were undertaken at Wairoa.

Engineering surveys have been carried out at Mohaka and Waipukurau.

Construction work has been in hand at the following aerodromes:—

Napier Aerodrome: During the year 101 acres have been levelled, involving 76,000 cubic yards of excavation. The whole area of 144 acres is now completed and sown in grass. It is anticipated that the aerodrome will be available for use in the early part of 1938.

Hastings Aerodrome: An additional 3·5 acres were levelled during the year. The total area is now 47 acres. A landing-circle has been placed and attention given to surrounding obstructions.

Waipukurau Aerodrome: A total of 62 acres was relevelled and turfed during the year: 38,000 cubic yards of material was excavated. The completed portion of ground is in use by light aircraft, and further extensive levelling and drainage work is in hand.

Dannevirke Aerodrome: This aerodrome has been completed and landing-circle placed during the period. The surface is in good order, and is in use by light aircraft.

Mohaka Emergency Landing-ground: This ground has been levelled and grass has been sown over the whole area; 33 acres were completed and sown in September, 1936, and are in use. The remaining 24 acres have been sown, but are not yet fit for use.

Westshore Landing-ground: This temporary landing-ground has been in good order and in constant use by club and commercial aircraft.

Wellington District.—Preliminary investigations were undertaken at Paraparaumu, and an engineering survey over 310 acres has been carried out. Construction work was in hand on the following aerodromes:—

Hood Aerodrome, Masterton: Construction work was completed and ground markings and boundary markers were placed. This aerodrome is in use.

Milson Aerodrome, Palmerston North: Earthwork is approaching completion, 67,000 cubic yards being excavated during the year. Tile drains are in hand and also practically completed, 30,750 ft. being placed during the year, while 81 miles of mole drains have been completed. A tarmac apron has been placed in front of the hangar area, and the access road has been metalled. A radio transmitting station is being constructed.

Feilding Aerodrome was completed, and is in use. During the year 41,500 cubic yards were excavated and 1,560 ft. of tile drains placed. A landing-circle of 50 ft. diameter has been completed.

Rongotai Aerodrome, Wellington, has been maintained in good order, and is in constant use by commercial and club aircraft. Extensions in the south-east corner were undertaken by the Wellington City Council, and a new hangar has been erected. Investigations concerning the future of this aerodrome are being undertaken.

Nelson District.—Preliminary investigations were undertaken at Awatere. Engineering surveys have been carried out at Clarence Bridge, Takaka, Woodbourne, and Nelson. Construction work is in hand on the following aerodromes:—

Nelson Aerodrome: A contract was let for approximately 600,000 cubic yards to be undertaken by modern-plant methods. Approximately 200,000 cubic yards have been excavated to date. A commencement has been made with the stream diversion, and an access road has been formed. A radio transmission station is being constructed.

Stoke Aerodrome: This aerodrome has been maintained in good repair, and has been continually in use by Cook Strait Airways and club aircraft.

Motueka Aerodrome: This aerodrome has been completed, 69 acres having been levelled and grassed. The removal of obstructing power and telephone lines is in hand. The field is in good order, and will be licensed in the near future.

Takaka Aerodrome: Arrangements are in hand for the full development of this aerodrome. The whole area has been cleared, fenced, and ploughed, and approximately 10 acres have been levelled. Arrangements are in hand for levelling and surfacing the whole area by contract.

Woodbourne Aerodrome is in satisfactory order and has been in constant use by Union Airways and Cook Strait Airways.

Blenheim Aerodrome: Earthwork on this aerodrome has been completed during the year, and the whole area will be in a fit condition for use as soon as the grass is well established. A total of 176 acres has been levelled. Extensions to the north-east to south-west runway are under consideration.

Lake Grassmere Emergency Landing-ground: Levelling-work is almost completed, and rabbit-proof fencing and stop-banking are in hand.

Clarence River Mouth Emergency Landing-ground: Proposals have been made to undertake this work by modern-plant methods at an early date.

Greymouth-West Coast District.—Preliminary investigations for sites have been carried out at Reefton, Rotomanu, Westport, and Waiho River Mouth.

Surveys have been undertaken at Westport, Weheka, Greymouth, Waiho, Okarito, and Wataroa. Construction has been in hand on the following aerodromes and landing-grounds:—

Westport Aerodrome: Construction has been completed on the original site north of the Buller River. This ground is in fair order, and is in use by light aircraft. Proposals for a new site on the south bank of the Buller suitable for commercial operation are under consideration.

Greymouth Aerodrome: The initial construction has been completed, and the aerodrome is in use. Proposals are in hand for extensions. A radio-transmitter has been installed.

Hokitika Aerodrome: Development work is still in hand, although the original scheme has been completed and the field is in use. Proposals are in hand for subsoil drainage system and pump to drain the field. A radio-transmitter has been installed.

Inchbonnie: Development of this ground has been completed during the year. The ground is well drained and suitably located for extensions when necessary.

Ross: The levelling of a limited area has been completed. Ploughing and grassing is in hand.

Wataroa: Two landing-strips have been completed, and the ground is fit for light aircraft. Development work on extensions is in hand, and the field is being surfaced with shingle.

Weheka: The initial landing-strip development of this field was completed, but owing to drainage difficulties it has not proved very satisfactory, and investigation for extensions on to firmer ground are in hand.

Waiho: The development of this field was completed, and an excellent field is available.

Mussel Point: Development is nearing completion, and extensive regrading has been undertaken. Sufficient ground is available for light aircraft, pending the consolidation of the newly levelled areas.

Upper Okuru: Development is in hand. The main strip is ready for use by light aircraft. Crowning and metalling of the strips is now in hand.

Haast: This ground is in use and has been maintained. Proposals for extensions and crowning of the landing-strips have been prepared, and the work will be in hand shortly.

Mahitahi: Initial development is in hand.

Karangarua: A temporary landing-strip has been prepared and is in use.

Christchurch-Canterbury District.—Investigations have been carried out at Simons Pass, Hapuku River Mouth, Kaikoura, Hurunui River Mouth, and Cheviot. Construction work has been carried out at the following aerodromes:—

Conway River Mouth Emergency Landing-ground: The preparation of this ground has been completed and grass has been sown. The ground should be ready for use in late spring.

Harewood Aerodrome (Christchurch Municipal): A commencement has been made using modern plant on levelling surfacing work over an area of 130 acres. This work is being done by the Christchurch City Council.

Timaru Airport: Good progress is being made with this aerodrome, and it should be completed early in 1938. Modern machinery is in use. The diversion and stop-banking of Otipua Stream is practically completed, and the construction of a new railway bridge and a large hardwood timber culvert to provide an outlet have been put in hand. Ring-drainage and stop-banking are well in hand, and a commencement has been made with the levelling and subsoil drainage of the flying-field.

Ashburton Aerodrome: Improvement work is being carried out.

Dunedin-Otago District.—Investigations have been undertaken at Waikouaiti, Waitaki River Mouth, and Pembroke. Engineering surveys have been carried out at Waikouaiti, Waianakarua, and Frankton. Construction work has been in hand on the following aerodromes:—

Taieri Aerodrome: This aerodrome was completed and put into use during the year, a total of 91 acres being surfaced. A radio transmission station has been provided.

Waianakarua Emergency Landing-ground: A contract has been let, and construction is in hand over 67 acres. The ground should be ready for use early in 1938.

Invercargill-Southland District.—Engineering surveys have been carried out at Gore. Construction work has been in hand during the year on the following aerodromes:—

Invercargill Airport: Additional areas have been levelled during the year, and 43 acres have been grassed, making a total of 84 acres graded and 88½ acres sown in grass. Drainage work and access road have been completed.

Gore Aerodrome: Earthwork has been completed, and the whole area of 57 acres sown down in grass. Drainage is now in hand. The aerodrome should be ready for use in December, 1937.

PLANT AND MECHANICAL EQUIPMENT.

Following on the directions of the Government, large purchases of modern plant were made during the period under review in order to equip the various works with efficient mechanical units. The bulk of this plant has now been received, and is in operation throughout New Zealand on all classes of work. The total value of the modern plant recently purchased is approximately £503,000, representing about 1,000 items, and in all cases complete specifications were prepared by this Department in inviting tenders for each plant item to ensure that only plant that was suitable for New Zealand conditions and mechanically sound would be purchased. The results obtained from equipping the Department with such plant is shown in a later statement. The work involved in purchasing, installing, and supervising the operation of this large amount of machinery has considerably increased the work of the staff. The advent of Diesel power on a commercial basis in highly efficient units has resulted in a large amount of the plant being so equipped. Typical examples of the modern mechanized units purchased and already in use are Diesel-powered mobile shovels and drag-lines, air-compressors, locomotives, winches, stationary-engine units, tractors with scooping and grading equipment, and road-graders.

Plant in Use.—During the year the following works in New Zealand were equipped with suitable plant, which was maintained in good order throughout:—

(*a*) Railway construction works, including tunnelling and formation.
(*b*) Roads and highway construction and maintenance under Public Works and Highways votes.
(*c*) Aerodromes; Construction of Defence and civil aerodrome and flying grounds.
(*d*) Irrigation schemes: Excavating irrigation-ditches, construction of dams.
(*e*) Quarrying: Supply of road-metal.
(*f*) Naval Defence: Construction of Kauri Point and Devonport Base extensions.
(*g*) Swamp-drainage and reclamation schemes.
(*h*) Bridges and crossing excavations: Construction on highways, roads, and railways.
(*i*) Harbour and river improvement and control works.
(*j*) Electric-power Supply Schemes: Construction and maintenance.
(*k*) Transmission-lines: Construction of new extensions.
(*l*) Launch and barge transport.

Operation of Plant.—The following summary shows the effect on cost of capital works carried out by the Department by the use of these modern and in most cases Diesel-powered mechanical units. Not only is a saving effected in actual cost but, the time factor involved, whilst not an amount that can be assessed in money, is a notable feature of the success of these modern units.

The Department's experience so far has shown that this new plant has performed with a maximum mechanical efficiency during the time it has been employed on the various types of work. This is attributed to the policy adopted of purchasing only that plant which complied to rigid specifications prepared by the Department's mechanical officers, and which specifications embodied sound engineering principles, and incorporated the latest improvements in design and operation which are the outcome of experience in other countries. In addition, in the larger types of plant, these must have proved their efficiency outside of New Zealand before any consideration was given to their purchase. The Department is therefore in a position, with the staff available, to purchase only highly efficient and economic mechanical units without the necessity of expensive experimentation.

The foregoing is borne out in the summary below.

Public Works Department Construction Plant.

A statement showing labour-costs versus the cost of modern plant :—

Name of Work.	Nature of Work.	Type of Plant used.	Cost per Cubic Yard.		Saving.	Remarks (including Lead and Useful Data): Time Comparison.
			Hand.	Machine.		
					Per Cent.	
Waioru–Tokaanu Road ..	Stripping ballast-pit and excavating ballast	Diesel tractor, carry-all and angle-dozer combination	6d.	3½d.	41·6	..
,, ...	Road-formation	Diesel tractor, carry-all and angle-dozer combination	1s.	4d.	75·0	On 4 chains lead.
Ahuriri Lagoon development ..	Excavating drains and forming road	Drag-line (petrol), crawler type..	2s. 4½d.	8½d.	70·18	..
Kamaka – Spring Creek, crossing elimination	Excavating spoil for filling ..	⅜ yard Diesel excavator, crawler type	1s. 8d. to 1s. 10d.	5·06d.	76·2	With slip material cost by hand would rise up to 2s. 6d. per cubic yard.
Mussel Point Aerodrome ..	Excavating and filling and levelling in loose sand and shingle	Diesel tractor and Hamilton carrier scoop	2s. to 2s. 6d.	9d. to 11d.	62·5 to 63·3	..
Karamea Harbour improvements..	Excavating and forming stop-banks in river-silt	Diesel tractor and Hamilton carrier scoop	2s. 3d. to 2s. 6d.	6d. to 9d.	77·7 to 7·0	..
Auckland–Whangarei Main Highway, Waipu–Kaiwaka Section	Excavation of spoil for road-formation	⅜ yard crawler type Diesel excavator	2s. 8d.	2s. 0·718d.	21·9	Unfavourable conditions for machine, wet weather causing loss of over one-third total days.
Ohinewai overbridge approaches ..	Excavation in hard clay for filling	..	3s. 3d.	1s. 6d. (tendered price)	53·8	Shows actual cost by hand against tendered price for work with machine.
Great South Road Highway construction	Excavation and filling	Diesel crawler excavators and mechanical scrapers	3s. 0d.	1s. 11d.	36·1	Lead up to 30 chains.
Hamilton–Rotorua S.H. ..	Excavation and filling (material mostly rhyolite)	..	4s. 6d.	2s. 8d. (tendered price)	40·7	Shows actual cost by hand against tendered price for work with machine.
Birkenhead – Maungaturoto S.H., Albany Hill	Excavation in heavy clay material	Diesel crawler excavator ..	2s. 8d.	1s. 3·4d.	50·0	Both actual costs on same job.
Taupiri drainage scheme ..	Excavating Rototuna drain ..	Diesel ⅜ yard crawler drag-line ..	1s. 10d. to 2s. (basic rate, 16s. per day)	9d.	60·8	Narrow drain, 2 ft. to 3 ft. water, hand excavating did not take out botton, while machine did.
,, ..	Excavating Komakorau Stream..	Diesel ⅜ yard crawler drag-line ..	1s. 6d.	7d.	61·1	Block cuttings in wide stream.
,, ..	Excavating Tauhei Stream ..	Petrol crawler drag-line excavator	1s. 2·25d. to 1s. 10d. (basic rate, 9s. per day)	6·6d. to 6·63d.	38·8	Obsolete type of machines.
,, ..	Excavating Upper Mangawara ..	Steam drag-line crawler excavator	1s. (basic rate, 9s. per day)	10d.	16·7	Machine cost high owing to flood and breakdown.
Gisborne–Waikokopu Railway, Kopuawhara Section	Excavation in hard sandstone underlying stiff rubble and clay	Diesel crawler-type shovel, ¾ yard bucket	3s. 1d.	1s. 6d.	50·4	Machine is doing job in a quarter of the time required by hand labour.
Gisborne – Waikokopu, Bartlett's Section	Excavation in heavy clay and papa	¾ yard Diesel crawler shovel type	2s. 6d.	1s. 6·24d.	40·0	Machine will complete job in one-third of the time required by hand labour.
Ditto	Excavation in heavy, wet clay and swamp soil	¾ yard Diesel crawler drag-line ..	1s. 2d.	6·3d.	57·1	Machine completed job in half the time (including double handling of one-fifth of total spoil) required by manual methods.

Public Works Department Construction Works—*continued.*

Name of Work.	Nature of Work.	Type of Plant used.	Cost per Cubic Yard.		Saving.	Remarks (including Lead and Useful Data): Time Comparison.
			Hand.	Machine.		
					Per Cent.	
Gisborne – Waikokopu, Bartlett's Section	Loading heavy silt into motor-trucks	Mechanical loader and petrol-driven tractor, with bulldozer	1s. 3d.	5·58d.	63·3	Considerable waiting-time would be involved by using hand loading, which adds to cost.
Gisborne Aerodrome	Excavating and filling	Mechanical excavator	1s. 5d. to 1s. 6d.	6d. to 8d.	60·0	Actual machine costs against estimated cost by hand shows a saving of £1,651 by machine.
,, ...	Excavating and filling	Diesel tractor angledozer and scoop	1s. 5d.	5·3d.	70·6	Shows difference of £121 on yardage to date, 2,500 cubic yards.
Plimmerton coast road	Excavating in clay	Diesel tractor and bulldozer ..	1s. 9d.	2d.	90·5	..
Invercargill and Gore airports ..	Construction	Diesel tractor and scoop ..	3s. 0·8d.	1s. 2·25d.	62·2	Hand labour used at Invercargill and machine at Gore.
Waianakarua Airport	Removing and replacing topsoil, levelling average lead, 8 chains	Diesel tractor and scoop ..	4s. 1d.	1s. 9d.	57·1	..
Duck Creek drainage scheme ..	Draining	Diesel crawler drag-line ..	2s. 8·17d.	8·50	75·0	Actual hand-labour cost against tendered price with machine.
Haast Pass Road and Homer McKerrow Road	Clearing road formation and bush work	Diesel tractor..	£9 per lineal chain	£6 8s. per lineal chain	28·8	Hand labour on Homer–McKerrow Road against machine on Haast Pass Road, and machine clearing greater widths
South Island Main Trunk Railway, Wharanui Section	Removing " blue " slip in blue pug	½ yard by ¾ yard Diesel crawler shovels	2s. 9d.	10·21d.	69·7	..
South Island Main Trunk Railway, Kaikoura Section	Excavating mixture of clay and boulders	Diesel shovel, crawler type ..	2s. 10½d.	15·68d.	55·0	..
Westport – Inangahua Railway, Inangahua end	Excavating clay, shingle, boulders	⅜ yard Diesel crawler drag-line excavator	3s. 3d.	1s. 0½d.	68·0	..
Ditto	Excavating rotten rock to spoil ..	⅜ yard crawler Diesel excavator..	3s. 6d.	1s. 0¾d.	74·3	..
,, ...	Digging heavy shingle to bank ..	⅜ yard Diesel excavator, crawler type	3s. 9d.	1s. 11d.	48·8	20 chains lead.
,, ...	Digging shingle with papa bottom	⅜ yard Diesel crawler excavator..	3s. 6d.	1s. 11½d.	44·0	40 chains lead.
Westport–Karamea Main Highway, crossing elimination	Digging and loading clay ..	Diesel crawler excavator ..	5s. 7d.	2s. 6d.	60·7	1 mile haul of spoil for filling bridge approaches.
Karamea River control	Forming river stop-bank, shallow earth cuttings	Tractor and scoop	3s. 6d.	9d.	85·7	Earth from paddocks.
Western Hutt Road	Excavating river-bed	Diesel crawler-type excavator ..	2s. 1d.	11·7d.	64·7	Actual costs in both cases.
Whirokino Deviation	Excavating peat	⅜ yard Diesel excavator, crawler type	2s. 10d.	10·45d.	69·1	Actual costs in both cases.
,, ...	Erection of stop-bank	⅜ yard Diesel excavator, crawler type	1s. 11·44d.	8·1d.	65·2	Actual costs.
,, ...	Trimming high batters of filling and removal of bad material	Diesel drag-line, ⅜ yard crawler type	2s. 0·7d.	7·33d.	70·8	..

PUBLIC WORKS DEPARTMENT CONSTRUCTION WORKS—*continued.*

Name of Work.	Nature of Work.	Type of Plant used.	Cost per Cubic Yard.		Saving.	Remarks (including Lead and Useful Data): Time Comparison.
			Hand.	Machine.		
					Per Cent.	
Nelson Aerodrome	Shifting material for formation ..	Diesel tractors, with carry-alls and scoops	£108,582 (estimate)	£23,582 (contract)	..	Saving in cost of £85,000 by use of contractor with machines as against hand labour; value of machines, £20,000.
Timaru Airport	Excavating and loading fine sandy clay	Diesel tractor and carry-all ..	2s. 6d.	2½d.	91·7	Average lead by machine was 3½ chains longer than that of hand labour.
,, ...	Excavating ditches for drainage..	Public Works Department designed ditcher	2s. 6d.	2d.	93·3	..
,, ...	Excavation from larger drains direct to bank	Diesel crawler drag-line, ¾ yard..	2s. 6d.	6d.	80·0	..
,, ...	Excavating and dumping fine beach shingle	¾ yard crawler-type Diesel drag-line	1s. 6d.	3d.	83·3	..
,, ...	Excavating heavy pug under water	¾ yard crawler-type Diesel drag-line	..	1s.	..	Manual excavation impossible without construction of expensive coffer-dam and using pumps.
Ashburton – Lyndhurst irrigation scheme	Excavation of main race in shingle and silt	Diesel tractor grader and angle-dozer	3s. 6½d.	1s. 6d. and 2s.	57·6 to 43·5	Estimated reduced cost with improved technique and designing races to suit machinery, 1s. per cubic yard.
Rangitata diversion race ..	Excavation from coarse shingle and silt, with occasional massive boulders	Diesel tractor and elevating grader	4s.	1s.	75·0	..
South Island Main Trunk Railway, Hawkswood, cutting headings	Excavating to fill	Diesel crawler-type excavator, ¾ yard	3s. 6d.	2s.	42·8	The speed is increased five times by use of machines.
Mangere Aerodrome	Levelling and filling	Petrol locos. and trucks ..	3s. 7d.	1s. 9d.	51·16	..
Devonport Naval Base	Excavating spoil and loading ..	Diesel shovel, crawler type ..	2s. 1·87d.	8·6d.	66·7	Loading into lorries.
Kaimai road construction ..	Excavating	⅜ Diesel shovel, crawler type ..	1s. 8½d.	1s.	41·4	..

Public Works Department Designed Plant.—The Department has designed and has had built in New Zealand a number of modern high-speed motor road-graders. These machines have now been in service for a sufficient period to judge their efficiency. To date they have proved conclusively to be highly efficient units both mechanically and in the work performed, under the worst possible New Zealand conditions. They compare more than favourably with similar imported units of foreign manufacture. As an illustration of the ability of these machines it can be quoted that they have scarified and graded roads that were originally constructed by the military authorities in the early days, these roads being laid down with heavy boulder undercourses, which, with an ordinary machine, would be impossible to deal with without other preparation to first remove the undercoursing. This ability is attributed to the excellence of the design. To date the New Zealand manufacturers have built and delivered five tandem-drive machines (six-wheelers), thirty-three single-drive machines (four-wheelers), and have still to produce fourteen single-drive machines, which will be delivered in due course. With these fourteen latter machines the power unit has been changed from a petrol-engine to a modern Diesel engine of British manufacture, which will prove a still more efficient power unit for this type of machine, and will effect a considerable saving in operating-costs. Several modifications of the original design were incorporated in the machines from time to time as the result of experience in operation, and the result is a credit to all concerned, including the New Zealand manufacturers, Messrs. A. and G. Price, of Thames.

The Department has also found that the standardization of grader-blades has enabled tenders to be called for the whole of the supplies required for the Dominion for all types and makes of road-graders, which results in a very considerable saving to the Department both financially and from the point that replacements are readily obtainable without loss of time.

Another interesting product of the Department is the ditching-machine employed at the Timaru Airport. This machine was designed by the Department, and is New-Zealand-built, and has proved to be highly efficient for the work required. Further developments along these lines in designing suitable machines for various works will receive the attention of the Department as occasion warrants.

Sales of Plant.—In keeping with the policy of purchasing new modern plant the Department is still continuing to dispose of worn-out and obsolete plant items by selling these by public tender. Plant items are withdrawn from service immediately their continued operation becomes uneconomic.

Local Bodies.—A considerable quantity of modern road and highway construction and maintenance plant has been obtained for local bodies on behalf of the Main Highways Board, and in all these cases the local bodies have benefited considerably by the Department's knowledge and experience of this modern plant in preparing the specifications (in this having due regard to the conditions under which the plant will be operating), analysing the tenders received, and making the necessary recommendations for the benefit of the local bodies. This phase of the work includes high-speed motor road-graders, tractors, and road-building equipment, quarry plant, and motor-vehicles. Local bodies generally are appreciating the fact of the Department giving recommendations covering the purchase of this plant.

Motor-vehicle Operations.—The general increase in the scope and field of the Department's undertakings throughout New Zealand in the period under review has necessitated a further increase in the motor-vehicle fleet to ensure that the necessary supervision of the large number of scattered activities in the various districts can be adequately carried out. Where necessary suitable economic light transport trucks are provided. Recently the Department took over the fleet of motor-vehicles, including sixteen motor-cars, operated by the Southland Power Board. The appointment of additional Main Highways Traffic Inspectors, requiring thirty-two new motor-cars, has also increased the total motor-vehicles under the Department's control.

The following statements outline the operations of the Public Works and Main Highways Board motor-vehicle fleet for the year :—

Table 1.

	Motor-vehicles.			
	At 1st July, 1936.	Sold.	Purchased.	At 30th June, 1937.
Cars	154	14	76	216
Light deliveries	131	16	115	230
Trucks 30 cwt. and over	79	8	41	112
	364	38	232	558

OPERATING-COSTS FOR YEAR.

The costs shown include—

Receiving Charges : Petrol, oil, grease, tires, tubes, repairs, and maintenance :

Standing Charges : Interest at 5 per cent. per annum and depreciation ranging from a minimum of 20 per cent. to a maximum of 40 per cent. per annum on capital cost, this variation being governed by the type and mechanical condition of each vehicle and the conditions under which it operates ; garage rent, 5s. per week ; registration and annual license fees.

Table 2.

Type of Vehicle.	Total Cost.	Total Mileage.	Cost per Mile.
	£	Miles.	d.
Year 1934–35—			
Cars and light deliveries (10 cwt. to 15 cwt.) ..	36,430	2,728,110	3·20
Trucks (1 ton and over)	14,563	621,413	5·63
All vehicles	50,993	3,349,523	3·65
Year 1935–36—			
Cars and light deliveries (10 cwt. to 15 cwt.) ..	39,724	3,058,246	3·12
Trucks (1 ton and over)	14,681	660,390	5·34
All vehicles	54,405	3,718,636	3·51
Year 1936–37—			
Cars and light deliveries (10 cwt. to 15 cwt.) ..	53,159	4,032,349	3·16
Trucks (1 ton and over)	17,570	770,353	5·47
All vehicles	70,729	4,802,702	3·53

Table 3.—Analysis of Table 2, showing Operating-costs in various Districts.

(Motor-vehicle operation, 1936–37.)

District.	Cars and Light Deliveries.				Trucks (1 Ton and Over.)			
	Number of Vehicles.	Mileage.	Total Cost.	Cost per Mile.	Number of Vehicles.	Mileage.	Total Cost.	Cost per Mile.
			£	d.			£	d.
Whangarei	21	300,990	4,110	3·28	4	25,369	485	4·59
Auckland	39	504,768	5,457	2·59	4	17,464	401	5·51
Tauranga	15	152,201	1,918	3·02	6	42,742	963	5·41
Gisborne	17	145,880	1,941	3·19	8	51,859	1,255	5·81
Taumarunui	15	174,382	2,358	3·25	8	130,126	2,328	4·29
Stratford	23	287,897	3,470	2·89	2	14,761	271	4·41
Napier	18	180,618	2,338	3·11	3	18,775	324	4·14
Wellington	29	282,721	3,306	2·81	13	51,873	1,421	6·57
Nelson	24	209,422	2,445	2·80	6	53,779	975	4·35
Greymouth	29	273,562	3,372	2·96	16	108,371	1,969	4·36
Christchurch	32	405,385	4,677	2·77	6	50,702	1,173	5·55
Dunedin	34	289,479	3,878	3·22	9	57,142	1,468	6·17
Total, general districts	296	3,207,305	39,270	2·94	85	622,963	13,033	5·02
Hamilton Electric-power District	47	324,404	5,244	3,88	9	39,535	1,335	8·10
Palmerston North Electric-power District	34	285,060	4,856	4·09	6	33,788	1,193	8·47
Christchurch Electric-power District	31	215,580	3,789	4·22	12	74,067	2,009	6·51
Total, electrical districts	112	825,044	13,889	4·04	27	147,390	4,537	7·39
Grand total, all districts	408	4,032,349	53,159	3·16	112	770,353	17,570	5·47

Note.—All vehicles that have operated for any part of the year are included—*i.e.*, vehicles purchased and sold during the period.

Total cost includes—

Running-cost: Tires and tubes, fuel, lubricants, repairs, and maintenance.

Standing Charges: Interest, depreciation, garaging (5s. per week), registration, and license fees.

Motor-vehicle Allowances.—Amount paid to Department officers at scale rates for the use of their own motor-vehicles upon Government business. The total comprises a large number of comparatively

small sums for mileages run for the convenience of the Department where the transfer or purchase of a departmental vehicle was not warranted and the arrangement of hire was inexpedient.

Year.	Total Allowances. £ s. d.
1934–35	1,571 10 2
1935–36	1,160 17 5
1936–37	2,497 8 5

Motor-lorry Hire.—This is the amount paid to private motor-truck owners for hire of their motor-vehicles on the Department's undertakings where it was not considered sound policy to utilize Departmental vehicles when reasonable competitive tenders from private enterprises were available, and where the transfer or purchase of a departmental vehicle was not considered to be warranted.

Year.	Amount paid. £
1934–35	49,489
1935–36	66,134
1936–37	191,003

This large increase is again due to the tremendous expansion of the Department's activities in the period under review.

Plant Depots.—In the Department's repair depots at Whangarei, Rotorua, and Wellington the volume of work carried out has increased considerably during the year. These depots provide necessary and adequate facilities for supervision and repairs of plant in the field whilst passing through the main centres under transfer. The plant depot at Whangarei, in addition, provides a repair and garage service for most of the Government vehicles in the district. This service is greatly appreciated by the Departments who are able to avail themselves of the facilities provided. On all railway works small repair shops, efficiently staffed, have been installed to provide facilities for dealing with the plant in operation, and on many other undertakings proper facilities have been provided for the care and maintenance of all plant engaged on the various works.

Services for other Departments.—Many other Government Departments during the year consulted the Public Works Department upon mechanical matters. This resulted in the Department being responsible for a considerable amount of mechanical work, including the preparation of specifications and contracts, figuring of proposals, inspections and consultations on various mechanical matters in connection with undertakings, including water-supply installations, pumping-schemes, heating-schemes, supply of machine tools and workshops equipment, installation of domestic mechanical services, electric-lift installations, supply of special motor-vehicles, equipment for aerodromes, equipment for Naval Base, Devonport; the Departments concerned including Defence, Naval, Mental Hospitals, Cook Islands, Transport, Lands, Forestry, Native, Mines, Marine, State Housing, Tourist and Publicity, Prisons, and Agriculture.

Inspection and Supervision.—Owing to the large amount of new plant that is now in operation considerable additional mechanical supervision and inspection has been carried out by field officers and the inspecting staff to ensure that the plant items are receiving proper mechanical attention and being operated economically and efficiently. Difficulty has been experienced in obtaining skilled operators, and to overcome this the Department had to train new operators for the various types of machines. This policy has resulted in the efficient operation of the machines, and in their careful handling and care.

High-speed Diesel power units comprise the bulk of the power plants in these modern machines, and in order that a reliable check can be kept on engine performance and engine maintenance the Department has purchased a full equipment of the latest precision testing-instruments and equipment for Diesel power units. This equipment has already been used extensively by the inspecting and field officers, with a resultant considerable saving of time and money to the Department in providing expert maintenance. This could not otherwise be carried out except by expensive transportation of the machines to the few places in New Zealand that are sufficiently equipped to deal with Diesel power unit maintenance.

General.—The Department has maintained approximately £1,000,000 worth of plant in operation throughout the year without any serious breakdown. It is realized that if any of these machines are idle for any length of time owing to mechanical defects, the cost of the works on which they are employed is increased. Every effort is directed to the efficient maintenance of the Government plant under the Department's control.

NAVAL AND DEFENCE DEPARTMENTAL WORKS.

During the whole of the year covered by this report a construction programme has been in hand on behalf of the Navy Office and the Defence Department. Works for the Navy Office have been continued at the Devonport Station, Auckland, and the Kauri Point Depot. Work in accordance with the Defence Department's programme has been carried out, and further development at Hobsonville and Wigram Air Bases has been in hand.

TRAMWAYS.

Auckland.—During the year the Auckland Transport Board recommissioned, after reconstruction on new lines, one of their cars previously accidentally damaged.

Three fatal accidents occurred, of which inquests have been held in two cases, absolving the Transport Board from blame. In the other case the inquest was adjourned.

Ten cars were damaged as the result of collisions between cars, and three others were damaged in collision with motor-vehicles. These cars have all been repaired, inspected, and returned to service.

Wellington.—No new tram-cars were submitted for inspection during the year, and no new track has been completed. The construction of double tracks in Bunny Street and Stout Street to give access to the new railway-station is in hand, but no connection has yet been made with the main system.

Christchurch.—Riccarton Route: The single track between Clyde Road and Riccarton Township has been taken up and relaid in a central position on the road.

Linwood and Dallington Route: All tracks on this route have been removed, and the service is now carried on with Diesel-engined buses.

New Brighton Route: Two additional loops have been constructed in Cashel Street. A further loop is proposed between New Brighton Bridge and the Wirihana Loop, and the new proposal is being investigated.

Dunedin.—During the year no new tram-cars were placed in service. Two new controllers were placed in car No. 63. The electric-tram route from the junction of the Rattray Street cable car-line and Maori Hill terminus was discontinued and the rails taken up. Two fatal accidents occurred during the year. In one case the Coroner found that death was due to injuries caused by the deceased being knocked down by a tram-car which left the rails after getting out of control on Signal Hill Road. In subsequent proceedings at the Supreme Court the tram-driver was found not guilty of manslaughter. In the other case death was due to heart-failure following shock after being knocked down by a tram car. The Coroner exonerated the city tramway authorities.

There was also a case of a collision between a tram-car and a motor-car near Grosvenor Street on the St. Clair line, the driver of the motor-car being dangerously injured. It was found that the driver of the motor-car was himself entirely to blame.

The equipment of the tram-cars involved in these accidents was tested and found to be in order. There was also a case of the brakes on car No. 18 failing on the St. Kilda route, a fault being discovered in the main armature lead at one point only. The fault was immediately remedied. A few minor accidents not necessitating any special inspection were reported during the year.

Invercargill.—During the year no new trams were placed in service, nor were any of the existing ones altered in any way. No extensions of tracks were made. No accidents necessitating special inspection of equipment were reported.

New Plymouth.—The realignment of 16½ chains of single tram-track was carried out in conjunction with road and railway improvements at the Moturoa terminus. This work has been inspected and passed.

Wanganui.—Double tracks were extended in Victoria Avenue, and a total of 2½ miles of new trolley wire was erected in various sections where wear had occurred.

DESIGNING OFFICE.

The Designing Engineer's staff has been particularly busy during the year and has had to be increased considerably.

For the elimination of railway-crossings complete working plans of twenty-two overbridges were prepared in addition to those undertaken in district offices and by consulting engineers, and scheme plans or preliminary designs have been investigated for forty other overbridges or subways. Designs of fifteen highway and road bridges were completed, including those of the Rakaia, Rangitata, and other important structures. On the railways under construction, the bridge plans, as yet incomplete, are now in hand. Plans of other miscellaneous structures, including two small concrete wharves, radio-masts, and railway-tunnel centering were also prepared. The checking of the designs of bridges for roads and highways prepared in district offices and by consulting engineers, the checking of designs for the Local Bodies' Loans Board, the Marine and other Departments, entailed a great deal of work, approximately 250 proposals being handled during the year.

PUBLIC BUILDINGS.—MAINTENANCE.

The maintenance of public buildings has been carried out by the District Engineers and their staffs in accordance with proposals, and reports prepared in the district offices. Maintenance work is, for more ready reference, included with public-building work reported on by the Government Architect.

PUBLIC-BUILDING WORKS AND ELECTRICAL OPERATIONS.

For details of the public-building works and of the operations of the hydro-electric enterprises, please see separate reports by the Government Architect and the Chief Electrical Engineer.

J. Wood, M.Inst.C.E.,
Engineer-in-Chief.

APPENDIX C.

ANNUAL REPORT OF BUILDINGS BY THE GOVERNMENT ARCHITECT.

The Government Architect to the Hon. Minister of Public Works.

Sir,—

I have the honour to submit the following report on the activities of the Architectural Branch for the year ended 30th June, 1937.

During the period plans were prepared for fifty-one buildings of an estimated total value of £1,905,000, of which eleven contracts, totalling £72,454, have been let. Eighteen other contracts to the value of £222,250, for buildings designed prior to 30th June, 1936, have also been let, making the total of building contracts let during the year £294,704. In addition, contracts for mechanical equipment totalling £40,094 have been let.

In addition to the above totals for buildings designed in Head Office, a large amount of minor additions, alterations, and repairs, and general maintenance of public buildings has been carried out by District Offices, and a considerable quantity of furniture and fittings has been manufactured in the Public Works Workshops for various Government Departments.

Working details for buildings under construction from last year have occupied the time of a section of the staff, and additional assistant architects and draughtsmen have been employed to enable the larger volume of work to be carried out with reasonable expedition, but it has been found difficult to obtain sufficient men with the necessary training and experience.

Urgent work involved in the development of civil aerodromes and the National Broadcasting Service, together with staffing and accommodation difficulties, have prevented as rapid progress with the work of relieving the position with regard to departmental office accommodation as you desired, but all plans are now well forward.

The policy of giving preference to New Zealand materials and manufactures is proving very satisfactory, and manufacturers have responded and are producing goods of excellent quality at reasonable prices, and the number of commodities it is necessary to import is gradually lessening.

In most localities builders have experienced difficulty in securing a sufficiency of seasoned New Zealand timber, particularly totara, suitable for exterior joinery, the demand for partially seasoned timber having outstripped the supply.

Complaints of the noise occasioned by the erection of steel-framed buildings in populated areas have led to investigation of methods of eliminating noise, and contractors are now required to make every effort to secure that result. As a means to that end, the use of welding instead of riveting has been thoroughly investigated in co-operation with the departmental engineers. As the buildings to be erected are of considerably greater magnitude than anything of the nature attempted previously in this Dominion, very comprehensive investigation as to methods of design and execution have been necessary. Recognized authorities the world over have been consulted, tests have been made, and specifications are now in course of preparation which I feel confident will enable welding to be the standard practice of the Department.

The increased building activity of local bodies has occasioned a considerable amount of work in examining and reporting upon plans of buildings submitted to the Local Government Loans Board.

Under the improved conditions as to hours and wages prices have naturally increased, but there is no evidence of exploitation. Competition for Government work has been keen, and the quality of workmanship has been well maintained.

Appended is a schedule of works, which includes maintenance work and minor contracts prepared in the various district offices.

Vice-regal.

Auckland.—Additions to the orderly's office were completed, electrical heating and power services were installed, and repairs, renovations, and maintenance generally were attended to.

Wellington.—Extensive renovations were undertaken, which included new entrance doors and entablatures between the reception-hall and entrance-lobby, main corridor, council chamber, and drawing-room, also renovations and repairs to their Excellencies' quarters. Three new greenhouses were built.

Post-offices.

Whangarei.—A new post-office was erected at Maungaturoto, and the Postmaster's residence is approaching completion. A new store and garage were erected at Dargaville. Repairs and renovations were effected at nine buildings, and alterations made to one. Electricity was installed in six buildings.

Auckland.—Extensive renovations were made to the exterior of the chief post-office, Auckland. A new garage at Stanley Street, lineman's shed and garage at Takapuna, and garage and store at Te Awamutu were erected. A start has been made to build a new post-office at Thames, and additions and alterations were carried out at Cambridge. Renovations and repairs were undertaken at thirty-eight buildings; alterations and additions were carried out to twelve buildings.

Taumarunui.—Repairs and renovations were attended to at seven buildings.

Tauranga.—A new post-office was built at Waimana, extensive alterations were made at Rotorua, and renovations and repairs were effected at three other buildings.

Gisborne.—A garage was built at Te Karaka, and a start made to build a garage and workshop at Gisborne. Alterations were made to two buildings, and renovations and repairs were executed at two buildings.

Stratford.—Garages and stores were erected both at New Plymouth and Hawera. Repairs and renovations were carried out at six buildings, additions made to three, and electricity installed in one.

Napier.—A commencement was made with the erection of a new automatic telephone-exchange. Repairs were dealt with at eight buildings and additions made to one.

Wellington.—The new post-office and Postmaster's residence at Pahiatua were completed, a house was built for the caretaker at Wellington Radio, a repeater station is being built at Lyall Bay, extensive alterations were made to the second and third floors in the General Post Office, and additions were made at Kilbirnie Post-office.

Nelson.—Repairs, renovations, general maintenance, and alterations were carried out at seven post-offices.

Christchurch.—The new post-office at Rangiora was completed, and a new post-office and residence were erected at Mayfield. New post-offices and residences are in course of erection at Belfast and Waikari. Extensive alterations and additions are in hand at Waimate. Repairs and renovations were effected at forty-three buildings and alterations made to sixteen.

Dunedin.—The new chief post-office at Dunedin was completed and opened for business in April, 1937, and accommodation provided therein for over a dozen other Government Departments. New post-offices and residences were erected at Omakau and at Thornbury, and a line store and workshops built at Wyndham. Repairs and renovations were effected at twenty buildings.

Greymouth.—A new post-office was built at Charleston, sound-proof bureaux fitted up in three post-offices, electricity installed in one building, additions made to two, and repairs and renovations carried out to one.

Courthouses.

Whangarei.—Repairs and renovations were attended to at six courthouses, and electricity installed in one.

Auckland.—The new law library in Auckland was finished, acoustical corrections were attended to at Hamilton Courthouse, alterations and additions were made to one, and repairs and renovations effected at five courthouses.

Tauranga.—Acoustical correction was carried out and heating installed at Tauranga Courthouse. One courthouse was renovated.

Gisborne.—Electric heating is being installed in the Gisborne Courthouse.

Stratford.—Five courthouses were renovated and repaired.

Napier.—One courthouse was renovated.

Wellington.—Additions were made to one courthouse and one courthouse was renovated.

Nelson.—A new courthouse is being erected at Blenheim. Minor repairs and maintenance were attended to.

Christchurch.—A new courthouse is in course of erection at Ashburton. Alterations were effected at two courthouses and renovations and repairs carried out at nine courthouses.

Dunedin.—Five courthouses were renovated and repaired.

Greymouth.—Three courthouses were repaired and renovated.

Police Stations and Gaols.

Whangarei.—Repairs and renovations were undertaken at eight buildings and electricity installed in three.

Auckland.—A new garage, cool store, and two staff houses were erected at Waikeria Borstal Institution, and twenty-one buildings were renovated and repaired.

Taumarunui.—General minor repairs and renovations were carried out.

Tauranga.—Ten buildings were renovated and repaired.

Gisborne.—Alterations were made to one building, and repairs and renovations were attended to in eight buildings.

Stratford.—A new police-station was erected at Waitotara and a new office built at Patea. Six buildings were renovated and repaired and electricity installed in two.

Napier.—A new station, offices, &c., and extensive alterations and additions were carried out at Wairoa. Four buildings were repaired and renovated.

Wellington.—Extensive alterations and additions were made to Tinui Police-station

Nelson.—Repairs and renovations, maintenance, and alterations were effected at nine buildings.

Christchurch.—Alterations were made to twelve buildings, and renovations and repairs were executed at thirty-four.

Dunedin.—Two-story additions, including new cells, were built at the Invercargill Police-station. Repairs and renovations were effected at twenty-nine buildings, and general maintenance and renovations were carried out at the Invercargill Borstal Institution.

Greymouth.—Fourteen buildings were renovated and repaired.

Mental Hospitals.

Avondale.—Renovations and repairs were attended to.

Kingseat.—The erection of Villas Nos. 4, 5, 6, 19, and 21 and the store building were completed. New boiler-house, butchery and bakery, laundry, and fuel stores are approaching completion.

Tokanui.—A new residence for the Medical Superintendent, also Villas Nos. 2 and 3 were completed. Alterations were made to old wards to transpose the male and female sections. Alterations and additions were made to the laundry sorting-room and annexe bathroom. A camp stable was in course of erection.

Porirua.—A large store is approaching completion; good progress was made with the new boiler-house. The towers have been strengthened and roofs over wards renewed. Repairs and renovations were made to five villas and other buildings.

Ngawhatu.—A new villa, No. 6, was erected. Repairs and renovations generally were attended to.

Sunnyside.—A new vegetable-house was completed, and a new bakehouse is in course of erection. Extensive additions to the female dining-room were carried out.

Templeton.—Villas Nos. 3 and 4 were completed, and a commencement was made with the erection of a new laundry.

Seacliff.—Repairs and renovations were attended to.

Hokitika.—A new villa was completed, and a new house and garage were built for the clerk. Extensive alterations were made to Aorangi and Sefton Wards. General maintenance and repairs were dealt with.

Education Department.

Auckland.—Renovations and repairs were made to five buildings and alterations to two.

Gisborne.—Alterations were effected at one building and renovations carried out at three.

Stratford.—A new block of class-rooms was erected at New Plymouth Girls' High School, and a new engineering block was built at Stratford Technical High School.

Wellington.—At Palmerston North the Boys' High School, the Girls' High School, and the Technical School were repaired after the severe cyclonic storm. Sundry renovations, repairs, and improvements were attended to elsewhere.

Nelson.—Additions were made to the Marlborough High School, Blenheim, and the existing structure strengthened. New workshops were built at the Nelson Boys' College. At the Special School for Girls, Richmond, a hospital annexe was erected and additions made to the Laundry. Repairs, renovations, and maintenance generally were attended to.

Christchurch.—Renovations and repairs were carried out at three institutions.

Dunedin.—A new Art School was erected at the King Edward Technical College. Additions were made to the South Otago High School, and three buildings were renovated and repaired.

Greymouth.—At Westport the technical school was renovated and additions and alterations effected to the workshops.

Health Department.

Auckland.—Renovations and repairs were carried out at St. Helens Hospital, Auckland, and at Motuihi Island Quarantine Station.

Christchurch.—A new staff dining-room was built at St. Helens Hospital, Christchurch, and repairs and renovations attended to.

Dunedin.—Repairs and renovations were carried out at the St. Helens Hospitals at Dunedin and Invercargill.

Greymouth.—A new surgical and maternity wing and extensive additions to the Nurses' Home, Greymouth, are in course of erection. An extension of four rooms at the Inangahua Maternity Hospital is approaching completion.

Defence Department.

Auckland.—At the Naval Base, Devonport, a moulding-shop was built, and a boiler-shop is in course of erection. At Kauri Point six magazines were built, and a caretaker's cottage and garage were erected. Repairs and renovations generally were attended to.

Stratford.—A new target-storage shed was built at New Plymouth. Two buildings were repaired and renovated.

Napier.—Three buildings were renovated and repaired.

Wellington.—Extensive new works have been undertaken at the forts.

Christchurch.—General repairs and renovations were attended to.

Dunedin.—Renovations and repairs were carried out at three buildings.

Greymouth.—Maintenance and renovations were attended to at three buildings.

Aerodromes.

Auckland.—A transmission-hut was built at Mangere Aerodome. Renovations and alterations were executed at the Hobsonville Air Base.

Stratford.—A transmission-hut was built at New Plymouth Aerodome.

Wellington.—A transmission-hut was built at Milsom Aerodrome.

Nelson.—Temporary buildings have been erected at the Municipal Airport, Nelson.

Department of Agriculture.

Whangarei.—A new house is being built at Dargaville.

Taumarunui.—Minor repairs and renovations were attended to.

Nelson.—Maintenance at two buildings was attended to.

Christchurch.—A new building was erected at Lincoln College for the Agronomy Division. Repairs and renovations were carried out at two buildings.

Dunedin.—Two buildings were repaired and renovated.

Tourist Department.

Napier.—At Lake House, Waikaremoana, the hot-water and electrical services have been enlarged, reconstructed, and brought up to date.

Taumarunui. — New staff quarters were erected at the Chateau Tongariro and extensive renovations undertaken to the main building. At the Waitomo Caves Hostel alterations were made to the lounge, four new bathrooms were built, and a cottage for the chief guide is in course of erection.

Miscellaneous.

Whangarei.—Six cottages were erected for the Native Department and a new store building erected for the Public Works Department.

Auckland.—Additions, alterations, and other works were attended to in connection with the fitting-up of new office accommodation. Renovations and repairs generally were carried out.

Taumarunui.—Five cottages, four cowsheds, and nine implement-sheds were built for the Waimiha Native Development Scheme. General repairs and renovations were attended to.

Tauranga.—Two cottages, one at Mamaku and one at Ngongotaha, were built for the Internal Affairs Department. Social halls, married quarters, and four cottages were erected on State highways construction. Sixty-three cottages, fifty-two cowsheds, and two store-sheds were erected, and repairs made to forty other buildings for the Native Land Department.

Stratford.—A new house was built to replace an old house on the site of approaches to Midhurst Overbridge. Repairs and renovations, and alterations and additions were carried out at ten buildings.

Wellington.—The steel frame of the new Government Life Insurance Building was completed, the concrete and stone-work erected up to the fourth floor and the steel windows and rendering up to the second floor; plumbing and electrical services were installed parallel with concrete work, &c. The foundations of the new departmental building in Stout Street are about half completed.

Additions were made to the Meteorological Office. The old Ministerial residence in Tinakori Road was fitted up temporarily as a dental clinic; the old coach-house and stables were demolished and a new Ministerial residence erected. A start was made to convert the Ministerial residence in Molesworth Street into two flats.

Studios were fitted up in Hope Gibbons Building for the National Commercial Broadcasting Service, Station 2ZB, and additions were made to the old 2YA building on Mount Victoria.

Extensive additions were made to the Public Works Office at Palmerston North. Repairs and renovations generally were attended to, new accommodation was fitted up for various departments and furniture supplied.

Dunedin.—A commencement was made with a new building for the State Fire Office at Invercargill. A new explosives magazine was built.

Greymouth.—A house was built for the District Engineer at Greymouth; an explosives magazine was built at Greymouth; additions to the School of Mines at Reefton and Westport are in hand, and repairs and renovations were made to the School of Mines at Granity. Repairs were made to the residence of the Collector of Customs at Greymouth.

Generally.—In addition to the customary maintenance, repairs, and renovations, a large amount of work has been involved in the procuring and fitting-up of office accommodation and provision of the necessary furniture and fittings to satisfy the growing needs of expanding Departments.

Schemes of decorations were designed and erected to celebrate the Coronation of His Majesty the King.

John T. Mair, A.R.I.B.A.,
Government Architect.

APPENDIX D.

ANNUAL REPORT OF THE CHIEF ELECTRICAL ENGINEER.

The Chief Electrical Engineer to The Hon. Minister of Public Works.

Sir,—

I beg to report on the position of the development of electric power in the Dominion for the past year, as follows:—

GENERATING-SCHEMES IN OPERATION.

NORTH ISLAND ELECTRIC-POWER SYSTEM.

1. Capital Outlay.

At the close of the year 1936–37 the total capital outlay was £8,546,750, representing assets in operation, and £429,446, representing assets not in operation, giving a total capital outlay of £8,976,196, and Table II gives an analysis of this amount.

2. Financial Results.

The total revenue for the year amounted to £887,410 and working-expenses £144,315, which resulted in a gross profit of £743,095, equal to a return of 8·75 per cent. on the average capital in operation (£8,489,741).

After paying interest (£391,241), depreciation (£10 464), the departmental proportion of the capital charges on King's Wharf Station (£38,120) and cost of raising loans, &c. amounting to £59,130, there was a net profit of £244,140. The accumulated loss now stands at £155,175 for the North Island system.

Comparative figures for the year ending 31st March, 1936, are as follows: Revenue, £795,391; working-expenses, £144,068; interest, £408,051; depreciation, £17,591; and King's Wharf charges, £38,148—with a net profit of £187,533.

The decrease in the depreciation charge from £17,591 in 1936 to £10,464 in 1937 is on account of the amount in the Fund having now reached the statutory 12½-per-cent. limitation, the payment of £10,464 being all that was necessary to augment the Fund to bring it up to the aforementioned limitation.

The accumulated Depreciation Reserve and Sinking Funds as at 31st March, 1937, amounted to £1,005,818. Table I gives full particulars of financial results as well as other relevant statistical information.

3. General.

The units generated totalled 688,704,277 for the system. Units actually sold totalled 625,673,473, and units used for station auxiliaries, &c., total 6,497,313.

The balance of 56,533,491 units represents transmission and distribution losses amounting to 8·21 per cent. of the total output.

The maximum load on the system was 124,460 kw. and the annual load factor 63·2 per cent. The total connected load was 923,674 kw., and the demand factor or ratio of maximum load to connected load was 13·47 per cent.

4. Construction, Operation, and Maintenance.

A. HAMILTON DISTRICT.

(1) Construction.

(a) power-stations.

Arapuni.—Work was continued throughout the year on the extensions to the power-house building and outdoor station, and on the installation of the fifth and sixth generating-units (Nos. 7 and 8), each of 24,000 Kv.a. About two hundred men were engaged on this work in the first half of the year, and about three hundred in the second half.

Concreting-work for the power-house foundations and tailrace was completed, and the power-house building extensions, together with the machine foundations, are well on towards completion.

The foundation work at the outdoor station was completed, and the new steel structure and most of the additional switchgear have been erected.

The assembling of Nos. 7 and 8 units was commenced about July, and by the end of March the erection of No. 7 turbine was nearing completion, and the scroll case of No. 8 turbine was well under way. Meanwhile the jointing of the stator quarters of No. 7 machine was completed in the workshop, and the whole stator winding dried out and tested in February.

The rotors of both No. 7 and No. 8 machines were completely assembled and tested.

One bank of transformers of 24,000 Kv.a. capacity was dried out and assembled ready for service.

Since the 31st March work has been concentrated upon the completion of No. 7 machine, and it is expected that it will be ready for service during August.

(B) SUBSTATIONS.

Penrose.—Three new 1,667 Kv.a. transformers for a second 22/50 Kv. bank have been dried out, but are not yet in service. Concrete pads were installed for three new 10,000 Kv.a. transformers to form a fourth 110/22 Kv. bank.

A new store and workshop was built for line equipment.

Bombay.—Three new 1,667 Kv.a. transformers for a second 110/50 Kv. bank have been dried out, but are not yet in service. Work is in progress on the concreting of transformer pads, and on the erection of additional switch-gear and steelwork.

Hamilton.—Impedance-distance relays on the 110 Kv. line O.C.B.'s were tested out under actual fault conditions, and were put into service.

Henderson.—Two 50 Kv. O.C.B.'s for the Penrose line, and 50 Kv. P.T.'s and directional relays were put into service.

Excavations were made for the extensions of the 50 Kv. steel structure for the take-off of the North Auckland 50 Kv. line.

Takapuna.—Three new 750 Kv.a. transformers to form a second 50/11 Kv. bank were dried out, but are not yet in service.

Tahekeroa.—The 1,000 Kv.a., 50/11 Kv. substation was put into service with temporary 11 Kv. equipment on 18th December, 1936, as a third supply point for the Waitemata Electric-power Board.

At the end of March the construction of the substation building, garage, and three cottages, and the installation of the new 11 Kv. switch-gear was almost completed. The 50 Kv. O.C.B.'s have yet to be installed.

Mareretu.—The 2,250 Kv.a., 50/11 Kv. substation was put into service with temporary 11 Kv. equipment on 19th December, 1936, as the first supply point for the North Auckland Electric-power Board. Work is proceeding on the construction of the substation building, garage, and three cottages, and on the installation of the new 11 Kv. switch-gear. The 50 Kv. O.C.B.'s are not yet installed.

Maungatapere.—A start was made in January, 1937, on the construction of the 2,250 Kv.a., 50/11 Kv. substation as a second supply point for the North Auckland Electric-power Board. The gantry and the 50 Kv. steel structure and fittings have been erected, and the concrete pads for the transformers and O.C.B. have been installed.

Huntly.—The 1,500 Kv.a., 50/11 Kv. bank was replaced by a new 2,250 Kv.a. bank on 18th October, 1936.

Hangatiki.—The 750 Kv.a., 50/11 Kv. bank was replaced by the 1,500 Kv.a. bank from Huntly on 31st March, 1936. The old transformers were made ready for transfer to Ngongotaha.

Rotoiti.—A two-pole substation structure was erected adjacent to the 50 Kv. line, and a 100 Kv.a., 3 ph., 47·5/6·6 Kv. transformer and the necessary switching-equipment were connected up, and were put into service on 31st January, 1937, as an additional supply point to allow the Tourist Department, Rotorua, to give supply to lakeside cottages and sawmills.

Edgecumbe.—The building of a fourth cottage was completed.

(C) TRANSMISSION-LINES.

North Auckland 50 Kv. Line.—Construction proceeded throughout the year, up to eighty men being engaged on this work. The Henderson–Tahekeroa section was livened at 11 Kv. in September as a Waitemata Power Board feeder from Henderson, and was put into service at 50 Kv. on 18th December, 1936. The Tahekeroa–Mareretu section was put into service at 50 Kv. on the following day. The construction of the Mareretu–Maungatapere section is well advanced, and the line will be ready for service some time before it is required.

A start was made on the investigation of a route for a 50 Kv. line from Maungatapere to Kaitaia.

(2) OPERATION AND MAINTENANCE.

Uninterrupted supply was given by Arapuni throughout the year, with the assistance of Horahora for three load shifts daily until November, when it was found possible to reduce the Horahora running-time to twelve load shifts a week. For normal operation the two stations were run continuously in parallel with Mangahao and Waikaremoana without any difficulties. No assistance was required from the stand-by stations during the year.

(A) POWER-STATIONS.

Arapuni.—Generating-units: After the restoration of No. 1 unit to service in March, 1936, No. 2 unit was dismantled for general overhaul. The machine was reassembled with the new spare runner installed in the turbine, and was restored to service at the end of April.

A large amount of work was done on the building-up of eroded areas on the spare turbine runners by welding with stainless steel electrodes and grinding to a smooth finish.

Other maintenance work included the fitting of a new main-distributor valve to No. 1 governor, the replacement of a badly worn brass collar on No. 2 rotating regulating valve, and the fitting of piston-rings to No. 3 pilot governor servomotor.

Outdoor Station: The work of replacing the original 110 Kv. pillar insulators by new all-porcelain pin-type insulators was completed early in the year.

The site of the 11 Kv. substation at the dam was altered and a new 11 Kv. line was erected to enable the old line to be dismantled for work in connection with the outdoor station extensions.

11 Kv. Bus Faults: Two 11 Kv. bus faults were caused by rats, one on 23rd June, which tripped out No. 1 generator, and the other on 24th June, which tripped out No. 3 generator, but there was no interruption to station supply.

Horahora.—Generating-units: No. 6 unit was shut down in April, No. 3 unit in August, and No. 1 unit in March for the replacement of worn turbine parts.

Relays: New overcurrent relays were put into service on Nos. 7 and 8 generators in September, and on Nos. 1 to 6 generators in January.

A flashover on the 11 Kv. bus was caused by the failure of an 11 Kv. insulator on 24th October, 1936, and a flashover on the 5 Kv. bus was caused by a bird on 3rd December, 1936.

Penrose Diesels: A D.C. auxiliary oil pump was installed in May to enable the Diesels to be started up in times of emergency without outside assistance for auxiliary power.

The plant was given a short run each week to charge up the air bottles, &c.

(B) SUBSTATIONS.

Penrose.—One 110 Kv. O.C.B. bushing which caused radio interference was replaced, all choke coils were removed from the 50 Kv. lines, and No. 3 (22 Kv.) O.C.B. was modified to make it suitable for the new 30,000 Kv.a. bank.

Bombay.—Three old 110 Kv. O.C.B.'s were dismantled to enable the tanks to be utilized for storing oil at the new North Auckland substations.

Hamilton.—An additional 11 Kv. feeder was installed by the Hamilton Borough Council, and was connected up on 19th April, 1936. The two existing borough cables were paralleled, and the panel thus made available was used for the new and larger feeder.

An additional 11 Kv. feeder for the Central Waikato Electric-power Board was connected up on 13th September, 1936.

Henderson.—A broken 11 Kv. bushing and a number of defective 50 Kv. strain insulators were replaced. An outage was caused by a flashover in a Power Board 11 Kv. feeder O.C.B. on 28th January, 1937.

Takapuna.—The 1,000 Kv.a., 3-phase transformer was transferred to Tahekeroa in November.

Tahekeroa.—A burn-out of the temporary 11 Kv. local service transformer occurred on 29th March, 1936.

Mareretu.—No trouble has been experienced at this substation since it was put into service with temporary 11 Kv. switch-gear on 18th December, 1936.

Kerepeehi.—A current transformer on a Power Board 11 Kv. feeder O.C.B. broke down on 20th August, 1936.

Waikino.—A Tirrill Regulator from the old Grand Junction steam plant was installed on the synchronous condenser in place of the original contact-making voltmeter and motor-operated rheostat.

Waihou.—Sixteen 50 Kv. post insulator units were found to be cracked.

Matamata.—The operator's cottage was renovated and connected up to the local service supply.

Huntly.—After the installation of the new 2,250 Kv.a. transformer bank on 18th October, 1936, the four 500 Kv.a. transformers were transferred to Hangatiki.

Te Awamutu.—An interruption to substation supply was caused by the breakdown of a current transformer on one of the 11 Kv. incoming feeders on 21st October, 1936, and another was caused by lightning on 8th November, 1936.

Hangatiki.—The ·0225 square inch 11 Kv. incoming cable was replaced by a ·04 square inch cable when the 750 Kv.a. transformer bank was replaced by a 1,500 Kv.a. bank in March, 1937.

Mamaku.—The tank of the 11 Kv. O.C.B. was punctured in several places during a thunderstorm on 8th November, 1936, and evidence of a flashover was found on an 11 Kv. bushing on the 50/11 Kv. transformer. The flashover was probably caused by a rat which was found nearby.

Ngongotaha.—The pig-tail connections of the 50 Kv. A.B.S.'s were renewed on account of deterioration.

Edgecumbe.—Depressions in the tops of the oil-storage tanks were filled with a bitumen mixuret to prevent water from accumulating and causing rusting.

A person committed suicide by climbing the structure and touching a live 50 Kv. conductor on 11th January, 1937.

Waiotahi.—A number of coils in the 11 Kv. earthing transformer were damaged by burning on 16th January, 1937, when a Power Board 11 Kv. O.C.B. failed to clear a feeder fault.

11 Kv. Substations.—Regular inspections were made and routine testing was carried out at each substation.

(C) TRANSMISSION-LINES.

(i) *110 Kv.*

Arapuni–Penrose Tower-line.—The only interruption to Penrose supply during the year was due to the incorrect operation of the distance relays at Hamilton No. 2 for a fault on the 110 Kv. wood-pole line on 15th December, 1936.

Arapuni–Penrose Wood-pole Line.—After the trouble caused by flashovers due to salt spray in February, 1936, arrangements were made for the removal of the earth wire and earth strips from all poles on this line. This work has been carried out as opportunity permitted, and at the end of the year the earth wire had been removed from approximately 660 poles. Owing to the difficulty in arranging a shut-down of this line at present, the work probably will not be completed until next summer.

Four faults occurred during the year, one being due to lightning, one to a hay stacker, and two to scrub fires.

Arapuni–Stratford.—An inspection of the legs of a number of towers showed that a certain amount of rusting had occurred at and below the ground-level, due apparently to the galvanizing being damaged by iron-shod rammers during construction. The rusty portions were cleaned and were painted with bitumen.

Three outages were caused by lightning.

(ii) *50 Kv.*

Horahora–Arapuni, Horahora–Hamilton–Huntly, Horahora–Paeroa, Waikino–Aoangatete, Bombay–Kerepeehi.—No trouble was experienced on these lines.

Penrose–Takapuna.—The 7/13 galvanized iron earth wire on the steel-tower portion of the line is being replaced by 7/14 copper on account of corrosion, and by the end of the year the new earth wire had been fitted to approximately 190 towers. Owing to the necessity of keeping one circuit

continually in service, the new earth wire was installed below the 50 Kv. conductors on the west circuit, and to enable this to be done new telephone cross-arms were fitted and the telephone-line was transferred to the east side of each tower.

A considerable reduction in induced voltage on the telephone-line was effected by transposing the 50 Kv. conductors.

Henderson–Mareretu.—A number of short outages of this line, which was first put into service in December, were caused by flashovers between the telephone-line and the 50 Kv. conductors during stormy weather. This trouble is being overcome by the installation of many additional span-breakers.

Kerepeehi–Waikino.—The only trouble experienced on this line was an outage caused by a cracked insulator.

Mystery Creek – Te Awamutu.—A general overhaul and refitting of pole-tops was carried out under live-line conditions.

Te Awamutu – Hangatiki.—Two outages occurred, one being caused by lightning and the other by a gorse fire.

Arapuni–Ngongotaha.—Five outages were caused by lightning during a thunderstorm on 8th November, 1936; two wires were burned through and several insulators were damaged.

Ngongotaha–Edgecumbe.—The specially treated wire in the sulphur area at Tikitere was examined from time to time, and, apart from a few rusty patches on the telephone-line and a slight discoloration of the paint on the 50 Kv. line, the wire was found in good condition.

A number of insulators on the 50 Kv. line A.B.S.'s at Mourea, Rotoehu, and Karaponga were shattered during a severe thunderstorm on 8th November, 1936, and three line outages occurred. Two other line outages were due to flashovers caused by swans.

Edgecumbe–Waiotahi.—The only trouble experienced on this line was a flashover caused by lightning.

Waiorongomai–Waikino.—A contract was let in November for the dismantling of the old tower-line over the mountain section, and this work was still in progress at the end of the financial year.

(iii) *11 Kv.*

Hautapu–Bruntwood.—The remaining single-circuit line on poles 243 to 280 was dismantled. The north and south 11 Kv. lines from Horahora now terminate at the Hautapu A.B.S., but the telephone-line remains intact to Hamilton.

Hamilton–Frankton.—One wire was burned through during a storm on 2nd May, 1936.

Waikino–Waihi.—A number of corroded steel-tower members were replaced by reconditioned parts obtained from the dismantled towers on the old Waiorongomai 50 Kv. line.

(iv) *General.*

Maintenance.—The usual maintenance work was carried out on the lines and access tracks, and the examination or testing of poles and insulators was carried out according to schedule. Poles were tested for soundness by boring, and holes due to decayed knots or other causes were cleaned out and filled with a bitumen mixture.

The solid telephone wire was replaced at P. and T. crossings on various lines by 7/16 copper to comply with regulations.

Pole Replacements.—Seventy-one poles consisting of five 52 ft., twenty-eight 42 ft., one 38 ft., seventeen 35 ft., four 30 ft., and sixteen 25 ft. poles were replaced during the year. Of this number twenty-one poles had defective heart-wood (dry rot, &c.), thirteen had decayed or extensive knot-holes, twenty-six had both defective heartwood and decayed or extensive knot-holes, and eleven were undersized after desapping.

One 42 ft. pole was replaced with the line alive.

Insulator Replacements.—Two hundred and ninety-eight insulators consisting of eight 110 Kv., 286 50 Kv., and four 11 Kv. insulators were found defective, and were replaced. Of this number eighteen insulators failed in service, 239 were found defective by live-line testing, and the remainder were found defective by inspection.

Of the eighteen insulators that failed in service three 110 Kv. and fourteen 50 Kv. insulators were shattered by lightning during three severe storms on 30th June, 1936, 8th November, 1936, and 30th November, 1936, and one 50 Kv. insulator was badly cracked.

Sixty-four of the defective 50 Kv. insulators were replaced with the line alive.

(D) TESTING.

The routine testing of instruments, meters, relays, &c., throughout the system was carried out according to schedule, and in addition a large amount of work was done for various supply authorities. The construction of four new 50/11 Kv. substations and the installation of new equipment at the existing stations called for a considerable amount of field work by the Test Department, as all equipment was tested prior to being put into service. Among the special tests carried out were tests on a concrete-steel pole, salt-spray tests on suspension insulators, tests on the new stator windings at Arapuni, and extensive tests on the distance relays at Hamilton under actual fault conditions.

(E) RELIABILITY OF SUPPLY.

Excluding the new North Auckland substations, which were first put into service in December, 1936, using temporary equipment, the average number of accidental interruptions to supply at each of the remaining sixteen major supply points was 5·75 of an average duration of 17 minutes. The corresponding figures for the previous two years were 12·5 and 16·9 minutes and 14 and 22 minutes.

The average number of prearranged interruptions was 3·9 of an average duration of 1 hour 54 minutes, compared with 5·9 and 1 hour 48 minutes, and 5·6 and 1 hour 40 minutes for the previous two years.

B. PALMERSTON NORTH DISTRICT.

1. Construction.

(*a*) power-stations.

Mangahao Power-house and Headworks.—The construction of the seven new staff cottages was completed early in the year.

Waikaremoana Power-house and Headworks.—Eight new cottages in the village were completed during the year, and plans have been prepared for cottages at several linemen's depots, and also for further extensions to the village.

An order has been placed for a third generating-unit, and tenders will close shortly for the corresponding transformer bank. The survey for the third pipe-line having been completed, a contract has been let, and it is expected that construction will shortly be under way.

(*b*) substations.

Khandallah.—The reconstruction of the outdoor structure and 110 kv. switch-gear was completed during the year.

The necessary 11 kv. switch-gear and cables have been installed in readiness for the supply to the railway electrification schemes.

Paraparaumu.—This is a new substation for a second point of supply to the Horowhenua Power Board. Construction was commenced in September and the substation was put into service in December.

Bunnythorpe.—Earthing-switches were installed on four line air-break switches.

Marton.—An earthing-switch was fitted to the line air-break switch on the north side of the substation.

Wanganui.—The second bank of transformers was installed and put into service.

An 11 kv. potential transformer was installed on the Power Board's structure to facilitate the paralleling of the Arapuni and Mangahao systems when required.

Okato.—This is a new substation consisting of a metering-hut, 11 kv. O.C.B., and 250 kw. transformer mounted on a pole structure. This substation is the point of supply for the Opunake Power Board, a new consumer taken over during the year from the New Plymouth Borough Council. Supply was commenced on the 1st November, 1936.

Opunake.—Departmental metering equipment was installed in the Opunake Power Board's power-house at Opunake.

Mangamaire.—Earthing-switches were installed on the two line air-break switches. A new 11 kv. panel and cable were installed for the second transformer.

A new cottage and single men's quarters were erected during the year.

Woodville.—An earthing-switch was installed on the Bunnythorpe West line air-break switch.

Dannevirke.—A new 11 kv. panel and cable were installed for the second transformer.

Napier.—A new bus-tie air-break switch was installed on the west side of the structure.

(*c*) transmission-lines.

Tuai–Gisborne.—The duplication of this line between Tuai and Ruakituri, a distance of 16·6 miles, was completed and the line put into service.

Khandallah–Masterton.—The survey of the transmission and telephone lines has been completed, but a certain amount of plan work is still outstanding. The track survey has still to be finalized. During the year a large number of deviations were investigated, and a special investigation was made of the geological aspect of the earthquake fault country near Featherston.

Khandallah–Ngahauranga: Khandallah–Khandallah Railway.—These two lines, of 50·7 chains and 46·8 chains respectively, for the railway-electrification schemes were surveyed and constructed during the year. Both lines are now ready for use when required, the Ngahauranga line having been already livened up.

(*d*) telephone system.

A motor generator ringing set was installed on the telephone system at Tuai Power-station.

(*e*) general.

Accommodation.—Due to the modified working-conditions under the recent legislation and other causes, extensive additions to the accommodation at the various substations and power-stations have become necessary.

The following additional accommodation is in course of erection:—

Napier	2 cottages.
Waipawa	2 cottages.
Dannevirke	1 cottage.
Hawera	1 cottage.

Stratford: Contract let for one cottage.
Wanganui: Tenders called for two cottages.
Mangahao Power-station: Site investigated and surveyed for additional cottages.
Tuai Power-station: Site surveyed for five additional cottages.
Palmerston North Office Site: Two cottages nearly completed.

Plans have also been prepared for several single men's quarters, but the contracts have not yet been finalized.

Palmerston North Office.—Owing to the greatly increased demand for space by the Civil Branch, plans have been prepared for extensions to the present office and store. The necessary contract is being finalized for this work, including the construction of a garage and workshop, plant-shed, pole-stacking site, and loading-bank.

2. Operation and Maintenance.

(*a*) power-stations.

Mangahao Power-house and Headworks.

A record flood was experienced towards the end of December, when 13·36 in. of rain were recorded at No. 1 dam in twenty-four hours, and Arapeti dam overflowed to a depth of 6 in. The total rainfall at No. 1 dam for the year was 187·22 in., rain being recorded on 225 days.

Considerable damage was done to the access road during the heavy rain in December. Between the top of the hill above No. 2 dam and No. 1 dam there were thirteen major slips including three large washouts.

The concreting-work in No. 2 dam cushion pool was completed, and advantage was taken of a low level in No. 1 dam to pump out No. 1 cushion pool. This was found to be in good order.

Permanent pegs were placed in the Arapeti land boundary, and the ragwort in this vicinity was attended to.

The automatic tripping-devices were installed on the pipe-lines at the surge-chamber, but have not been put into service pending further adjustments to the gate winches, which have been fitted with new gearing.

To further improve conditions on the switchboard gallery, the motor-generator ringing-set was placed outside the partition wall.

On the 19th February a complete shut-down of the station was experienced. Following the clearing of a fault on the Mangahao–Khandallah lines, all generators tripped on over-voltage.

Reliability of Generating-units.—The following table shows the reliability of the generating-units during the period for which records are available:—

(Period: April, 1927, to March, 1937.)

Unit.	Time on Load.		Time Idle.		Time under Repair.				Total Time.	
					Not in Demand.		In Demand.			
	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage
1	78,719	89·76	7,376	8·41	1,595	1·82	6	0·01	87,672	100
2	79,573	90·74	6,427	7·33	1,689	1·92	6	0·01	87,672	100
3	80,550	91·85	5,574	6·36	1,538	1·75	34	0·04	87,672	100
4	79,494	90·65	5,280	6·02	2,906	3·31	16	0·02	87,672	100
5	79,544	90·71	5,999	6·84	2,151	2·45	1	0·001	87,672	100

Available Time = Time on load plus time idle.
Reliable Time = Available time plus time under repair and not in demand.

Unit.	Availability.	Reliability.
	Per Cent.	Per Cent.
1	98·17	99·99
2	98·07	99·99
3	98·21	99·96
4	96·67	99·98
5	97·55	100·00

Sedimentation: No. 1 Dam Basin, Mangahao.—A series of observations and measurements have been taken as follows:—

January, 1931: Transverse and cross-sections fixed in upper reaches of Mangahao Lake.
March, 1933: Sedimentation checked on above sections and line of soundings made on Main Lake.
March, 1935: Further checks taken over whole lake.
March, 1937: No further field work done, but plans brought up to date. Analysed results indicate that further checks should be made about 1938 to fix rate of sedimentation over five-year period, 1933–38.

The rate of sedimentation observed to date indicates that the dam will be completely silted in a period of approximately fifty years from the date of completion of the dam.

Waikaremoana Power-house and Headworks.

A drier season than usual has been experienced, the rainfall for the year being 47·93 in. The lake-level has shown a steady drop during the year, from 2,018·70 ft. to 2,010·60 ft.

The operation of the turbines and generators has been very satisfactory during the year.

On the outdoor structure barriers have been erected to prevent access aloft from one bay to another, and the transformer neutrals have been insulated from the transformer tanks.

Reliability of Generating-units.—The following table shows the reliability of the generating-units during the period for which records are available :—

(Period : April, 1933, to March, 1937.)

Unit.	Time on load.		Time idle.		Time under Repair.				Total Time.	
					Not in Demand.		In Demand.			
	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage.	Hours.	Per-centage.
1	32,897	93·82	1,552	4·43	615	1·75	..	..	35,064	100
2	32,834	93·64	1,120	3·19	1,110	3·17	..	..	35,064	100

Available Time = Time on load plus time idle.
Reliable Time = Available time plus time under repair and not in demand.

Unit.	Availability.	Reliability.
	Per Cent.	Per Cent.
1	98·25	100
2	96·83	100

(*b*) SUBSTATIONS.

Khandallah.—Two capacitor bushings failed during the year. The first caused a total shut-down to Khandallah Substation of 4 minutes, while the second fault was cleared without an interruption. Another fault cleared without an interruption was due to leakage over the capacitor bushings during a heavy rainstorm.

Other total shut-downs were—One of 8 minutes, due to a broken 110 kv. jumper; one of 3 minutes, due to a fault on the Khandallah–Melling line; and one of 27 minutes, due to a fault on the Mangahao–Khandallah line.

Melling.—The core from the 5,000 kv.a. transformer that was damaged by lightning last year has been rewound.

Paraparaumu.—This substation was put into service on the 9th December as a second point of supply for the Horowhenua Power Board.

Bunnythorpe.—Arrangements were made here for the overhaul of bushings from the various substations, and during the year forty-four transformer and O.C.B. bushings were reconditioned. Some 11 kv. switch-gear from Marton was also overhauled.

The transformer neutral bus was reconstructed, and the substation earthing-system modified.

Marton.—The line terminations were altered in connection with the rearrangement of the phasing at Wanganui.

Wanganui.—In connection with the installation of the new transformer bank, modifications were made to the existing phasing of the substation.

The termination of the south line was changed over from No. 1 to No. 4 bay in order to facilitate switching operations.

A shut-down occurred on one occasion due to a lightning-storm, a current-transformer chamber on one of the Power Board's feeders being considerably damaged.

Hawera.—The aluminium caps on the lightning-arresters were changed for brass ones to prevent electrolytic action between the caps and brass lugs at the end of the jumpers from the station 110 kv. bus.

Stratford.—A lightning-storm on the 8th November damaged the high-tension bushings on two 110 kv. potential transformers.

New Plymouth.—No trouble was experienced here during the year.

Okato.—Supply was commenced from this substation to the Opunake Power Board on the 1st November. No trouble has been experienced here since that date.

Opunake.—The departmental metering-equipment installed here has been regularly maintained.

Masterton.—No trouble was experienced here during the year.

Mangamaire.—A new well was sunk for the water-supply, and a new pump and pump-house erected.

Woodville.—The station battery was replaced by a new one of the motor-car type, and a trickle charger installed.

Dannevirke.—On the 16th January a severe lightning storm was experienced over the substation, which shattered all the lightning-arrester fuses, and caused an interruption of fifteen minutes.

The station battery was replaced by one of the motor-car type, and a trickle charger installed.

Waipawa.—An isolating-link on the line side of the north O.C.B. carried away while the O.C.B. was being isolated. The post insulators on this phase were subsequently replaced.

The bushings in this O.C.B. were reconditioned, and provision was made to drain the oil from the bushings for test purposes.

Napier.—No trouble was experienced here during the year. The station battery was replaced by one of the motor-car type.

Wairoa.—Trouble was experienced on one occasion due to failure of an 11 kv. cable-sealing box, two roof bushings being damaged by flying metal. A virtual interruption of 8 hours 44 minutes resulted.

Plans have been prepared for alterations to the layout to facilitate the changing-over from one transformer to the other in the event of faults.

Gisborne.—No trouble was experienced here during the year.

(*c*) TRANSMISSION-LINES.

(i) *110 kv.*

Mangaore–Khandallah Duplicate Line.—A deviation of about half a mile was made at Paraparaumu in order to connect up with the new substation structure.

A shut-down of 27 minutes occurred on the line on the 27th February, due to a flashover caused by a gorse fire under the tower section near Pahautanui.

Heavy flooding occurred in the Ohau, Otaki, and Waikanae Rivers in December, but no damage was done to the main lines.

On the telephone-line trouble was experienced at the Otaki River, one pole being washed out during the floods in December. Preparations are now well advanced for reconstruction of the telephone crossing and piling all poles.

Khandallah–Melling.—Two shut-downs were experienced on the line during the year.

The first, of 4 minutes, was due to a gorse fire under the line which caused a flashover. The second, of 3 minutes, was due to a fencing-wire which was being strained across a gully whipping up into contact with the line, and two men (non-departmental) received serious electrical burns.

Mangaore–Bunnythorpe Duplicate Line.—One fault occurred on the west line during the year, but was cleared without an interruption.

Two poles, one on each line, were shifted at Bunnythorpe Railway-station for railway-deviation works. A new 52 ft. pole was erected on the North bank of the Manawatu River where a deviation was made due to erosion of the river bank.

On the telephone-line, Victoria Hut, which was wrecked by a gale in February, 1936, was rebuilt.

Bunnythorpe–Marton–Wanganui.—The live-line gang has been working on this line during the latter part of the year. Pole-caps were fitted to all poles between Wanganui Substation and Turakina River.

Wanganui–Hawera–Stratford.—Two shut-downs occurred during the year. The first was due to a flashover caused by lightning, several insulators being shattered and one pole splintered. The second was due to a gorse fire near Wanganui, which caused two separate flashovers.

On the telephone-line several breaks were caused by external causes—viz., one due to the branch of a tree blown across the line during a gale, two breaks due to tree-felling operations, and a fourth due to a hay-stacker catching the line.

Stratford–Pohokura.—A lightning-storm occurred on this section on the 6th November. Several insulator units were shattered, and two 110 kv. bushings at Stratford damaged.

Bunnythorpe–Woodville Duplicate Line.—This line gave satisfactory operation during the year.

On the telephone-line an interruption occurred due to the breaking of a rata cross-arm. The interior had rotted completely, leaving a hard outer shell.

Woodville–Mangamaire–Masterton.—On the telephone-line one break occurred due to a tree blown on the line, and on Mount Bruce the top was broken off a pole. Another pole was washed out at the Mangatainoka River.

Woodville–Dannevirke–Waipawa–Napier.—The live-line gang completed the overhaul of this line during the year.

There was one shut-down on this line due to an unknown cause, but was assumed to be due to lightning near Napier.

Two poles were shifted, one to avoid a slip near Matamau, and the other on account of river erosion between Dannevirke and Woodville.

No trouble was experienced on the telephone-line.

Napier–Tuai Duplicate Line.—The work of fitting vibration dampers on this line was delayed owing to the late arrival of material, but preparations are now well in hand to carry out this work.

(ii) *50 kv.*

Stratford–New Plymouth.—One interruption occurred on this line due to a lightning-storm. Three poles were slightly scarred, and a conductor slightly pitted.

During this lightning-storm one telegraph-pole was burnt through.

Tuai–Gisborne.—Two interruptions occurred on this line. The first is believed to have been due to the accumulation of snow on a cross-arm during a snowstorm causing a flashover. The second was due to a bad contact on one phase of the sectionalizing-switch at Tiniroto. Four short interruptions, of a total of 12 minutes were caused by the first fault, while a longer one of 4 hours 57 minutes was due to the second one.

Tuai–Wairoa Line.—This line is being completely overhauled, and the spacing between phases is being increased to permit live-line work. Certain angles have been eliminated and a stadia survey of the line was made.

(iii) *11 kv.*

Mangaore–Shannon.—This line is maintained by the Horowhenua Power Board. During the year one shutdown of 3 hours occurred due to an opossum coming into contact with the line, five 11 kv. and low-tension wires being burnt through.

Khandallah–Petone.—A broken jumper and several broken strands were repaired.

Tuai 11 kv. Lines.—No trouble was experienced on these lines, except that on one occasion a pole on the mill line was burnt through. No interruption resulted, the pole being replaced later.

(iv) *General.*

(1) *Lightning-storms.*—Eleven storms were reported during the year, but only five caused disturbances on the system; one on the Wanganui–Hawera line shattered several insulators and splintered a pole, and one in the Taranaki District caused a shut-down on the New Plymouth line, shattered several insulators on the Arapuni–Stratford line, and damaged two 110 kv. potential transformer bushings at Stratford. The third occurred near Wanganui Substation and damaged some of the Power Board's switch-gear. A fourth near Napier was presumed to have been the cause of an interruption on the Napier–Woodville line, while the fifth over Dannevirke Substation shattered the lightning-arrester fuses and caused a shut-down between Woodville and Tuai.

(2) *Special Maintenance Work.*—During the year the live-line gang completed the overhaul of the Woodville–Napier line, and were latterly working on the Bunnythorpe–Wanganui line.

In addition to changing poles and insulators, refitting poles, &c., under live-line conditions, the following special work was carried out:—

Jumpers on the Dannevirke structure were removed alive.

The Wanganui structure was overhauled, post insulators "buzz-stick" tested at various substations, and assistance given on general maintenance-work at substations.

The other special maintenance gang was chiefly engaged on the overhaul of the Mangahao–Khandallah lines. In addition to general maintenance-work, a deviation was made in both lines at Paraparaumu Substation and two telephone-huts were shifted. This gang also carried out work on the erection of the new transformer and steel structure at Paraparaumu Substation and assisted on the reconstruction of the structure at Khandallah. Latterly they were engaged on the erection of the two 11 kv. lines from Khandallah Substation to Khandallah Railway and Ngahauranga for the railway-electrification schemes.

(3) *Khandallah High-Tension Testing Set.*—The usual retests were made of all insulators found defective and removed from the lines.

The following special tests were also carried out:—

Porosity tests on several insulators, dry flashover and puncture tests on two-piece pin type insulators, and voltage tests on a length of cable.

(4) *Vibration.*—A design of festoon vibration damper for use on the Tuai–Napier copper lines was completed after experimental work, and material ordered for dampers. Material for experimental dampers of the same type for use on the Stratford–New Plymouth line was also ordered. The Bunnythorpe–Wanganui section of A.C.S.R. line, previously thought to be free from vibration trouble, has now shown up a considerable number of broken strands, and action is under review.

(5) *Pole Maintenance and Deterioration.*—The visit of some Australian forestry experts to ascertain the cause of rejection of large percentages of Australian hardwood poles to New Zealand and to negotiate a draft specification for poles led to the collection of a number of samples showing various forms of decay, and this was used as the nucleus for a "pole museum." Discussions with the mycologists of the Agriculture and Forestry Departments led to a better appreciation of the problem of pole decay and to a study of the moisture distribution in standing poles, with a view to determining whether the source of moisture was the ground or the top of the pole. An experimental section of a pole was artificially inoculated with a wood-destroying fungus obtained from another pole, with a view to determining the rate of progress of decay. Sample decaying pole sections were also erected on the line to determine the rate of decay.

In conjunction with representatives of the Australian forestry interests, the New Zealand Railway Department, the Post and Telegraph Department, and the New Zealand supply authorities, a draft standard specification for poles was drawn up and recommended for adoption by the various interested bodies.

A systematic collection of insects found in hardwood poles was commenced. This has shown that the Australian termites, *Calotermes insularis* (White) and *Calotermes olfieldi* (Hill), are definitely established in New Zealand, having been found in poles twelve to thirteen years old, and the possibility of some Australian longhorn beetles being established is strongly indicated.

A special oxy-acetylene blow torch was acquired during the year. The purpose of this is to burn out knots and also to burn out the rot in existing knot holes. These holes are then filled with bitumen or plastic wood to prevent the access of moisture. Successful trials have been carried out, both on poles on the ground and on standing poles. All new poles are now being treated before erection. It has been found, however, that very wet weather prevents the successful burning-out of rot owing to excess moisture.

(6) *Insulator Deterioration.*—Live-line testing of all insulators in service was carried out with the following results :—

	Strain.	Suspension.
Total number tested—		
110 kv.	24,084	102,019
50 kv.	1,814	1,194
Total	25,898	103,213
Number defective—		
110 kv.	28	207
50 kv.	Nil	Nil
Total	28	207

Total number tested	129,111
Total defective	235
Percentage defective	0·182

The above table does not include 50 kv. pin type insulators.

(7) *Survey of Lines.*—The check survey of the Woodville–Napier line was completed and that of the Bunnythorpe–Wanganui line is under way.

The resurvey of the Mangahao–Khandallah lines is being checked.

(*d*) TELEPHONE-LINES.

An analysis of all the interruptions to telephone service, of which there was a record in the power-station logs, was made back to January, 1931. It was found that there had been a total of 503 interruptions in the period. These were grouped into eight general causes, with about forty separate individual causes within these general subdivisions. It was plain that no general cure could be devised, and that it would be necessary to deal with individual causes and eliminate them one by one. To this end a Telephone Interruption Report was instituted from which a complete analysis can be made from time to time, and with causes definitely ascertained suitable remedies devised. Vibration breaks, as a cause, have now disappeared, due to the installation of dampers, and the elimination of the bulk of the other causes is within sight.

(*e*) COMMUNICATION SYSTEM.

The question of telephone protection against induced voltages received further attention, and the basic data for the design of insulating transformers for use with a mid-point earthing system of protection were calculated and submitted to manufacturers. A case occurred where an insulating transformer was by-passed due to the use of a separate earth for the telephone arrester, with the result that in several substations the telephone lightning-arrester earths have now been bonded to the main station eath. An investigation is in progress to determine the distribution of substation equipotentials, and this will determine whether a reversion to separate earths for the telephone system is feasible.

(*f*) TESTING.

The usual six-monthly maintenance tests on all relays and meters were carried out in accordance with the schedule. Various special tests were carried out in the test-room and in the field ; these included tests on a pumping equipment and special tests on the radio transmitters at Mangahao and Tuai, with a view to incorporating crystal control.

Phasing problems were investigated and alterations supervised ; arrangements were made for the routine testing of all rubber gloves in the district ; inductive interference tests at Titahi Bay and Tawa Flat were witnessed ; several 110 kv. fuses were reconditioned ; and new contacts were designed and made up for the automatic tripping devices at the Mangahao surge-chamber.

In addition a number of tests were made on meters and metering equipments for various supply authorities, both on site and in the test-room.

(*g*) GENERAL.

(1) *Load.*—It was not found necessary to call on standby plants during the year.

The maximum load on the system was 55,160 kw., as compared with 55,120 kw. last year. However, if the output from Evans Bay Power-station is included, this year's maximum demand was 63,100 kw., an increase of 14·5 per cent. The total output was 305,709,291 units, or 307,580,890 units including Evans Bay output, an increase of 12 per cent. over last year's total of 274,728,861 units. The annual load factor was 55·6 per cent. as against 56·7 per cent. last year.

The Mangahao-Waikaremoana system was operated in parallel with the Arapuni system throughout the year, and the following are the details of the interchange of power between the two systems, last year's figures being given in brackets :—

From Arapuni—		
Maximum demand	20,840 kw.	(19,800 kw.)
Units supplied	52,858,752	(38,414,250)
To Arapuni—		
Maximum demand	6,620 kw.	(12,830 kw.)
Units supplied	98,788	(319,901)

(2) *Reliability of Supply.*—During the year there were thirty-six faults causing interruptions to consumers, twenty-two of which originated on the Department's system and fourteen on consumers' systems. Of these, nineteen faults on the Department's system and nine faults on consumers' systems caused a total interruption to the 11 kv. bus-bars at one or more substations.

There were also nine faults on the Department's system which were cleared without causing an interruption to supply to any consumer.

Due to faults on the Department's system, supply to Khandallah Substation was interrupted on four occasions during the year of a total duration of 42 minutes. The most serious one, of 27 minutes, was due to a flashover caused by a gorse fire under the Mangahao–Khandallah transmission-line near Pahautanui.

The average number of interruptions to each of the eighteen consumers was five, faults on the Department's system being responsible for four of these.

The average duration of each interruption was 37 minutes, but, excluding seven major interruptions, details of which are given below, this time is reduced to 6·3 minutes.

Major Interruptions to Supply during Year 1936–37.

Consumer.	Duration. Hrs.	Mins.	Remarks.
Dannevirke Electric-power Board	3	02	Pothead on main 11 kv. cable at Dannevirke blew up.
Horowhenua Electric-power Board	2	57	Fault on Power Board's system. Opossum came into contact with Mangaore–Shannon 11 kv. line.
New Plymouth Borough Council ..	16	00	Due to lightning in Taranaki District. Interruption prolonged, as Borough Council was able to carry its own load.
Poverty Bay Electric-power Board	4	57	Jumper on 50 kv. A.B.S. at Tiniroto pulled out of socket due to solder melting.
Wairoa Electric-power Board ..	8	44	11 kv. cable-box in Wairoa Substation failed. A two-phase supply was maintained for 2 hours 43 minutes of this period.
Lake House	4	28	Both due to failure of an 11 kv. transformer at Onepoto.
Thomas' Mill	4	28	
Total time	44	36	

The following table gives a comparison of the causes of troubles on the Department's system over the last three years :—

	Year ending 31st March, 1935.	1936.	1937.
(1) In 11 kv. apparatus	4	..	6
(2) In 50 kv. apparatus	..	1	1
(3) In 110 kv. apparatus	6	10	4
(4) On 11 kv. lines	3	1	3
(5) On 50 kv. lines	1	5	1
(6) On 110 kv. lines (defects)	2	..	..
(7) On 110 kv. lines (external causes)	6	3	6
(8) Generators	..	3	..
(9) Relays	..	3	..
Operation—			
(10) Mistakes	3	3	2
(11) Accidents	1	5	2
(12) Errors of judgment	..	..	..
(13) Lightning	13	8	5
(14) Earthquakes	..	..	..
(15) Unknown causes	6	5	4
Totals	45	47	34

(3) *General.*—In addition to the normal routine duties, several special features were dealt with.

A commutator-grinder was designed to facilitate the trueing-up of slip-rings and commutators, and is attachable to the various generators, exciters, and synchronous condensers on the system. So far this has been used only at Mangahao Power-station, but has come up to all requirements.

In connection with the additions to accommodation required at the various substations and power-stations, standard designs for a five-roomed cottage and a single men's quarters were prepared.

Investigations were made in connection with the supply of power to the East Coast Railway works, particular attention being given to the loading-conditions on the line.

The load during June, 1937, has been very heavy, and, due to the new units at Arapuni being late, it has been necessary to give a considerable amount of study to the operation of the system. The operation of the system under overload conditions has required from the operators of all power-houses very close attention, and, considering the limited facilities at their command, they are to be congratulated on the way in which they have carried out their duties.

SOUTH ISLAND ELECTRIC-POWER SYSTEM.

Introductory.

Hitherto the "South Island electric-power system" referred to the Lake Coleridge and Waitaki plants which are now operating as an interconnected system, but during the year the generating plant at Lake Monowai, together with the whole reticulation system of the Southland Electric-power Board, was acquired by the Government and placed under the control of this Department as an addition to the "South Island electric-power system," although it is not yet interconnected with the Lake Coleridge-Waitaki section.

Consequential on this acquisition the two accounts have since been amalgamated, and in future the "South Island electric-power system" will comprise the Lake Coleridge–Waitaki-Southland plants operating as an interconnected unit.

The capital in operation at 31st March, 1937, was £6,085,892, and in addition to this amount there is a sum of £63,332 representing assets not yet in operation. In Table II will be found an analysis of the capital outlay. The revenue for the year was £329,058, and working-costs £85,829, which resulted in a gross profit of £243,229, equal to a return of 4 per cent. on the capital in operation. After paying interest £212,640, depreciation and other capital charges £138,695, the net result was a loss of £108,106 for the year.

The accumulated Depreciation Reserve, General Reserve, and sinking funds as at 31st March, 1937, amounted to £809,900, and Table I gives full particulars of financial results as well as other relevant statistical information.

Pending completion of the 110 Kv. transmission-line to connect the two systems together the report of operating results is this year presented under two individual headings—viz., (*a*) Christchurch District, and (*b*) Invercargill District.

A. CHRISTCHURCH DISTRICT.

The year ending 31st March, 1937, represents the twenty-second year of operation of the Lake Coleridge undertaking and the second complete year of operation of the Waitaki Power Scheme.

During this period the Coleridge and Waitaki Stations have continued to be run in parallel, and the accounts have accordingly been combined.

The year's operations have been outstanding with respect to marked increase in load on the system and the new works undertaken in connection with the supply and distribution of electric power to the West Coast districts.

1. Capital Outlay.

The capital outlay at 31st March was £4,499,767, of which assets to the value of £59,393 were not in operation.

2. Financial Results.

The total revenue for the year was £259,864, and working-expenses totalled £65,275, making a gross profit of £194,589, which equals a return of 4·38 per cent. on the average capital outlay in operation (£4,440,466).

The interest charge for the year was £177,126, which, together with depreciation (£79,653) and cost of raising loans (£26,420), necessitated the transfer of £88,610 from the General Reserve Fund to enable the full appropriation to be made for the Depreciation Reserve Account. The year's working, therefore, resulted in a loss of £88,610.

No funds were available for sinking fund this year; the deficiency to this account was £98,492 at 31st March.

The accumulated Depreciation Reserve and sinking funds at 31st March, 1937, amounted to £709,053, and the General Reserve Fund to £67,703.

The detailed operating-costs show that the total cost per unit generated for the year was 0·0823d., compared with 0·0751d. for the previous year, an increase of nearly 10 per cent. This increase is due chiefly to the institution of the forty-hour week, plus wages and salary increases.

In Table V are given the gross financial results of the distribution of energy from the Lake Coleridge–Waitaki–Southland electric-power system, and of the power supply authorities and other consumers connected to the Government system.

3. General.

The total units generated was 190,280,000, representing an increase of 11·6 per cent. on those for last year. Of these units, 166,406,285 were sold, while 3,399,537 were otherwise accounted for. The balance of 20,474,178 units represents transmission and distribution losses and amounted to 10·7 per cent. of the units generated.

The maximum system load increased from 36,780 Kw. to 44,520 Kw., an increase of 21 per cent., which is an exceptionally large increase.

The average load factor for the year was 48·8 per cent., a decrease on that of last year; this is largely due to the exceptional peak load experienced.

4. Construction, Operation, and Maintenance.

(1) Construction.

(a) *Power-stations.*

Lake Coleridge Power-station.—During the year very little construction work was done at the power-house; the 6·6 Kv. voltage regulator for local supply was installed and put into service in July. In January the preliminary work on the construction of the new Harper gates at the intake to the diversion channel was commenced, and by the end of March boxing was being placed in position for the new structure. This work is being undertaken in conjunction with the General Branch, and during this period floods in the Harper River have delayed the work to a certain extent.

Waitaki Power-station.—New starters were installed for the governor oil-pumps, replacement starters of a more modern type having been supplied free of charge for this purpose. A 3 in. vertical-type centrifugal pump was installed for gallery drainage.

The dismantling of temporary plant and lines was continued; the temporary 11 Kv./400 volt substation was dismantled and village temporary service-lines taken down. The renovation of twelve temporary cottages for further occupation was carried out.

A temporary 11 Kv./400 volt-transformer bank with automatic voltage regulator and oil switch was installed in the power-house in February to provide means of taking power from the main lines in the event of a shut-down being necessary during the course of the work being done on the temporary sluice gates in the dam by the General Branch.

It was found that a shut-down was not required as the river conditions were favourable; this equipment was later dismantled.

(b) *Substations.*

Addington Substation.—In order to meet the increasing demand of the Municipal Electricity Department's load a new summation metering-panel was installed at Addington, and two new feeders of 0·2 square inch cross-sectional area were laid between Addington Substation and Hagley Park. The first of these feeders, No. 2, was put into service in June, and the second at a later date. These new cables replaced the old Armagh Street feeders of 0·04 square inch section.

A new 33 Kv. bus on the outdoor structure was erected for the Motukarara line. A new 11 Kv. line on the causeway over McCormack's Bay was built and put into service for supply to Sumner Borough.

Hororata Substation.—The garage at the Point Substation was re-erected at Hororata, and a line O.C.B. installed for service on the second Hororata–Ashburton line, which was recently built to replace the old line from the Point to Ashburton.

Point Substation.—The new switch-gear was erected and the balance of this substation dismantled. This substation is now unattended, and much reduced in size and equipment since the dismantling of the line to Ashburton.

Ashburton Substation.—The two new cottages and fencing was completed and the former occupied. New switch-gear installed was completed and put into service.

Timaru Substation.—The main work carried out consisted of finishing details at the new substation and the removal of the synchronous condenser from the old site and storing at the new substation. The work included installation of outdoor-type telephone at the outdoor structures, connecting up and putting into service of lighting standards, levelling and making drains on the site, fitting and painting of new switchroom, levelling yard, and general cleaning up.

The substation building at the old site has now been completely demolished.

Glenavy Substation.—Outdoor lighting standards were erected and put into service.

The 10-ton crane from the old Timaru Substation was modified where necessary and re-erected at Glenavy. Further levelling and laying-out of the section was done.

Oamaru Substation.—Work on lighting and levelling of the section and the finishing of the interior of the substation building was carried out.

Half-way Bush Substation.—Minor items only of construction were done, consisting of painting of transformers and switchroom interior, installation of lighting standards, and outdoor telephone.

The porches of the cottages were glassed-in and a lineman's quarters built. Work in levelling and laying out the site was done.

(c) *Transmission-lines.*

The new 19/.092 copper line from Hororata to Ashburton was completed and put into service in August and the old line from the Point to Ashburton was dismantled.

Work on the new 66 Kv. line to the West Coast was done as detailed under Section (*g*).

(d) *Telephone System.*

The trunk telephone system which now links up Coleridge and Half-way Bush and all intermediate system stations has been improved by the installation of telephone test-points at accessible positions in the line.

During the year an extension line from Lake Coleridge was commenced to link up the system with the West Coast; the first section as far as Otira has been put into service and has proved of use in connection with construction work.

(e) *Test Department.*

During the year an exceptional amount of work has been entailed with modification of relay systems at the various substations, due to changes in the transmission-lines, and also in the design and construction of standard-type control, metering, and relay panels. Panels are also being made up for the West Coast system.

Double-line relay protection was effected at Ashburton and Hororata for the new line, temporary relays for this work being made up, pending the arrival of the relays ordered.

Temporary metering and relay equipment was made up for standby supply at Waitaki during work on the dam.

An 11 Kv. metering cubicle for the Point Substation was constructed and installed and new switch-gear was built for Hororata Substation and Lake Coleridge power-house.

A testing transformer of 6 Kv.A. short-time rating was built to deliver up to 2,000 amps. for relay and O.C.B. testing.

The tests and investigations recorded throughout the year were 299.

(f) Survey.

In May the survey of the Arthur's Pass – Otira section of the 66 Kv. West Coast transmission-line was started, and in spite of delays due to rough terrain and adverse weather conditions good progress was maintained.

Three survey parties were engaged on this line, being located at Lake Coleridge, Arthur's Pass, and Hokitika. During the year the complete line route was selected.

Preliminary inspections were made of a route for the Dunedin–Gore 110 Kv. line and also for extensions of the 66 Kv. lines to the north of Hokitika.

The survey of the transmission-line from Lake Coleridge to Cass was also completed.

Preliminary survey work in connection with the new substation sites at Arahura and Palmerston South was carried out.

A special survey of lake contours and investigation of levels was carried out at lakes Tekapo, Ohau, and Pukaki and adjacent country.

(g) West Coast Electrification.

The proposal to supply power to the West Coast by a 66 Kv. transmission-line from Lake Coleridge was finalized early in the year, and survey work was commenced in May and practically completed during the year under review.

Preparation of tower foundations for the Arthur's Pass section was made and a contract for the piling-work and erection of structures at the Waimakariri and Mingha river crossings was let.

In July a site was selected for the Arahura main terminal substation, three miles from Hokitika. This site was surveyed and cleared in August, and a contract for the access-road excavation and metalling was let in February.

In October an office was established in Hokitika to take local charge of the West Coast work. Additional survey staff was engaged and several bush-felling contracts for the transmission-line route were let.

The first section of four miles of the main telephone-line from Arahura Substation to Otira was constructed.

Investigation of sites for the Diesel Station and for Blackwater 66 Kv. Substation was made, and the site at Dobson was surveyed, a start on the excavation for machine foundations being made on 15th March.

(2) Operation and Maintenance.

(a) Power-stations.

General.—During the year the Lake Coleridge and Waitaki power-stations operated in parallel satisfactorily, there being no troubles of any magnitude at either of these stations. The interchange of load between these stations has been very advantagageous for the carrying-out of maintenance-work and the control of lake level at Coleridge, this latter requirement being necessary during the new construction work at the Harper intake gates.

Lake Coleridge Power-station.—The lake-level has been maintained throughout the year.

The Harper River gates reached a stage of excessive wear, and flooding in May eroded No. 2 gate and blocked the channel with boulders and shingle, heavy maintenance-work being entailed. The new gates were started in January, as previously detailed.

The Acheron diversion works have been maintained in good order.

The grouting of No. 2 tunnel was completed in June and the pipes filled for service; 235 tons of cement were used on this work.

In February No. 3 generating-unit was overhauled and the turbine runner and shaft brought to Christchurch for fitting liner rings and refitting of thrust collar and filling of cavitated areas in the runner vanes.

Adjustment and repairs to the Larner-Johnson valve control gear were carried out, and an overhaul of the K2 and K3 switch-gear and potential transformers was completed.

Repair work on Nos. 4 and 5 main gates and Nos. 5 and 7 sluice gates was carried out.

No. 7 pipe-line exterior was scraped and painted, and similar work on Nos. 4, 5, and 6 is proceeding.

Waitaki Power-station.—The installation of a temporary 11 Kv./400 V. bank of transformers and control switch-gear was completed in May.

It was found that the river-flow was such that a light day load of 3,000 Kw. could be carried on the station conveniently without disorganizing the work on the dam.

Repair work was carried out on the penstock-filling valves and the rod couplings strengthened to withstand the effects of vibration.

Oil filtering of O.C.B.'s was completed and insulators changed and cleaned down where necessary.

The dismantling of overhead lines and substation equipment used for construction was carried out.

The renovation of twelve cottages for staff was put in hand and the interior work finished in February.

In addition the usual maintenance-work on plant and village was done.

Lyttelton Diesel Station.—There was no occasion to call upon this plant during the year, but it was maintained in good order and test load runs were made in July.

Towards the end of the financial year the dismantling of the building and plant was commenced preparatory to its transfer to Dobson for erection there as an auxiliary supply for the West Coast electrification scheme pending supply being available from Lake Coleridge.

(b) Substations.

The Addington switch-gear has functioned satisfactorily during the year.

Routine oil filtering and maintenance-work has been carried out at all substations during the year.

An 11 Kv. voltage regulator at Ashburton which broke down on 11th June, was repaired and replaced in service.

(c) Transmission-lines.

There were five total interruptions to the main supply during the year, totalling 22½ minutes, the most serious interruption being one of ten minutes on 10th February, following trouble on the Municipal Electricity Department's underground cables in Christchurch City.

During the year the inspection and replacement of poles, tree-cutting, and clearing gorse, &c., was continued, a total of 164 poles being replaced.

The annual insulator testing was completed and a total of 93,812 insulators were tested, of which 525 were defective.

The following work under live-line methods was done during the year: 3 crossarms changed, 2 binders changed, 102 insulators changed, and 4 poles changed.

An overhaul of the Darfield feeder for the Railway Department and the Malvern Power Board was made and a special overhaul of the Tramway and Montreal Street feeders was necessitated by the fault on 10th February, which caused considerable damage to these lines and terminal equipment.

5. Rainfall and Lake Level.

Maximum river flow at Waitaki for year ending 31st March, 32,000 cusecs (12th October).
Minimum river flow at Waitaki for year ending 31st March, 4,200 cusecs (29th June).
Lake Coleridge: Rainfall for the year was 40·69 in.
Harper: Rainfall for the year was 55·62 in.
Waitaki: Rainfall for the year was 17·54 in.
Lake Coleridge: Lake level at 31st March was 1671·67 ft.

B. INVERCARGILL DISTRICT.

A poll of the ratepayers having carried a proposal that the Southland Electric-power Board's undertaking be acquired by the Crown, in pursuance and exercise of the powers conferred on him by section 8 of the Southland Electric-power Supply Act, 1936, His Excellency the Governor-General, by Order in Council dated the 9th day of October, 1936, declared that on the 13th day of October, 1936, "the Southland Electric-power District shall be abolished and the Southland Electric-power Board dissolved." On the date so fixed the assets of the Board became vested in His Majesty the King, the liabilities and engagements of the Board became liabilities and engagements of the Crown, and the undertaking theretofore carried on by the Board became an undertaking carried on by the Minister of Public Works.

1. Capital Outlay.

The capital outlay at 31st March was £1,649,457, of which assets to the value of £3,939 were not in operation.

2. Finance.

The total revenue for the period 13th October, 1936, to 31st March, 1937, was £69,194, including a sum of £137, being additional charges in connection with rates levied by the former Southland Electric-power Board. Working expenses for the period were £20,554, including £182 for commission for collecting rates, allowances, and amounts written off. The interest charge was £35,514. After providing an amount of £32,622 for the Depreciation Reserve there was a net loss for the period of £19,496.

No funds were available for sinking fund this year, the contribution being in arrears to the amount of £16,495.

General reserves amounting to £461,455 8s. 7d. appearing in the final balance-sheet of the Board were partly utilized in writing down assets considered to be fictitious, made up of—

	£	s.	d.
Interest and sinking fund during construction	168,347	3	10
Exchange expenditure	49,500	0	0
Surveys and preliminary expenses	11,249	1	8
Proportion of expenditure in regard to financing consumers prior to revenue earnings	15,582	14	5
Plant, tools, &c.	19,817	12	0
Obsolescent stocks	7,646	14	6
	£272,143	6	5

The balance of £189,312 2s. 2d. was carried forward and is to be utilized next year to write off the following:—

	£	s.	d.
Surveys and preliminary expenses and cost of raising loans (original)	92,361	0	9
Interest and sinking fund during construction	14,410	9	2
Obsolescent capital assets	82,540	12	3
	£189,312	2	2

3. General.

Units generated and purchased by the Department for the period 13th October, 1936, to 31st March, 1937, were: Generated at Monowai, 15,110,950; purchased for resale, 73,660: a total of 15,184,610. Of these units, 7,997,208 were sold to retail consumers, 3,068,261 to bulk consumers, while 112,935 were accounted for in departmental use. The balance, representing losses, totalled 4,006,206 units, or 26·38 per cent. of units generated and purchased for resale. The number of active consumers on 31st March, 1937, was 10,638.

DESIGN OFFICE.

(A) Electrical Section.

In the year under review a large amount of design work was involved and it was found necessary to further augment the Design Office staff to cope with it.

For the North Island systems the principal design work carried out was that connected with the extensions to Arapuni Power-station. As the peak load on these systems exceeded the installed generating-capacity in the winter of 1936, it was apparent that the installation of additional generating-capacity must proceed apace if the ever-increasing demand for electric power is to be met.

In the South Island the peak load to date is less than the present installed generating-capacity, but the extension of the Department's activities into Westland and Southland, and the growth of load in areas already served, all point to the need for further generating-plant at an early date. The principal design work carried out for these systems was that involved in these extensions.

Now that most of the large manufacturing firms have facilities for testing their switchgear under actual short-circuit conditions it is found that the ratings assigned to most of the older switchgear installations cannot be sustained by test. With recent increases and projected future increases in the installed generating-capacity, particularly in the North Island, and the interconnection of the systems, the switchgear at most stations will have to withstand far more exacting service under short-circuit conditions in the future than in the past. To meet this service inadequate switchgear is to be replaced at several stations, the displaced equipment being utilized where suitable for smaller stations where the duty is not so severe.

Extensive additions to housing accommodation for operating and maintenance staff involved a considerable amount of design work. Some of the new staff accommodation is to replace existing temporary accommodation which has reached the end of its useful life, whilst the remainder is to provide for the additional staff required on account of the extensions to the systems and the introduction of a shorter working-week. In some cases the drawings and specifications were prepared by District Offices.

Lake Coleridge - Waitaki System.

To provide for the increasing load on the Southland electric-power supply, which already exceeds the installed capacity of the Monowai Power-station, an interconnecting transmission-line to operate at a pressure of 110 Kv. is to be run from Half-way Bush Substation to Gore Substation to supply the excess load from the Lake Coleridge - Waitaki system. At the latter station the voltage will be stepped down to the operation transmission voltage of the Southland system by a bank of 110/66 Kv. auto-transformers.

The extension of the main South Island system into Westland involves the construction of a double-circuit 66 Kv. transmission-line over Arthur's Pass from Lake Coleridge Power-station to Arahura Substation. This transmission-line rises to high altitudes and traverses exceptionally rough country, so it has been designed to withstand the severe climatic conditions under which it will operate.

The following design work has been carried out for this system:—

Half-way-Bush.—Drawings and specifications for tendering purposes for outdoor steelwork and switchgear extensions.

Ashburton.—Specification and drawing for tendering purposes for rectifier charging equipment.

The detail design work for the controlling switchgear for the West Coast line at the Lake Coleridge Power-station is being done by Christchurch Office.

Southland System.

The interconnection of the Lake Coleridge - Waitaki system with the Southland system involves extensive additions to Gore Substation buildings and equipment. The additions to this station and equipment include a bank of 110/66 Kv. auto-transformers, controlling switchgear for auto-transformers and the 110 Kv. transmission-line, workshop building with 25 ton crane, and oil filter-house with its oil-purifying and handling equipment.

The following design work has been carried out for this system:—

Gore.—Preliminary layout of building and equipment on site. Specification for 25 ton electric overhead crane. Drawings and specifications for tendering purposes for 110 Kv. outdoor switchgear and steelwork.

Westland System.

The terminal station for the main transmission-line from Lake Coleridge Power-station will be Arahura Substation, which will also be an important distributing centre for the Westland system. From Arahura a 66 Kv. line is being run to Dobson Substation, and thence to Blackwater Substation, with a branch line to Kaimata Substation. From Dobson, an 11 Kv. line will supply Ngahere Substation. To minimize the voltage fluctuations due to the surging nature of the load of the gold-dredges, which will form a large part of the system load, a 5,000 kVA. 11,000-volt synchronous condenser will be installed at Arahura Substation.

The following design work has been carried out for this system :—

Arahura.—Detail drawings and specifications for building contract for substation buildings. Layout drawing of buildings and equipment on site. Drawing and specification for traverser truck for handling main transformers. Drawing and specification for oil-storage tanks. Preliminary layout drawing of synchronous condenser and its switchgear.

Dredge Substations.—Specification for switchgear and metering cubicles.

For the most part the detail design work for the other substations is being undertaken by District Office.

Mangahao-Waikaremoana System.

To provide a standby for the two main generating-units at Waikaremoana Power-station, which carry the base load of the system, and have been in fairly continuous operation for some years, a third generating-unit, of slightly larger output than the existing units, is to be installed.

To avoid instability in the electrical operation of the system, quick-response excitation equipment is being provided for this unit, and new excitation and voltage regulating equipment having similar characteristics will replace the present equipment on the existing main units.

An additional bank of transformers of 20,000 kVA. capacity, and controlling switchgear is to be installed at Khandallah Substation to carry the increasing load of Wellington City and surrounding district.

The following design work has been carried out for this system :—

Waikaremoana.—Drawings and specifications for tendering purposes for third generating-unit and its switchgear and voltage-regulating equipment. Specifications and drawings for tendering purposes for new excitation and voltage-regulating equipment for existing main and auxiliary alternators. Specifications for motor-driven standby exciter for the main alternators. Specifications and drawings for tendering purposes for new 400-volt switchgear. Drawings and specifications for building contracts for combined wagon, garage, and workshop of reinforced concrete, and for communal motor-car garage, also of reinforced concrete.

Khandallah.—Preliminary layout drawing of proposed extensions to provide for additional switchgear and transformers. Specifications and drawings for tendering purposes for 20,000 kVA. bank of 110/11 kV. transformers.

Paraparaumu.—Foundations for 110 kV. outdoor switchgear and steelwork.

Arapuni-Horahora System.

The extensions to Arapuni Power-station and outdoor station called for a large amount of detail design work. The structural design of the power-station building and of the foundations for main units and auxiliaries was completed. At the outdoor-station building the crane-room has been extended over the access roadway to provide better facilities for handling heavy apparatus. The shaft and runway details for the new automatic lift from the power-station to the outdoor station called for special design on account of its being inclined at an angle of $15\frac{1}{2}^{\circ}$ to the vertical. To eliminate the dust nuisance in the windings, the new generators are cooled by closed air-circulating systems. The cooling water for the air-coolers and all other cooling-water requirements for the new generating-units and transformers are supplied from the tailrace by centrifugal pumps, all pumping-equipment being in duplicate and of sufficient capacity to provide for future extensions.

Duplicate drainage-pumps are also being installed for the building extensions, and provision is made for utilizing these for pumping out draught-tubes.

An oil-filtering system is provided in the power-station for handling and filtering transformer and switch oil, and a separate system for lubricating oil.

Extensive additions and some modifications to the low-tension A.C. and D.C. switchgear were necessary to provide for the various machine auxiliaries and additions to the station lighting, heating, and power services generally.

A CO_2 fire-protection system is provided for the new generating-units, with provision for extension to the two future generating-units.

The following design work has been carried out for this station :—

(*a*) Completion of structural design of power-station and machine foundations.
(*b*) Drawings and specifications for stop-log gates for draught-tube, gantry crane for stop-logs, wall crane for workshop, steel doors and other interior fittings for power-station, and water rheostat for testing main units.
(*c*) Design of lift and cable shaft.
(*d*) Design of retaining-wall at south end of power-station.
(*e*) Drawings and specifications for fire-protection system.
(*f*) Drawings and specifications for motor-driven pumping-sets and design of cooling-water system.
(*g*) Design of oil filtering and piping systems for transformer and lubricating oil.
(*h*) Design of foundations, concrete structures, traverser tracks, cable trenches, and climb-proof fencing for outdoor station, and extension to crane-room of outdoor station building.
(*i*) Drawings and specifications for extensions and modifications to low-tension A.C. and D.C. switchboards, power and control cables, cable-boxes, miscellaneous switchgear, and voltage-regulating equipment for station generators.
(*j*) Design of blank ends for hydraulic testing of scroll cases.

Other design work carried out for the Arapuni-Horahora system included the following :—

Tahekeroa, Mareretu, and Maungatapere.—Drawings and specifications for tendering purposes for building contract for reinforced-concrete switchroom and cottages. Layout and foundation drawings for indoor and outdoor switchgear, main transformers, and 11 kV. cables.

Penrose.—Drawings of proposed 20,000 kVA. condenser for tendering purposes. Foundation details for new 110 kV. oil-circuit breakers for 15,000 kVA. transformer-banks.

Bombay.—Layout and foundation drawings for controlling 110 kV. and 50 kV. oil-circuit breakers for second 110/50 kV. transformer-bank.

Henderson.—Layout and foundation details for additional 50 kV. switchgear for controlling North Auckland line and for 50 kV. oil-circuit breakers for main transformer-banks.

General.—The plotting of operating data for the various systems including lake-level and river-flow data, maximum loads and weekly output for generating-stations, maximum demands and consumption of energy for local supply authorities and other major consumers was continued throughout the year.

Specifications were prepared for electrical equipment for the Mechanical Branch and other Departments, including the following equipment:—

Diesel generating-sets for construction camps. 250 kW. motor-generator set for Devonport Naval Base. Diesel generating-sets, automatic switchgear, and storage batteries for lighthouse service.

Ornamental lighting installation for Rotorua.

Motors for irrigation pumping-sets.

The use of motor-car type batteries, operated on the floating system for switch operation, is being extended to most of the stations, rectifiers of the copper-oxide type being used to trickle-charge the battery and supply the normal D.C. load. Several of these rectifiers have been made up by New Zealand firms.

Designs have been prepared for single and communal garages for rental to members of the operating staff for private motor-cars.

A considerable amount of study has been given to current literature on concrete construction with a view to improving the standard, firstly, by more careful study of aggregate grading and control of the process of manufacture, and, secondly, by improved methods of handling, compacting in the forms by the use of vibratory placing machines, and curing.

Study has also been given to the use of electric-arc welding for major steel structures; and for joining and building up concrete reinforcement; also to the adoption of rigid frames for power-station and substation buildings for greater efficiency in the resistance to earthquake effects.

Transmission-lines.

West Coast (66 kV. lines)—

(*a*) Lake Coleridge to Arahura on West Coast via Arthur's Pass and Otira: Double circuit.

(*b*) Arahura to Dobson: Single circuit.

For above lines several types of wood-pole structures have been designed and detailed, both with and without guys. Charts were prepared for use in the field when locating the supports, also stringing charts for the conductors. Steel towers were necessary for the Arthur's Pass – Otira section, and drawings and specifications were made for the ordering of these structures. Route plans were prepared showing the location of the towers. Sundry foundation drawings, and location of supports at river crossings have been dealt with.

Dunedin-Gore (110 kV. line, single circuit).—Drawings of the wood-pole structures have been prepared, and charts for their location in the field. The Clutha River will be crossed at Clydevale and a preliminary layout of the crossing, including height and type of supports, and height and tension of the conductors, has been made.

General.—Between Ashburton and Timaru the existing lines cross the Rangitata River, being supported on 66 kV. steel towers purchased in 1922. Subsequent developments have made it necessary to raise the voltage in the near future, and the structural alterations to the towers for this purpose have been investigated.

Two 11 kV. feeders from Khandallah Substation for electrical supply to the New Zealand Railways at Ngahauranga and Khandallah have been constructed. Plans have been checked, and title searches made.

The construction of the North Auckland 50 kV. line as far as Maungatapere was completed early in 1937. Stringing charts and data were supplied for use in the field.

In association with several other Government Departments some work has been done on a standard specification for New South Wales timber poles, with a view to a more uniform inspection.

The possibility of making concrete poles to replace the larger timber poles upwards of 50 ft. or more in length has been investigated. A 50 ft. pole was designed and four experimental poles made. These were tested to destruction in various ways to ascertain their behaviour under the different loadings occurring in service and during construction of transmission-lines. The poles made demonstrated their ability to carry the loads for which they were designed, but on the score of high cost and excessive weight, cannot be recommended for general purposes. Useful data was obtained for any future work in this direction.

Several designs of concrete poles from outside sources have been examined with a view to approval by the Department.

Various applications from Electric-power Boards for approval of new lines have been dealt with, checks being required on the strength of supports, and conductor sags and tensions, to ascertain their compliance with the Electric Supply Regulations.

(B) Hydraulic Section.

Investigation of Power Resources.

During the year further surveys have been made at Lakes Tekapo, Pukaki, and Ohau with a view to determining the amount of land and buildings that would be affected if a control dam were built at the outlet of each lake.

A report is in preparation concerning the future of the South Island system of supply, the amount of stored water required to regulate supply, and how much it is advisable or necessary to provide at each place. A study is also being made of the alternative scheme of diverting Lake Tekapo through the Two Thumb Range and developing a high head scheme into the Opihi a few miles above Fairlie.

Consideration is also being given to the possibility of a power development from the Rangitata in conjunction with the irrigation project there. Such power would be available chiefly, and ultimately, only during the winter season when it is most needed.

Waikaremoana.—In consequence of the decision not to proceed with the lake-control work and upper development, boring and testing are proceeding with a view to pushing on with the lower development.

Contracts have been let for the penstock, generating-plant, and other equipment for the third and final unit in the main station, and a start has been made in the erection of anchor and supports for the penstock.

Lake Coleridge.—With, for the time being, a surplus of power at Waitaki the opportunity has been taken to replace the Harper River diversion-gates which were first built in 1921, extensively repaired in 1928, and now completely worn out. The new gates are being built to a different alignment and to a somewhat novel design. It is anticipated that with the new alignment and robust construction the wear caused by travelling shingle will be greatly reduced.

ELECTRIC-POWER BOARDS.

During the year the Southland Electric-power District was taken over by the Government as from 13th October, 1936, and the constitution of the Bay of Islands Electric-power District was gazetted on 4th March, 1937, but the Board which has been elected is not yet functioning as an electric supply authority. There are now forty-five electric-power districts constituted, and forty-one Electric-power Boards (including Westland Power, Ltd., operating under delegated license) are actually carrying out the distribution and sale of electrical energy (August, 1937). The total area covered is 71,746 square miles, or 69·4 per cent. of the total area of the Dominion (103,415 square miles); the total population concerned is 1,045,841, or 66·3 per cent. of the total population (1,577,109) of the Dominion; and the unimproved value of the land included in the electric-power districts and outer areas is £232,038,236, or 77 per cent. of the total unimproved value of the Dominion (£301,137,513).

So far only one of the four main cities—viz., Auckland—has been included in the inner area of an electric-power district, but of the secondary centres the cities of Wanganui, Palmerston North, and Invercargill (up till 12th October, 1936), and the Boroughs of Timaru, Napier, Hastings, Blenheim, Greymouth, Gisborne, and Oamaru are included. The advantage of Power Board organization is more obvious to rural than to urban ratepayers, and yet the above position indicates that some of the more important centres have realized that it is to their advantage generally to be associated with the country in undertaking the work of reticulation of electric power on a comprehensive scale.

Table VIII gives details of the gazetted date of constitution, the area, population, and rateable value of each of forty-five power districts already formed, also the amounts of the loans already authorized, and the voting on polls taken. The total amount of the loans authorized by the forty districts which have taken their polls is £13,040,770. The population of the districts concerned is 917,147, so that the loans authorized amount to £14·22 per head of population, as compared with £14·76 last year. The unimproved valuation of the districts is £209,806,297, the loans authorized amounting to 6·2 per cent. of the unimproved rateable value of the lands pledged as security for the loans. The aggregate voting at the polls totalled 76,816 for and 14,206 against the respective loan proposals.

Table XI shows the capital outlay incurred by each Board up to the end of the financial year 1936–37, together with the revenue and annual expenditure.

The total capital outlay by the forty Boards which are in operation is £12,999,177, practically all of which is on works in service. The gross revenue from the sale of electricity by these Boards was £2,327,959. The general result is a profit over the whole business of the Power Boards of £131,599 for appropriation to reserve funds, &c., after paying working-expenses and capital charges for interest, sinking fund, and depreciation.

During the last year three of the Boards struck a general rate, which was collected in all cases, and the following table gives details of the rates levied and collected:—

RATES COLLECTED BY ELECTRIC-POWER BOARDS FOR YEAR ENDED 31ST MARCH, 1937.

Name of Board.	General Rate.		Availability Rate.		Special Rates.		Total Amount collected.
	Levied.	Collected.	Levied.	Collected.	Levied.	Collected.	
	d.	£		£	d.	£	£
Banks Peninsula ..	0·202 and 0·02	2,844*	..	..	..	..	2,844*
Malvern	$\frac{7}{32}$	2,376	..	..	..	..	2,376
Marlborough ..	..	..	..	74*	..	..	74*
Manawatu-Oroua ..	$\frac{1}{4}$	4*	..	..	..	..	4*
Otago	..	893*	..	..	..	..	893*
Southland† ..	..	5,409†*	..	..	..	..	5,409*
Taranaki	..	..	..	56*	..	..	56*
Waimea	..	..	..	..	0·75	25*	25*
Wairoa	$\frac{1}{16}$	1,832*	..	..	..	..	1,832*
Totals, 1937 ..	..	13,358	..	130	..	25	13,513
„ 1936 ..	..	39,645	..	109	..	3,736	43,490

* Includes arrears for previous years. † Southland taken over by Government on 13th October, 1936.

LOCAL ELECTRIC-SUPPLY SYSTEMS.

Including the seven Government plants, there are now (31st March, 1937), forty public electric-power stations operating in the Dominion.

Ninety-three local electric-supply authorities are directly engaged in the retail sale of electricity, and the following table shows the proportion using Government-generated power :—

Class of Local Authority controlling Electric-supply System.	Using Government Supply.			Using Non-Government Supply.
	Wholly.	Partial.	Total.	
Power Board	28 (*a*) §	4 (*b*) (*d*) §	32	8 (*c*) §
City Council operating own reticulation	3 (*e*)	2 (*f*)	5	1 (*g*)
Borough Council operating own reticulation	12 (*h*)	7 (*i*)	19	9 (*j*)
County Council operating own reticulation	2 (*k*)	..	2	3 (*l*)
Town Board operating own reticulation	1 (*m*)	1 (*n*)	2	2 (*o*)
Company	..	..	..	5 (*p*)
Private	..	..	..	1 (*q*)
Tourist Department (Rotorua)	1	..	1	..
Public Works Department, Southland	1 (*r*)	..	1	..
	48	14	62	29
			91	

§ Included in these areas are the following cities, boroughs, and town districts :—

(*a*)					(*b*)		(*c*)	
Cities (2).	Boroughs (58).		Town Districts (37).		Boroughs (9).	Town Districts (2).	Boroughs (9).	Town Districts (2).
Auckland.	Akaroa.	New Lynn.	Bulls.	Te Karaka.	Balclutha.	Manaia.	Alexandra.	Tahunanui.
Wanganui.	Ashburton	Newmarket.	Ellerslie.	Te Kauwhata.	Eltham.	Normanby.	Blenheim.	Takaka.
	Birkenhead.	Ngaruawahia.	Glen Eden.	Tinwald.	Hawera.		Brunner.	
	Cambridge.	Northcote.	Havelock North.	Tuakau.	Kaitangata.		Cromwell.	
	Carterton.	Oamaru.	Helensville.	Turua.	Lawrence.		Greymouth.	
	Dannevirke.	Onehunga	Henderson.	Waiuku.	Milton.		Motueka.	
	Dargaville.	One Tree Hill.	Hikurangi.	Warkworth.	Opunake.		Richmond.	
	Devonport.	Opotiki.	Howick.	Waverley	Palmerston South.		Roxburgh.	
	Eastbourne.	Otahuhu.	Hunterville.		Waikouaiti.		Runanga.	
	Ekctahuna.	Otaki.	Johnsonville.					
	Featherston.	Paeroa.	Kihikihi.					
	Feilding.	Pahiatua.	Leamington.					
	Foxton.	Petone.	Leeston.					
	Geraldine.	Pukekohe.	Mangaweka.					
	Gisborne.	Shannon.	Manurewa.					
	Greytown	Takapuna.	Mercer.					
	Hampden.	Te Awamutu	Ohaupo.					
	Hastings.	Te Aroha.	Onerahi.					
	Huntly.	Te Kuiti.	Ormondville.					
	Levin.	Temuka.	Otorohanga.					
	Lower Hutt.	Thames.	Papakura.					
	Martinborough.	Timaru.	Papatoetoe.					
	Marton.	Upper Hutt.	Patutahi.					
	Masterton.	Waihi.	Pleasant Point.					
	Matamata.	Waimate.	Putaruru.					
	Morrinsville.	Waipawa.	Raglan.					
	Mt. Albert.	Waipukurau.	Rongotea.					
	Mt. Eden.	Wairoa.	Southbridge.					
	Napier.	Woodville.	Taradale.					

(*d*) Opunake, South Taranaki, Taranaki, and Otago (through Dunedin City Corporation).
(*e*) Palmerston North, Christchurch (including New Brighton Borough), Invercargill.
(*f*) Wellington, Dunedin (including St. Kilda, Port Chalmers, West Harbour, Green Island, and Mosgiel Boroughs and Outram Town District).
(*g*) Nelson.
(*h*) Bluff, Hamilton, Kaiapoi, Lyttelton, Napier, Rangiora, Riccarton, Sumner, Te Aroha, Thames, Timaru, Wairoa.
(*i*) Whakatane, Waitara, Inglewood, New Plymouth, Stratford, Patea, Taihape.
(*j*) Ohakune, Picton, Queenstown, Raetihi, Taumarunui, Tauranga, Te Puke, Westport, Whangarei.
(*k*) Heathcote, Waimairi.
(*l*) Kaikoura, Murchison, Uawa.
(*m*) Mangaweka.
(*n*) Kaponga (through Taranaki Power Board).
(*o*) Kamo, Manunui.
(*p*) Included boroughs (Hokitika, Kumara, Whangarei).
(*q*) Rawene.
(*r*) Includes 7 boroughs (Bluff, Gore, Mataura, Riverton, South Invercargill, Tapanui, Winton) and 5 town districts (Edendale, Lumsden, Nightcaps, Otautau, Wyndham).

Summary of Numbers of Cities, Boroughs, and Town Districts.

	North Island.			South Island.		
	Cities.	Boroughs.	Town Districts.	Cities.	Boroughs.	Town Districts.
Number	4	68	48	4	49	14
Electricity available in	4	68	41	4	46	13
Government supply available in	4	62	35	3	32	10
Taking whole supply from Government ..	3*	52	33	2	21	9

* Wellington City takes practically the whole of its supply, although listed as "partial supply."

Public electric-supply is not yet available in the following boroughs and town districts (Kohukohu Town District has partial private supply) :—

Boroughs.	*Town Districts.*	
Arrowtown (South Island).	Clinton (South Island).	Kawhia (North Island).
Naseby (South Island).	Kaikohe (North Island).	Kohukohu (North Island).
Ross (South Island).	Kaitaia (North Island).	Ohura (North Island).
	Kawakawa (North Island).	Russell (North Island).

On the 13th October, 1936, the Southland Electric-power Board's hydro station at Lake Monowai together with the whole of the Board's reticulation system was acquired by the Government.

Negotiations are now in progress between the North Auckland Electric-power Board and the Kamo Town Board for the acquisition of the latter's reticulation system in Kamo, and the inclusion of the Town District as a constituent portion of the North Auckland Electric-power District.

Arrangements were finalized for the transfer of the generating plant and reticulation system of the Havelock North Town Board to the Hawke's Bay Power Board as from 1st April, 1937.

During the year Palmerston North City Council has completed the installation of a 2,000 kw. Diesel plant which is to be used for standby purposes, and Marlborough Power Board let a contract for the installation of an additional Diesel set of 900 kw. capacity. Trial runs have recently taken place on the Wellington City Corporation's new standby steam plant which is equipped with boilers specially designed for the rapid raising of steam, and on the Hume (Cobb River) Electric-power Company's Diesel standby plant at Stoke. These two plants are rated at 15,000 kw. and 750 kw. respectively, and will be incorporated in next year's statistics.

The total installed capacity (excluding standby plant) is at present 235,509 kw. The increase is due to Queenstown Borough Council's additional Diesel plant purchased from Skippers, Ltd. The increase for year ending 31st March, 1938, is expected to be approximately 60,000 kw. of new plant, including standby.

The proportion of installed plant as at 31st March, 1937, is as follows :—

	Stations.	Kilowatts.	Proportion per Cent.
Water-power (excluding 11 standby installations)	35	234,537	99·55
Steam-power (excluding standby plants at Portland (3,190 kw.), Auckland (41,160 kw.), Wanganui (1,500 kw.), Wellington (10,000 kw.), Invercargill (1,975 kw.), Gisborne (350 kw.), Waihi,* Huntly (1,500 kw.), Dunedin (1,875 kw.), Christchurch (1,500 kw.), Nelson (500 kw.), Petone (516 kw.), Hokitika (625 kw.) : totalling 64,691 kw.)	1	750	0·32
Gas-power (excluding standby plants at Palmerston North (1,020 kw.), Westport (210 kw.), Kaikoura (37 kw.), Taihape (75 kw.), Franklin (187 kw.) : totalling 1,529 kw.) ..	0	..	..
Oil-power (excluding standby plants at Penrose (3,750 kw.), Dobson (5,760 kw.), Palmerston North (2,000 kw.), Dunedin (860 kw.), Blenheim (456 kw.), Hastings (1,087 kw.), Gisborne (980 kw.), Ashburton (160 kw.), Napier (500 kw.), Thames (262 kw.), Opunake (148 kw.), Ohakune (113 kw.), Hawera (485 kw.), Oamaru (192 kw.), New Plymouth (350 kw.), Hokitika (Kanieri) (150 kw.), Hokitika (200 kw.), Motueka (110 kw.), Patea (64 kw.), Reefton (80 kw.), Petone (316 kw.) : totalling 18,027 kw.)	4	222	0·13
Total	40	235,509	100·00

* 1,640 kw. plant partially dismantled at present.

The number of consumers supplied has increased from 355,973 to 371,027, an increase of 15,054, or 4·22 per cent., for the year.

The total population included in the various electric-supply areas is 1,461,651, or 93 per cent. of the total population of the Dominion, so that the ideal of a supply being available to every home in the Dominion is well on the way to realization. The maximum demand per head of population in the areas supplied now exceeds the allocation of 0·15 kw., or 0·2 horse-power, per head of population, the original basis of the design of the Government schemes. Table X shows, for each supply authority, the average maximum demand per consumer.

The units sold per head of population supplied were 587, as compared with 531 last year. (See footnote on Table X.)

The total length of transmission and distribution line in service is 23,322 route-miles, as compared with 22,424 last year, an increase of 898 miles, or 4 per cent. This fact would seem to indicate that there is a steady demand for the extension of electric lines to meet the requirements of the rural areas. The number of consumers per route-mile is 15·90, as compared with 15·87 last year.

The new factor introduced for comparative purposes last year was "Units sold per £1 of distribution capital," and appears again this year in Table X. This index figure is computed from the total units sold (section 9 of F.P. 15) divided by the capital outlay shown opposite subsections (*c*) and (*d*) of section 15 of F.P. 15, and is one which it is hoped will be of value to supply authorities in general when its purport is fully appreciated.

The sales per route-mile of line were 36,800 units, and the gross revenue £220‡. The units are greater than last year (34,550), and there is an increase in revenue as against £215 last year, due to a general reduction in selling-rates and to load-building campaigns. This increase can also be attributed to a decided improvement in the economic conditions which have prevailed during the past three years, and an examination of the table under "Growth of Load" reveals interesting figures in connection with Electric Cooking and Electric water-heating for the 1935–1937 period.

Out of the ninety-three distributing authorities (including Public Works Department, North Island and South Island systems, and excluding Ross Borough), eighty-two showed a profit for the year amounting to £689,753 and eleven showed a loss amounting to £119,622. The gross revenue (excluding rates) was £5,124,220, and the general result is a profit for the whole Dominion of £570,131 after paying working-costs (£2,386,987) and capital (interest, sinking fund, and depreciation, exchange, &c.) charges (£2,167,102) at the rate of 6·33 per cent. on the total capital outlay of £34,253,508. This shows a net profit of 1·66 per cent., as compared with 1·67 per cent. last year. The business on the whole is thus a thoroughly sound and remunerative one as well as supplying a public necessity to 93 per cent. of the population of the Dominion.

The following table summarizes the results of the year's operations in connection with electric supply throughout the Dominion, and Tables XI and XII show the financial statistics for each supply authority. It should be noted that the method of compilation and computation adopted for the following table is slightly different to that of years previous to 1933 :—

—	—	Water.	Steam.	Gas.	Oil.	Total.
1. Number of main stations	No.	35(*a*)	1(*b*)	..	4(*c*)	40
2. Installed capacity (main plant)	Kw.	234,537	750	..	222	235,509
3. Number of standby plants	No.	11(*d*)	10(*e*)	5(*f*)	20(*g*)	46
4. Installed capacity (standby plant)	Kw.	4,202	63,825	1,325	17,607	86,959
5. Number of consumers	No.	367,086	3,219	..	722	371,027
6. Connected load	Kw.	1,465,956	9,534	..	997	1,476,487
7. Units generated	No.	1,079,848,259	4,957,363	208,707	1,739,430	1,086,753,759
8. Units sold to consumers (Table X)	No.	855,720,466	1,878,032	..	231,877	857,830,375
9. Percentage of non-productive units	%	20·76	21·56	..	20·05	21·06
10. Total operative capital (including distribution systems and standby plant)	£	34,098,886	118,158	..	36,464	34,253,508
11. Total capital per kilowatt installed (including distributing systems, &c.)	£	106·0	94·5	..	164·2	106·2
12. Annual working-costs	£	1,167,513*	16,306*	..	5,946	1,189,765*
13. Annual working-cost per unit under section 8	d.	0·33	2·08	..	6·15	0·33
14. Annual capital costs (interest, sinking fund, and depreciation)	£	2,156,120	8,471	..	2,511	2,167,102
15. Annual capital cost per unit under section 8	d.	0·60	1·08	..	2·60	0·61
16. Annual capital costs as percentage of capital	%	6·32	7·16	..	6·89	6·33
17. Total annual costs (section 12 plus section 14)	£	3,323,633	24,777	..	8,457	3,356,867
18. Total annual cost per unit under section 8	d.	0·93	3·16	..	8·75	0·94
19. Total annual revenue (from retail sale of electricity)	£	3,791,500	28,418	..	6,861	3,826,779
20. Average revenue per unit (from sections 19 and 8)	d.	1·063	3·63	..	7·10	1·071
21. Gross revenue (excluding rates and bulk sales)	£	3,890,086	29,535	..	7,377	3,926,998
22. Net profit (section 21, less section 17)	£	566,453	4,758	..	1,080†	570,131
23. Ratio working-costs to gross revenue (section 12 and section 21)	%	30·00	55·20	..	80·60	30·30

* After deducting revenue derived from bulk sales (Table XI). † Loss. ‡ This figure is distinct from that of £215, shown in Table XIII, which is compiled on revenue from sale of electricity only.

NOTES :—

MAIN STATIONS.

(*a*) Hydro-electric: Arapuni, Hora Hora, Mangahao, Waikaremoana, Coleridge, Waitaki, Monowai, Golden Bay, Grey, Marlborough, Opunake, Otago Central, Taranaki, Teviot, Waimea (2), Wairere, Dunedin, New Plymouth, Queenstown, Raetihi, Ross, Taihape, Taumarunui, Tauranga, Westport, Whakatane, Havelock North, Kaponga, Murchison, Keri Keri, Kanieri, Reefton, Wairua Falls, Westland Power, Ltd. Total, 35.
(*b*) Steam: Nelson. Total, 1.
(*c*) Oil: Picton, Kaikoura, Uawa, Rawene. Total, 4.

STANDBY STATIONS.

(*d*) Hydro-electric: Akaroa, Fairlie, Hawera, Kourarau, Oamaru, Ohakune, Patea, Rotorua, Tauranga, Te Aroha, Thames. Total, 11.
(*e*) Steam: Huntly, Auckland, Wanganui, Christchurch, Dunedin, Invercargill, Nelson, Wellington, Portland, Westland Power, Ltd. Total, 10.
(*f*) Gas: Pukekohe, Palmerston North, Taihape, Westport, Kaikoura. Total, 5.
(*g*) Oil: Penrose, Dobson (ex Lyttelton), Ashburton, Hastings, Blenheim, Opunake, Gisborne, Hawera, Motueka, Oamaru, Dunedin, Palmerston North, Napier, New Plymouth, Ohakune, Patea, Thames, Kanieri, Reefton, Westland Power, Ltd. Total, 20.

BROKEN WIRES AND POLES.

There were 2,006 broken wires reported by electric-supply authorities, with 108,249 miles of conductor erected. The corresponding figures for the previous year were 8,290 broken wires, and 104,499 miles of conductor in use. The large number of breaks recorded for 1936 was due to an exceptional period of violent gales.

Falling trees were again the principal cause of the breaks, and accounted for 28 per cent. of the total, as against 47 per cent. for 1936.

As regards broken poles, 574 instances were reported for the year, of which 303, or 52·8 per cent., were New Zealand blue-gum.

For 1936 the total number of broken poles reported was 451, and it is still evident that electric-supply authorities who experimented with New Zealand blue-gum and nondescript Australian hardwoods during the past decade are now being called upon to make replacements sooner than the anticipated life of fifteen years for poles used on distribution-lines.

ACTUAL MILEAGES AND SIZES OF OVERHEAD CONDUCTORS IN USE AT 31ST MARCH, 1937.

Size of Conductors (S.W.G.).	Copper.		Aluminium.		Galvanized Steel.		Galvanized Iron.		Copperweld.		Steel-cored Aluminium.		Bronze.		Total Breakages.
	Miles.	Breakages.	Miles.	Breakages.	Miles.	Breakages.	Miles.	Breakages.	Miles.	Breakages.	Miles.	Breakages.	Miles.	Breakages.	
7/20 ..	6,959	378	..	..	..	..	..	..	..	..	..	..	..	..	378
7/18 ..	11,917	439	..	..	..	..	..	..	..	..	..	..	..	..	439
7/17 ..	2,655	52	..	..	..	..	..	..	..	..	..	..	..	..	52
7/16 ..	22,325	206	18	7	120	1	141	..	..	..	177	..	..	..	214
7/15 ..	109	..	..	..	..	..	..	..	..	..	166	..	..	..	..
7/14 ..	11,714	35	8	1	49	..	..	..	..	..	894	..	..	..	36
7/13 ..	1,143	4	..	..	5		2	..	..	..	..	..	..	..	4
7/12 ..	493	4	153	1	3	..	..	..	5	..	3	..	..	..	5
7/11 ..	4	..	..	..	..	..	..	..	..	..	2	..	..	..	..
7/10 ..	33	..	204	..	..	..	..	..	11	..	51	2	..	..	2
7/9 ..	76	..	15	..	5	..	..	..	..	..	..	..	..	..	..
7/8 ..	..	..	1	..	..	..	..	..	..	..	640	..	..	..	..
19/18 ..	400	5	..	..	..	..	..	..	..	..	..	..	..	..	5
19/17 ..	590	24	..	..	..	..	..	..	..	..	..	..	..	..	24
19/16 ..	1,739	17	..	..	..	..	..	..	..	..	..	..	..	..	17
19/15 ..	173	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19/14 ..	625	3	..	..	..	..	..	..	..	..	..	..	..	..	3
19/13 ..	2,999	4	..	..	..	..	..	..	..	..	..	..	..	..	4
19/12 ..	223	2	..	..	2	..	..	..	..	..	..	..	..	..	2
19/10 ..	370	..	1	..	..	..	..	..	..	..	..	..	..	..	..
37/16 ..	57	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37/15 ..	400	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37/14 ..	91	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37/13 ..	23	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37/12 ..	151	..	..	..	..	..	..	..	..	..	227	..	..	..	..
66/13 ..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	2,546	197	..	..	9	..	94	..	12	..	..	..	..	..	197
11	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	9,030	330	..	..	417	..	223	2	432	..	..	..	..	..	332
8	13,223	173	..	..	4,338	8	5,320	67	537	1	..	..	..	..	249
7	770	5	..	..	..	..	128	..	91	..	..	..	..	..	5
6	310	5	..	..	110	..	154	..	206	..	..	..	..	..	5
5	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..
4	599	..	..	..	..	..	..	..	79		2	..	..	..	..
2	67	..	..	..	..	..	..	..	..	..	..	..	..	..	..
0	79	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2/0 ..	..	..	10	7	..	..	..	..	..	..	59	..	..	..	7
3/0 ..	..	..	..	..	..	..	..	..	..	..	399	..	..	..	..
3/12 ..	71	4	15	..	..	..	..	..	..	..	..	..	..	..	4
3/11 ..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..
3/10 ..	24	..	5	..	..	..	..	..	..	..	..	..	30	..	..
3/9 ..	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..
3/8 ..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..
4/16 ..	13	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4/14 ..	..	..	..	..	253	1	..	..	..	..	..	..	..	..	1
5/14 ..	..	..	..	..	209	..	..	..	..	..	..	..	..	..	..
6/144 ..	..	..	..	..	..	..	..	..	..	..	19	..	..	..	..
7/136 ..	54	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Miscellaneous ..	46	20	8	1	..	..	2	..	12	..	41	..	..	..	21
Totals ..	92,107	1,907	457	17	5,520	10	6,064	69	1,391	1	2,680	2	30	..	2,006

Grand total, 108,249 miles.

No returns of conductor mileages received from Auckland and Christchurch.

GROWTH OF LOAD.

The total connected load at end of the year under review was 1,476,487 Kw., compared with 1,342,577 for 1936, an increase of 133,910 Kw., or 10 per cent.

Statistics pertaining to the increasing use of electric ranges, electric water-heaters, and milking-machines have been collected and scheduled for some years past, and from the following table will be seen the annual growth which has taken place in each class :—

Year.	Route-miles of Line in Service.	Consumers.	Annual Increase.	Electric Ranges.	Annual Increase.	Electric Water-heaters.	Annual Increase.	Electrified Milking-machines.	Annual Increase.
		Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
1925 ..	6,011	148,699	..	1,526	..	..	..	3,581	..
1926 ..	12,454	192,392	29·3	4,671	205·0	6,654	..	4,856	35·8
1927 ..	14,975	228,345	18·7	9,511	104·0	14,160	113·0	6,738	38·8
1928 ..	17,063	243,795	6·8	15,766	66·0	21,513	52·0	8,514	26·3
1929 ..	17,759	266,306	9·2	20,254	28·5	29,257	36·0	10,161	19·4
1930 ..	19,128	284,235	6·7	25,997	28·3	37,564	28·5	11,922	17·3
1931 ..	19,636	300,809	5·9	29,480	13·2	42,803	13·9	13,656	14·5
1932 ..	20,251	309,360	2·8	31,973	8·5	45,796	7·1	14,163	3·7
1933 ..	20,585	322,997	4·4	33,998	6·4	48,070	5·0	15,913	12·4
1934 ..	20,996	334,593	3·6	36,081	6·2	50,272	4·6	16,992	6·8
1935 ..	21,707	342,334	2·3	39,730	10·1	53,635	6·7	17,200	1·2
1936 ..	22,424	355,973	4·0	44,837	12·9	58,864	9·8	18,458	7·4
1937 ..	23,322	371,027	4·2	53,402	19·1	67,049	13·9	20,275	9·8

The total increase in route-miles of line for the above twelve-year period is 289 per cent.

See Table XIV for details of ranges, waterheaters, and milking-machines for year ended 31st March, 1937.

ELECTRICAL SUPPLY AND ELECTRICAL WIRING REGULATIONS.

During the past year numbers of 6 volt, 12 volt, and 18 volt portable electric-lighting plants have been installed in territories not readily accessible to public electric-supply systems. Under the Electrical Wiremen's Registration Act the services of a registered wireman are not necessary to install the wiring where the voltage does not exceed 20 volts, but this does not include exemption from the requirements of the Electrical Wiring Regulations issued under the Public Works Act. Some modification of the standard Electrical Wiring Regulations is deemed necessary in such cases, and the Regulations Advisory Committee has under way the preparation of regulations defining the requirements to be observed by persons installing such sets with a rating not exceeding 500 watts.

INSPECTION OF ELECTRIC LINES, ALSO PRIVATE GENERATING-PLANTS.

The annual departmental inspection of the electric lines in operation was carried out in the case of supply authorities last year, and any defects or breaches of the regulations which came under notice were duly notified to the supply authorities concerned. In one instance an electric-supply authority was called on to reconstruct an E.H.T. line which had been erected contrary to regulation standards. These inspection activities of the Department undoubtedly tend towards the maintaining of a high standard, and the general willingness on the part of the supply authorities to co-operate in a general observance of the regulations governing such matters is of great assistance to this Department.

The following supply authorities have notified extensions to electric lines in their respective districts during the year :—

Power Boards—
- Ashburton.
- Auckland.
- Banks Peninsula.
- Cambridge.
- Central Hawke's Bay.
- Central Waikato.
- Dannevirke.
- Franklin.
- Golden Bay.
- Hawke's Bay.
- Hutt Valley.
- Horowhenua.
- Malvern.
- Marlborough.
- Manawatu-Oroua.
- North Canterbury.
- Otago.
- Otago Central.
- Poverty Bay.
- South Canterbury.
- South Taranaki.

Power Boards—*continued.*
- Southland.
- Springs-Ellesmere.
- Taranaki.
- Tararua.
- Tauranga.
- Te Awamutu.
- Thames Valley.
- Waitomo.
- Waimea.
- Wairarapa.
- Wairere.
- Waitaki.
- Waitemata.
- Wanganui-Rangitikei.

Cities—
- Dunedin.
- Invercargill.
- Nelson.
- Palmerston North.
- Wellington.

Boroughs—
- Hamilton.
- Lyttelton.
- Napier.
- New Plymouth.
- Ohakune.
- Patea.
- Picton.
- Taumarunui.
- Thames.
- Westport.

County Councils—
- Heathcote.
- Waimairi.

Companies—
- Alderton Utility Co.
- Kanieri Electric, Ltd.
- Skippers Ltd.
- Westland Power, Ltd.
- Hume (Cobb River) E.P. Co.
- Westport Coal Co.

It is not generally known that under the Electrical Wiremen's Registration Amendment Act, 1928, it is mandatory to give notice of the installation of private electric plants, and provision is made for the inspection of these plants before same are placed in service. During the year inspections have been made as opportunity offered.

LICENSES AND PERMITS ISSUED.

The following water-power and electric-line licenses (61) and permits (11) have been issued during the period between 30th June, 1936, and 30th June, 1937: *Licenses*—J. H. Donaldson, Okaihau; F. H. S. Smith, Albury; G. W. McCaa, Tutaki; G. Murray, Braemar; G. G. Murray, Glenmore; Hall Association, Ranfurly; G. C. L. Birdling, Orari; F. H. Newman, Owen River; W. Webber, Kaeo; T. A. Hows, Kaeo; S. Grey, Winchester; T. Harrison, Winchester; M. M. Woolley, Peel Forest; A. F. Speight, Otautau; J. Goodger, Lindis Pass; R. T. Cole, Tikitiki; A. P. Leigh, Kaikohe; Hydro Coal Mines, Ltd., Westport; Hume Pipe Co., Cobb River (two amendments); Hutt Valley Power Board; Westland Power Board (Kumara area); Molyneux Gold-dredging Co., Clyde; Tourist Department, Rotorua; Queenstown Borough Council (additions); S. Long, Wellsford; W. F. Baldwin, Ohaeawai; Haldane and Polglase, Bainham; P. R. Sargood, Pembroke; Waitemata Power Board; Golden Bay Power Board; N. W. Gibbs, Murchison; J. Hill, Kawhia Road; J. S. Bailey, Tutaki; M. M. Massey, Waipu; C. F. G. Parr, Pirongia; C. F. Turk, Karamea; N. S. Grant, Waipu; W. G. Grant, Bainham; L. Cooper, Whangamomona; Taranaki Power Board; L. L. W. Heaphy, Berlins; J. C. Minifie, Coroglen; Kaikohe Town Board; F. R. Cripps, Whatoro; Chamber of Commerce, Coromandel; G. H. Strieff, Te Aroha; B. D. Bosca, Murchison; Co-operative Dairy Co., Awanui; A. E. Walker, Kokopu; Northland Radios, Kaikohe; Westport Coal Co. (consolidation); Taihape Borough Council; H. Baigent and Sons, Nelson; Hall Committee, Omarama; A. C. Sutton, Kurow; N. Wells, Mercury Bay; Bruce Bay Timber Co., Bruce Bay; W. M. Sutherland, Omarama; W. O. Rutherford, Culverden; D. Powick, Wekaweka. *Revocations* (2)—M. and J. W. F. McBeth, Puriri; P. Prendergast, Ikamatua. *Assignments* (4)—Hume Pipe Co. (Australia), Ltd.; L. Cooper, Rai Valley; P. Spender, Rawene; Tokomaru Farmers' Co-operative Co., Tokomaru Bay. *Permits* (11)—Puriri Timber Co., Kaingaroa; J. T. W. Marshall, Murapara; H. Foster, Otiria; W. Berry, Harihari; S. J. Bergman, Kakapotahi; E. K. Blundell, Okoke; G. McKenzie, Mangatoro Valley; S. Knight and Son, Ongarue; L. W. Todd, Tutaki; J. A. Taylor, Mapiu; A. C. G. Fell, Nikau Bay.

ELECTRICAL ACCIDENTS.

During the year there were reported to the Department forty-seven electrical accidents, involving the loss of human life in eleven instances. (Three of the accidents included more than one person injured.) Corresponding figures for 1936 were forty-eight and nine respectively.

This year's electrical accidents resulted in injuries (fatal and otherwise) to the following:—

Electrical employees	15
Other tradesmen	6
General public	23
Stock	3
Total	47

The following is a summary of electrical accidents for the past five years—viz., 1933 to 1937:—

Classification.	1933.		1934.		1935.		1936.		1937.		Totals.	
	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.	Total.	Fatal.		
Electrical employees	15	2	12	2	17	2	13	2	15	..	72	8
Other tradesmen	9	4	1	..	3	..	10	1	6	2	29	7
General public	7	6	19	8	17	5	20	6	23	9	86	34
Stock	8	..	1	..	8	..	9	..	3	..	29	..
Totals	39	12	33	10	45	7	52	9	47	11	216	49

ELECTRICAL FIRES.

During the year there were twenty-three fires attributed to electrical causes and reported to the Department by electrical-supply authorities, as per list below. The corresponding figures for 1936 and 1935 were twenty-seven and twenty-two respectively.

The sources of this year's electrical fires included the following:—

Electric irons	7
Other electrical appliances	6
Defective installations	3
Defective flexible cords	3
Defective radio installation	1
Bedding in contact with lamp	1
Contact between distribution and service lines	1
Lightning	1
Totals	23

The following is a summary of causes of electrical fires for the five-yearly period, 1933–37 :—

——	1933.	1934.	1935.	1936.	1937.	Totals.
Electric irons	4	12	8	8	7	39
Electric radiators	2	..	1	2	..	5
Other electrical appliances	2	3	6	4	6	21
Defective installations	4	11	7	12	3	37
Defective flexible cords	..	..	..	..	3	3
Defective radio installations	1	..	..	..	1	2
Bedding in contact with lamp	..	..	..	..	1	1
Contact between distribution and service lines	..	..	..	..	1	1
Lightning	..	..	..	..	1	1
Soldering-iron	..	..	..	1	..	1
Totals	13	26	22	27	23	111

REGISTRATION OF ELECTRICAL WIREMEN.

The year under review has been a very active one, due mainly to the increased activity in the building and allied trades. The number of candidates for the examination has increased in the written part to 335 from a minimum of 231 in 1934–35, and in the practical part to 227 from a minimum of 149 in 1935–36. The centres at which examinations are held have now been increased in number in order to provide better facilities for the candidates. These centres had been reduced during the period of restricted trade.

Registrations increased to 225 from a minimum of 132 in 1931–32.

The number of inspectors registered during the year shows a big increase, from 26 last year to 59, due partly to a general change of positions; there have, however, been 48 new inspectors registered. The registration of persons engaged in the radio industry continues at a steady rate, there having been 67 registered during the year. A number of applications for registration for this class of work indicated that the experience of the applicant had not been gained in a legal manner. The matter was taken up with the Radio Institutes, with the trade papers, and a circular letter was sent to all licensed radio dealers in an endeavour to warn future applicants that they must obtain experience in conformity with the Act.

Eleven persons were registered for the assembly and repair of electrical apparatus, but it is quite evident there is a large number of unregistered persons engaged in this class of work, and reports received of the dangerous manner in which some of this work is carried out indicates that more active steps should be taken to put a stop to the practice. The dangerous work is mainly done in retail establishments by salespeople. Where assembly or repair work is carried out by other than a registered person it must be inspected and tested by a registered person.

Reports of breaches of the Act show a decided increase, from 47 last year to 67, although they are considerably less than the peak year—namely, 1930–31—when 112 reports were received. In addition to the breaches of the Electrical Wiremen's Registration Act, records have been made of breaches of the Wiring Regulations by registered persons, such breaches being other than defective work and including failing to obtain permission before commencing wiring and before connecting wiring and apparatus to the source of supply and also including failure to notify the supply authority of completion of work. A total of 49 reports of breaches of the Wiring Regulations were received. Six wiremen were prosecuted for failing to return on demand the registration certificates which had been issued to them. Four salesmen were prosecuted for installing washing and ironing machines. All of these machines had been installed in a dangerous manner. A salesman was prosecuted for installing in a particularly dangerous manner in a shop-window a luminous-discharge-tube electric sign, in that bare wires at a pressure of 6,000 volts were readily accessible to children. Two unregistered persons were prosecuted for installing radio sets.

It is to be regretted that there are still a number of consumers who will not avail themselves of the protection provided by the Act, but prefer to take risks by doing their own repairs and extensions. The increased use of radio-receiving sets has undoubtedly had a bearing on this matter, so also has the unrestricted sale of accessories and flexible cord to the general public. Consumers who have the idea that the work is quite simple often neglect elementary precautions known to all skilled wiremen. In the majority of cases the consumer experiences no ill effects, but occasional fires and accidents show the wisdom of having the work done by experts. During the year there was one fatal accident to a consumer caused by carrying out work on live wires and a fatal accident to an employee in an engineering works caused by work carried out by a fellow-employee.

Reports of defective work carried out by registered wiremen have decreased slightly during the year, from 32 last year to 29, but the number is still in excess of the minimum number reported in any one year—namely, 26 in 1932–33. The Act provides for the endorsement of the registration certificates of persons who have carried out defective work and also for the removal of their names from the register when necessary. Provision is made for the removal of an endorsement after twelve months. Four endorsements were made during the year and five were removed.

Steps were taken during the year to bring the provisions of the Act under the notice of mine-managers, as a certain amount of misunderstanding existed due to the fact that, although the Acts relating to mines require competent persons to do the work, it was not clear that these persons had to be registered.

A matter which has caused some concern is that several applications for registration were received from persons who had not served an apprenticeship to the electrical trade as required by the Act. To bring the necessity for apprenticeship under the notice of those most concerned, and also to draw attention to the need for some contracts of apprenticeship to be registered, a circular was prepared and the co-operation of the electrical-supply authorities was requested to ensure delivery to the right persons. The Department of Labour offered its co-operation, and it is anticipated that this difficulty will soon be solved.

A solution was found for the problem regarding the necessary experience for registration on the part of the employees of electrical-supply authorities.

During the year 173 names which had been removed from the registers in 1936 as a result of the quinquennial purging were restored to the registers, making a total of 247 up to the end of March, 1937. Notice was received that a number of persons whose names had been purged from the registers were deceased.

The electrical-supply authorities have again given valuable assistance in the enforcement of the Act. The Act has been the means of attracting a good type of man to the trade, as well as considerably improving the standard of work and service to the public by this important branch of the electrical industry.

F. T. M. Kissel, B.Sc., M.I.E.E., A.M.I.C.E.,
Chief Electrical Engineer.

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TABLE I.—SUMMARY OF FINANCIAL AND OPERATING STATISTICS FOR NORTH ISLAND AND SOUTH ISLAND ELECTRIC-POWER SYSTEMS FOR THE YEAR ENDING 31ST MARCH, 1937.

NOTE.—North Island system includes Arapuni–Horahora–Mangahao–Waikaremoana all interconnected. South Island system includes Lake Coleridge and Waitaki interconnected, and Southland, not yet interconnected.

(*a*) Financial.

	1936–37 (Third Year).
	£
(1) **Capital outlay**—	
Assets in operation—	
North Island system	8,546,750
South Island system	6,085,892
Total assets in operation	14,632,642
Assets not in operation—	
North Island system	429,446
South Island system	63,332
Total assets not in operation	492,778
Total capital outlay	15,125,420
(2) **Revenue for year**—	
North Island system	887,410
South Island system	329,058*
Total revenue for year	1,216,468
(3) **Costs**—	
Working-costs—	
North Island system	144,315
South Island system	85,829†
Total working-costs for year	230,144
(4) **Capital charges**—	
Interest—	
North Island system	391,241
South Island system	212,640
Cost of raising loans, &c.—	
North Island system	59,130
South Island system	26,420

	1936–37 (Third Year).
	£
(4) **Capital charges**—*continued.*	
Depreciation—	
North Island system	10,464
South Island system	112,275
Half capital charges, King's Wharf Station	38,120
Total capital charges for year	850,290
(5) **Total costs for year**	1,080,434
(6) **Net profit or loss for year**—	
North Island system	*Cr.* 244,140
South Island system	*Dr.* 108,106
Total **profit** for year	136,034
(7) **Accumulated Depreciation Reserve**—	
North Island system	949,888
South Island system	471,083
Total Depreciation Reserve	1,420,971
(8) **Accumulated Sinking Fund Reserve**—	
North Island system	55,930
South Island system	271,114
Total Sinking Fund Reserve	327,044
(9) **Accumulated loss**—	
North Island system	155,175
(10) **General Reserve**—	
North Island system	Nil
South Island system	67,703
(11) **Electric Supply Account to date**‡	*Dr.* 87,472

(Continued on next page.)

TABLE I.—SUMMARY OF FINANCIAL AND OPERATING STATISTICS FOR NORTH ISLAND AND SOUTH ISLAND ELECTRIC-POWER SYSTEMS FOR THE YEAR ENDING 31ST MARCH, 1937—*continued.*

NOTE.—North Island system includes Arapuni–Horahora–Mangahao–Waikaremoana all interconnected. South Island system includes Lake Coleridge and Waitaki interconnected, and Southland, not yet interconnected.

(*b*) Operating Results.

	1936–37 (Third Year).
Maximum load (kilowatts)—	
North Island system	124,460
South Island system	44,520
Southland system	7,400
Average load (kilowatts)—	
North Island system	78,400
South Island system	21,721
Southland system	3,696
Average load factor—	Per Cent.
North Island system	63·2
South Island system	48·8
Southland system	50·4§
Units output—	Units.
North Island system	688,704,277
South Island system	190,280,000
Southland system	15,184,610§
Units distributed—	
Units sold—	
North Island system	625,673,473
South Island system	166,406,285
Southland system	11,178,404§
Combined	803,258,162
Units unsold (station auxiliaries, &c.)—	
North Island system	6,497,313
South Island system	3,399,537
Southland system	112,935§
Combined	10,009,785
Total units distributed, North Island system	632,170,786
Total units distributed, South Island system	169,805,822
Total units distributed, Southland system	11,291,339§

Line losses—	Units.	Per Cent.
Transmission—		
North Island system	56,258,029	8·19
South Island system	19,220,130	10·5
Southland system	..	..
Combined	75,478,159	..
Distribution—		
North Island system	275,462	..
South Island system	1,254,048	0·74
Southland system	4,006,206	26·38
Combined	5,535,716	..
Total line losses, North Island system	56,533,491	8·21
Total line losses, South Island system	20,474,178	10·75
Total line losses, Southland system	4,006,206	26·22

	1936–37 (Third Year).
Revenue—	
Per kilowatt (system maximum)—	
North Island system	7·13‖
South Island system	5·83‖
Southland system	19·45‖
Per unit generated—	d.
North Island system	0·308
South Island system	0·327
Southland system	1·046
Per unit distributed—	
North Island system	0·337
South Island system	0·367
Southland system	1·422
Per unit sold—	
North Island system	0·341‖
South Island system	0·374‖
Southland system	1·422‖
Working-costs—	
Per kilowatt (system maximum)—	£
North Island system	1·16
South Island system	1·47
Southland system	6·17
Per unit generated—	d.
North Island system	0·0503
South Island system	0·0820
Southland system	0·3220
Per unit distributed—	
North Island system	0·0548
South Island system	0·0920
Southland system	0·4370
Per unit sold—	
North Island system	0·0554
South Island system	0·0940
Southland system	0·4370
Capital charges—	
Per kilowatt (system maximum)—	£
North Island system	4·01
South Island system	6·36
Southland system	17·47
Per unit generated	d.
North Island system	0·1740
South Island system	0·3570
Southland system	1·0770
Per unit distributed—	
North Island system	0·1896
South Island system	0·4000
Southland system	1·4630
Per unit sold —	
North Island system	0·1916
South Island system	0·4090
Southland system	1·4630
Total costs—	
Per kilowatt (system maximum)—	£
North Island system	5·17
South Island system	7·83
Southland system	23·64
Per unit generated—	d.
North Island system	0·224
South Island system	0·439
Southland system	1·399
Per unit distributed—	
North Island system	0·244
South Island system	0·492
Southland system	1·900
Per unit sold—	
North Island system	0·247
South Island system	0·503
Southland system	1·900

* Includes £137 miscellaneous revenue from Southland. † Includes £182 miscellaneous payments in connection with Southland.
‡ Does not include arrears in sinking fund payments (£794,994). § From 13th October, 1936, to 31st March, 1937. ‖ Based on gross revenue.
For corresponding figures, based on revenue received from sale of electricity only, see Table XIII.

Table II.—Analysis of Capital Outlay as at 31st March, 1937.

North Island System.	£	South Island System (including Southland).	£	Combined Totals. £
Headworks and power-stations—		Headworks and power-stations—		
Land, fencing, and roading—		Land, fencing, and roading—		
Arapuni	110,401	Coleridge	24,339	
Horahora	3,208	Waitaki	48,480	
Mangahao	72,130	Southland	32,765	
Waikaremoana	67,262			358,585
Headworks—		Headworks—		
Arapuni	1,284,950	Coleridge	519,976	
Horahora	151,423	Waitaki	1,075,147	
Mangahao	848,862	Southland	95,348	
Waikaremoana	148,515			4,124,221
Generating-station, buildings, and village—		Generating-station, buildings, and village—		
Arapuni	407,803	Coleridge	85,451	
Horahora	60,847	Waitaki	458,512	
Mangahao	169,286	Southland	41,156	
Waikaremoana	163,980			1,387,035
Generating plant and machinery—		Generating plant and machinery—		
Arapuni	598,927	Coleridge	162,595	
Horahora	95,241	Waitaki	183,536	
Mangahao	190,674	Southland	62,925	
Waikaremoana	175,441			1,469,339
Auxiliary stations (three)—Penrose, Huntly, Grand Junction	82,030	Auxiliary station (one)—Dobson (ex Lyttelton)	89,101	171,131
Transmission and distribution—		Transmission and distribution—		
Primary distribution—		Primary distribution—		
11 kv. lines	42,114	11 kv. lines	535,951	
33 kv. lines	..	33 kv. lines	26,405	
50 kv. lines	393,028	50 kv. lines	..	
66 kv. lines	..	66 kv. lines	434,836	
110 kv. lines	1,147,677	110 kv. lines	253,211	
Secondary distribution	..	Secondary distribution	297,794	3,131,016
Substations—		Substations—		
11 kv. substations	15,381	11 kv. substations	..	
33 kv. substations	..	33 kv. substations	8,729	
50 kv. substations	207,315	50 kv. substations	..	
66 kv. substations	..	66 kv. substations	274,362	
110 kv. substations	756,077	110 kv. substations	173,610	1,435,474
General—		General—		
General offices, garages, stores, and other accommodation	37,559	General offices, garages, stores, and other accommodation	22,435	
Telephone services	4,788	Telephone services	36,080	
Explorations and preliminary surveys; engineering, office, and general expenses; charges and expenses of raising loans	793,633	Explorations and preliminary surveys; engineering, office, and general expenses; charges and expenses of raising loans	738,427	
Interest during construction	947,644	Interest during construction	468,053	3,048,619
			6,149,224	
Grand totals	8,976,196			15,125,420

Table III.—Operating or Working Costs for Year Ended 31st March, 1937.

	North Island System.				South Island System (including Southland).			
	Cost.	Cost per Unit.			Cost.	Cost per Unit.		
		Generated.	Distributed.	Sold.		Generated.	Distributed.	Sold.
	£	d.	d.	d.	£	d.	d.	d.
(*a*) Headworks amd power-stations	41,613	0·0145	0·0159	0·0160	25,444	0·0297	0·0338	0·0344
(*b*) Auxiliary stations	183	..	..	..	1,075	..	..	..
	41,796	0·0145	0·0159	0·0160	26,519	0·0310	0·0352	0·0358
(*c*) Transmission and distribution—								
Primary distribution	25,521	0·0089	0·0096	0·0097	11,041	0·0129	0·01465	0·01492
Secondary distribution	..	..	..	..	6,490	0·00759	0·00862	0·00877
(*d*) Substations	23,869	0·0083	0·0090	0·0091	15,668	0·01830	0·02080	0·02120
(*e*) Management and general—								
General expenses	540	..	..	..	2,939	..	..	..
Management	45,582	0·0159	0·0173	0·0175	21,748	0·02870	0·03260	0·03350
Total costs (*a*) to (*e*)	137,308	0·0476	0·0518	0·0523	84,405	0·0988	0·1120	0·1141
(*f*) Power purchased	..	..	..	..	..	..	..	..
(*g*) Standby provision	7,007	0·0024	0·0027	0·0027	1,425	..	..	..
Total costs (*a*) to (*g*)	144,315	0·0500	0·0545	0·0550	85,830	0·1005	0·1138	0·1161

North Island System.		*South Island System.*	
Units generated	688,704,277	Units generated	205,464,610
Units distributed	632,170,786	Units distributed	180,984,226
Units sold	625,673,473	Units sold	177,584,689

Table IV.—North Island Electric-power System.—Gross Financial Results of Distribution of Energy for the Year ended 31st March, 1937.

Distributing Authority.	Number of Consumers.	Capital Outlay.	Revenue.						Expenditure.									Balance.			No.
			From Sale of Electrical Energy.		Rates.	Trading Account.	Other Sources.	Total.	Paid for Electrical Energy.	Working-costs and Management.	Interest.	Depreciation.	Sinking Fund.	Principal Repayment.	Exchange.	Other Expenditure.	Total.	Profit.		Loss.	
			Retail.	Bulk (for Resale).														Appropriated to Reserves.	Unappropriated.		
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	
1. Public Works Department	320	8,546,750*	40,409	837,739	..	..	9,262	887,410	..	144,315	391,241	10,464	..	..	..	59,130	605,150	244,140	..	..	1.
	..	..	..	..	..	..	..	..	..	..	19,295†	7,192†	10,169†	..	..	1,464†	38,120†				
2. Auckland Power Board ..	56,089	3,387,931	643,248	..	..	..	7,444	650,692	230,042	120,812	118,072	41,952	62,597	..	47,424	9,591	630,490	2,541	17,661	..	2.
3. Bay of Plenty Power Board ..	1,735	197,239	41,860	..	..	1,364	1,071	44,295	13,245	9,402	8,826	457	3,067	..	..	249	35,246	4,123	4,926	..	3.
4. Cambridge Power Board ..	1,494	112,478	20,818	..	..	182	367	21,367	7,655	6,478	4,421	..	2,006	..	47	53	20,660	..	707	..	4.
5. Central Hawke's Bay Power Board	1,815	156,484	24,213	..	..	..	81	24,294	7,802	5,222	5,966	540	104	2,815	..	..	22,449	40	1,805	..	5.
6. Central Waikato Power Board	5,719	391,900	67,191	56	..	619	663	68,529	25,320	13,613	16,078	1,709	6,182	1,894	..	..	64,796	..	3,733	..	6.
7. Dannevirke Power Board ..	2,885	221,642	31,052	..	..	107	203	31,362	7,672	7,720	9,192	1,067	3,284	130	..	..	29,065	511	1,786	..	7.
8. Franklin Power Board ..	4,267	307,823	53,203	..	..	2,813	2,294	58,310	21,587	10,888	13,284	6,514	5,367	..	..	..	57,640	562	108	..	8.
9. Hamilton Borough Council ..	4,866	63,950	41,814	..	..	..	171	41,985	14,547	9,014	1,959	..	2,348	..	..	328	28,196	13,789	..	..	9.
10. Havelock North Town Board‡	318	26,532	3,424	..	..	..	15	3,439	964	1,056	728	..	119	543	..	..	3,410	29	..	..	10.
11. Hawke's Bay Power Board ..	7,186	373,216	69,567	17,587	..	..	491	87,645	39,130	17,722	17,468	..	2,000	3,461	..	..	79,781	7,864	..	..	11.
12. Horowhenua Power Board ..	4,839	240,084	50,006	..	..	412	869	51,287	21,869	11,712	8,546	..	163	4,804	..	..	47,094	560	3,633	..	12.
13. Hutt Valley Power Board ..	12,823	382,138	112,918	..	..	561	1,031	114,510	48,815	25,478	16,786	2,741	1,300	4,007	..	..	99,127	9,000	6,383	..	13.
14. Inglewood Borough Council ..	441	9,050	4,332	..	..	352	..	4,684	1,615	1,315	448	50	340	106	..	..	3,874	810	..	..	14.
15. Kaponga Town Board ..	395	16,927	5,372	..	72	93	478	6,015	907	4,107	639	..	465	143	..	..	6,261	..	..	246	15.
16. Manawatu-Oroua Power Board ..	5,245	487,843	73,394	18,660	4	301	246	92,605	40,025	16,799	20,953	1,940	7,068	444	..	..	87,229	..	5,376	..	16.
17. Mangaweka Town Board ..	124	5,757	1,098	..	169	50	177	1,494	353	686	91	..	22	..	..	..	1,152	..	342	..	17.
18. Napier Borough Council ..	4,868	129,367	43,249	..	..	..	1,408	44,657	16,624	8,599	5,696	2,183	1,683	..	..	..	34,785	9,872	..	..	18.
19. New Plymouth Borough Council	6,672	355,359	71,046	950	..	1,433	1,103	74,532	8,490	25,151	11,985	500	1,468	4,630	497	..	52,721	18,865	2,946	..	19.
20. North Auckland Power Board§	523	60,241	902	..	..	812	68	1,782	271	453	119	..	..	..	..	..	843	..	939	..	20.
21. Opunake Power Board ..	1,063	109,260	13,033	..	..	..	53	13,086	1,395	5,462	3,704	220	2,039	..	..	..	12,820	2	264	..	21.
22. Palmerston North City Council	6,188	259,882	60,844	..	..	371	105	61,320	21,851‖	11,133	7,600	4,068	3,155	..	..	..	47,807	11,922	1,591	..	22.
23. Patea Borough Council ..	423	18,266	4,749	..	..	25	22	4,796	1,265	1,619	563	49	156	129	..	..	3,781	1,015	..	..	23.
24. Poverty Bay Power Board ..	5,408	328,392	61,958	..	..	126	1,838	63,922	16,672	16,639	12,873	1,700	8,188	..	..	..	56,072	6,793	1,057	..	24.
25. Rotorua (Tourist Department)	2,351	79,692	24,060	..	..	..	780	24,840	7,641	6,900	3,882	1,553	1,553	..	..	..	21,529	..	3,311	..	25.
26. South Taranaki Power Board ..	3,531	219,367	38,819	1,265	..	365	400	40,849	8,831	12,844	8,778	1,129	3,554	2,014	..	..	37,150	3,136	563	..	26.
27. Stratford Borough Council ..	1,122	28,263	14,073	..	..	..	..	14,073	5,029	2,180	1,827	..	1,083	..	..	..	10,119	3,954	..	..	27.
28. Taihape Borough Council ..	577	10,574	5,417	..	..	..	..	5,417	90	2,197	621	508	109	86	..	..	3,611	1,000	806	..	28.
29. Taranaki Power Board ..	2,715	483,744	40,297	9,179	56	..	372	49,904	1,778	14,368	19,307	..	..	8,307	..	..	43,760	4,140	2,004	..	29.
30. Tararua Power Board ..	1,907	173,083	26,043	..	..	511	228	26,782	7,067	6,310	6,989	654	1,957	1,100	..	..	24,077	..	2,705	..	30.
31. Te Aroha Borough Council ..	754	17,120	7,933	..	..	..	17	7,950	2,900	2,893	415	350	52	..	..	..	6,610	372	968	..	31.
32. Te Awamutu Power Board ..	2,101	196,100	32,188	..	..	11	126	32,325	11,569	7,178	6,865	..	..	2,879	..	265	28,756	486	3,083	..	32.
33. Thames Valley Power Board ..	8,461	805,743	120,794	5,367	..	..	1,319	127,480	43,408	26,712	39,170	..	3,668	8,614	2,488	133	124,193	..	3,287	..	33.
34. Thames Borough Council ..	1,198	30,460	10,768	..	..	..	84	10,852	2,468	5,356	452	35	139	..	..	..	8,450	1,000	1,402	..	34.
35. Wairarapa Power Board ..	5,383	352,640	54,799	..	..	1,210	783	56,792	13,125	15,108	14,680	3,113	4,989	44	..	..	51,059	5,733	..	..	35.
36. Wairoa Power Board ..	439	65,230	8,400	5,590	1,832	..	316	16,138	7,660	2,311	2,962	..	600	836	..	..	14,369	..	1,769	..	36.
37. Wairoa Borough Council ..	730	11,373	8,750	..	..	..	79	8,829	5,590	1,291	648	..	376	..	..	..	7,905	676	248	..	37.
38. Waitara Borough Council ..	564	7,512	4,380	..	506	162	50	5,098	1,627	986	535	327	..	382	..	..	3,857	735	506	..	38.
39. Waitemata Power Board ..	12,231	490,279	91,523	..	..	867	1,192	93,582	34,387	23,779	18,732	1,878	2,758	6,064	..	2,380	89,978	..	3,604	..	39.
40. Waitomo Power Board ..	1,496	107,136	20,595	..	..	281	30	20,906	7,857	4,145	4,747	151	1,318	341	..	..	18,559	1,887	460	..	40.
41. Wanganui-Rangitikei Power Board	10,829	529,453	108,852	443	..	..	1,491	110,786	38,810	21,289	22,417	15,940	2,090	9,589	..	..	110,135	651	..	..	41.
42. Wellington City Council ..	36,764	1,288,967	329,791	..	..	..	5,815	335,606	107,096	110,123	20,825	2,873	4,842	..	22,660	..	268,419	37,759	29,428	..	42.
Total	228,859	21,085,247	2,487,182	896,836	2,639	13,028	42,542	3,442,227	855,049	741,365	870,385	111,857	152,378	63,362	73,116	73,593	2,941,105	393,967	107,401	246	

* Assets in operation. £3,191 for arrears to Power Board.

† Half capital charges for King's Wharf Station, paid by Department.

‡ Taken over by Hawke's Bay Power Board as from 1st April, 1937.

§ Commenced supply December, 1936.

‖ Includes

Gross profit, £501,122; rates collected, £2,639; net profit, £498,483. Ratio working expenses to revenue = 46·4 per cent.; ratio capital charges to capital outlay = 6·38 per cent.

TABLE V.—SOUTH ISLAND ELECTRIC-POWER SYSTEM.—GROSS FINANCIAL RESULTS OF DISTRIBUTION OF ENERGY FOR THE YEAR ENDED 31ST MARCH, 1937.

Distributing Authority.	Number of Consumers.	Capital Outlay.	Revenue.						Expenditure.								Balance.		
			From Sale of Energy.		Rates.	Trading Account.	Other Sources.	Total.	Paid for Electrical Energy.	Working-costs and Management.	Interest.	Depreciation.	Sinking Fund.	Other Funds Principal Repayments.	Other Expenditure.	Total.	Profits.		Loss.
			Retail.	Bulk (for Resale).													Appropriation to Reserves.	Unappropriated.	
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Public Works Department (Coleridge-Waitaki)	152	4,499,767	45,787	210,982	..	422	2,673	259,864	..	65,275	177,126	79,653	..	..	26,420†	348,474	..	..	88,610
Ashburton Power Board	4,226	331,960	48,565	..	..	..	703	49,268	13,856	9,423	15,115	2,224	1,453	5,100	..	47,171	2,043	54	..
Banks Peninsula Power Board ..	1,039	101,541	12,634	..	2,844	138	278	15,894	4,212	5,775	4,395	..	1,954	..	..	16,336	..	..	442
Christchurch City Council	30,942	818,256	233,604	10,049	..	1,869	5,766	251,288	91,000	74,406	9,649	33,540	4,463	..	1,072*	214,130	37,158	..	..
Dunedin City Council	28,472	1,651,217	234,277	13,621	..	..	2,149	250,047	13,650	63,208	52,495	31,056	25,864	..	3,509*	189,782	60,265	..	..
Heathcote County Council	1,317	25,173	11,269	..	..	..	61	11,330	6,441	2,588	1,058	..	869	..	..	10,956	..	374	..
Kaiapoi Borough Council	500	10,918	3,254	..	..	..	310	3,564	1,294	959	284	177	134	..	..	2,848	..	716	..
Lyttelton Borough Council	940	13,024	6,804	..	..	9	..	6,813	2,685	1,809	228	256	117	..	..	5,095	699	1,019	..
Malvern Power Board	698	71,271	7,997	..	2,376	57	263	10,693	1,850	3,621	3,127	..	886	..	..	9,484	..	1,209	..
North Canterbury Power Board ..	2,458	182,432	26,239	3,297	..	176	831	30,543	11,248	8,431	6,694	..	3,047	..	..	29,420	125	998	..
Otago Power Board	4,338	308,732	46,416	..	893	..	48	47,357	13,621	8,249	12,971	4,873	3,170	3,952	..	46,836	..	521	..
Riccarton Borough Council	1,571	23,138	12,686	..	..	310	..	12,996	6,152	4,351	229	564	156	..	..	11,452	305	1,239	..
Rangiora Borough Council	723	9,270	5,630	..	..	..	45	5,675	2,003	2,471	183	335	..	..	..	4,992	..	683	..
South Canterbury Power Board ..	4,512	349,073	42,423	18,739	..	459	1,025	62,646	30,776	7,866	12,950	3,511	5,565	..	..	60,668	..	1,978	..
Springs Ellesmere Power Board ..	2,671	160,766	30,681	..	..	11	252	30,944	11,902	7,900	6,162	..	2,814	..	..	28,778	..	2,166	..
Sumner Borough Council	1,087	15,716	6,188	..	..	12	..	6,200	2,985	1,947	305	345	..	..	..	5,582	618	..	..
Timaru Borough Council	4,754	105,458	38,906	..	..	..	150	39,056	18,739	10,451	1,970	..	3,302	..	..	34,462	4,594	..	..
Waimairi County Council	3,633	63,617	21,227	33	72	12	106	21,450	10,530	4,202	1,551	4,160	1,134	..	..	21,577	..	..	127
Waitaki Power Board	4,230	188,820	36,333	..	..	1,335	253	37,921	13,778	8,868	7,478	1,291	2,961	..	..	34,376	2,817	728	..
Totals	98,263	8,930,149	870,920	256,721	6,185	4,810	14,913	1,153,549	256,722	291,800	313,970	161,985	57,889	9,052	31,001	1,122,419	108,624	11,685	89,179
Public Works Department, Southland	10,638	1,649,457	56,125	10,094	..	..	2,975	69,194	..	20,554	35,514	32,622	..	..	..	88,690	..	..	19,496
Invercargill City Council	6,182	138,752	52,686	..	..	..	1,712	54,398	21,303	12,285	3,052	471	..	1,442	..	38,553	15,845	..	..
Bluff Borough Council	531	10,760	4,470	..	..	..	307	4,777	2,518	1,142	337	91	205	..	..	4,293	484	..	..
Totals	17,351	1,798,969	113,281	10,094	..	..	4,994	128,369	23,821	33,981	38,903	33,184	205	1,442	..	131,536	16,329	..	19,496
Grand totals	115,614	10,729,118	984,201	266,815	6,185	4,810	19,907	1,281,918	280,543	325,781	352,873	195,169	58,094	10,494	31,001	1,253,955	124,953	11,685	109,125

* Exchange. † Cost of raising loans.

Gross profit, £27,963; rates collected, £6,185; net profit, £21,778. Ratio working-expenses to revenue = 47·3 per cent; ratio capital charges to capital outlay = 6·04 per cent.

TABLE VI.—ROUTE-MILES OF LINE OPERATED BY THE PUBLIC WORKS DEPARTMENT, AS AT 31ST MARCH, 1937.

NORTH ISLAND SYSTEM.

Voltage	110 kv.		50 kv.		11 kv.				3 kv.	Total Route-miles,
Number of Circuits ..	1.	2.	1.	2.	1.	2.	3.	4.	1.	
Miles	486·40	258·57	435·07	36·55	13·22	22·58	0·18	4·55	6·62	1,263·74

SOUTH ISLAND SYSTEM.
(Including Southland.)

Voltage ..	110 kv.		66 kv.		33 kv.		11 kv.				6·6 kv.	3 kv.	L.T.	Total Route-miles,
Number of Circuits ..	1.	2.	1.	2.	1.	2.	1.	2.	3.	4.	1.	1.	..	
Miles ..	183·85	37·79	401·81	43·00	17·18	19·69	1,702·65	61·69	1·27	5·52	4·17	37	1,548·3	4,063·92

Actual Mileages and Sizes of Overhead Conductors in use in connection with above Lines.

—	North Island System.						South Island System.					
	Copper.	A.C.S.R.	Galvanized Iron.	Copperweld.	Cadmium Copper.	Total Miles.	Copper.	Aluminium.	A.C.S.R.	Galvanized Iron.	Copperweld.	Total Miles.
1/·104..	..	..	..	..	..	..	56	..	..	..	..	56
1/·112..	..	..	..	..	278	278	..	..	..	..	..	..
1/·160..	..	..	202	573	..	775	4,013	..	..	2,921	14	6,948
1/·176..	..	..	..	..	..	..	769	..	..	..	..	769
1/·192..	..	..	..	..	..	..	..	..	..	..	..	..
1/0 ..	72	..	..	..	..	72	..	..	..	..	..	..
3/0 ..	..	..	..	..	..	..	..	..	399	..	..	399
7/·036..	..	..	..	..	..	..	74	..	..	..	..	74
7/·044..	..	..	..	..	..	..	69	..	..	..	..	69
7/·052..	..	..	..	..	..	..	3	..	..	..	..	3
7/·064..	66	..	..	..	..	66	206	5	..	..	..	211
7/·080..	664	..	..	..	..	664	1,071	2	..	..	..	1,073
7/·092..	..	..	..	..	..	..	967	..	..	..	..	967
7/·104..	200	..	..	..	..	200	..	14	..	..	..	14
7/·128..	..	..	..	..	..	..	14	180	..	..	..	194
7/·135..	..	..	..	..	..	..	..	..	..	..	..	..
7/·167..	..	636	..	..	..	636	..	..	..	..	4	4
7/·182..	..	..	..	..	..	..	..	..	..	..	8	8
19/·052..	3	..	..	..	..	3	..	..	..	..	..	..
19/·064..	408	..	..	..	..	408	40	..	..	..	..	40
19/·072..	..	..	..	..	..	..	..	..	..	..	..	..
19/·080..	..	..	..	..	..	..	5	..	..	..	..	5
19/·092..	1,936	..	..	..	..	1,936	1,048	..	..	..	..	1,048
19/·104..	436	..	..	..	..	436	36	..	..	..	..	36
37/·072..	359	..	..	..	..	359	..	..	..	..	..	..
37/·092..	17	..	..	..	..	17	..	..	..	..	..	..
37/·102.	..	..	..	..	..	..	..	..	227	..	..	227
Totals	4,161	636	202	573	278	5,850*	8,371	201	626	2,921	26	12,145†

* Includes 1,039 miles of telephone line conductors.

† Does not include 1,262 miles of telephone line conductors.

TABLE VII.—ROUTE-MILES OF SUPPLY AUTHORITIES' LINES CONNECTED TO GOVERNMENT SYSTEMS AS AT 31ST MARCH, 1937.

Voltage	22,000, or 33,000	11,000.				6,600.				3,300.		400.		Total Route-miles (*a*)
Number of Circuits	1.	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	1.	2.	
North Island System.														
Auckland Power Board	54·01	167·25	..	..	..	183·73	..	..	..	..	..	754·58	..	1,159·57
Bay of Plenty Power Board	..	237·63	..	..	..	..	..	..	..	..	..	32·62	..	270·25
Cambridge Power Board	..	1·50	..	..	..	..	..	..	..	..	116·50	73·25	..	191·25
Central Hawke's Bay Power Board	..	162·75	1·63	..	..	30·00	..	..	..	4·31	..	49·49	..	248·33
Central Waikato Power Board	..	331·47	13·10	0·67	..	..	..	..	..	99·62	..	307·20	..	752·06
Dannevirke Power Board	..	24·34	3·00	1·50	..	211·75	0·50	..	..	..	..	86·17	..	328·15
Franklin Power Board	..	427·30	13·00	0·37	0·63	..	..	..	..	..	..	191·00	..	632·30
Hamilton Borough Council	..	7·60	..	..	..	..	..	..	..	..	..	52·90	..	60·50
Hawke's Bay Power Board	..	203·25	15·00	..	..	..	..	..	..	6·31	..	96·88	..	323·44
Horowhenua Power Board	..	172·31	5·89	1·44	..	..	..	..	..	..	..	488·85	..	668·54
Hutt Valley Power Board	..	10·13	25·56	..	..	18·26	64·01	..	..	..	..	185·24	2·20	306·65
Manawatu-Oroua Power Board	..	277·81	33·00	..	1·50	..	..	..	..	161·69	..	158·30	..	632·30
New Plymouth Borough Council	..	260·44	16·00	..	2·00	..	..	..	..	..	..	62·35	2·00	343·29
North Auckland Power Board	..	60·11	13·00	..	..	..	..	..	..	..	..	..	23·60	96·71
Opunake Power Board	..	..	..	..	..	133·00	..	..	..	..	..	127·00	..	260·00
Poverty Bay Power Board	..	42·08	6·75	..	..	154·58	11·50	..	0·23	..	..	230·09	0·83	447·06
Rotorua (Tourist Department)	..	..	..	..	..	36·74	5·00	..	..	8·75	..	17·53	0·51	68·53
South Taranaki Power Board	..	203·63	8·80	..	..	..	..	..	..	1·37	..	188·66	..	402·56
Taranaki Power Board	†34·35	47·61	..	..	..	320·85	5·00	0·16	0·08	..	..	251·29	0·19	659·53
Tararua Power Board	..	142·19	5·39	..	..	..	..	..	..	142·21	..	147·88	..	437·91
Te Awamutu Power Board	..	69·49	12·00	..	..	..	..	..	..	155·50	4·75	87·44	..	329·18
Te Aroha Borough Council	..	1·00	..	..	..	..	..	..	..	4·20	..	13·74	..	18·94
Thames Borough Council	..	1·25	..	..	..	..	..	..	..	4·50	..	16·00	..	21·75
Thames Valley Power Board	..	539·86	84·50	..	..	..	..	..	..	33·68	..	198·82	..	856·86
Wairarapa Power Board	..	261·23	27·38	1·25	..	..	..	..	..	13·68	..	328·68	..	633·97
Wairoa Power Board	..	38·00	24·00	..	..	..	..	..	..	6·00	..	53·53	..	121·53
Waitemata Power Board	..	781·90	7·03	..	..	..	..	..	..	0·33	..	..	..	789·26
Waitomo Power Board	..	105·91	5·75	1·00	0·25	..	..	..	..	..	..	24·36	0·50	137·77
Wanganui-Rangitikei Power Board	..	223·94	38·00	..	..	230·31	..	..	..	3·00	..	504·00	..	1,003·25
*Wellington City Council	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals	88·36	4,801·98	358·78	6·23	4·38	1,319·22	86·01	0·16	0·31	645·15	121·25	4,654·60	103·08	12,201·44(*a*)

* Not received in time for inclusion in this table. † 33 Kv. (*a*) Includes underground cables.

TABLE VII.—ROUTE-MILES OF SUPPLY AUTHORITIES' LINES CONNECTED TO GOVERNMENT SYSTEMS AS AT 31ST MARCH, 1937—*continued.*

Voltage	33,000.		11,000.				6,600.		3,300.			400.		230.	Underground Cable.	Total Route-miles.
Number of Circuits	1.	2.	1.	2.	3.	4.	1.	2.	1.	2.	3.	1.	2.	1.		
South Island System.																
Ashburton Power Board	..	..	77·44	19·00	0·7	0·62	729·51	2·10	..	..	..	84·31	..	..	1·00	914·68
Banks Peninsula Power Board	22·0	..	25·44	..	..	..	58·20	4·00	40·36	..	..	56·00	..	..	..	206·00
Christchurch City Council	..	..	15·60	..	..	..	..	..	6·44	..	..	255·00	..	..	70·60	347·60
Dunedin City Council	96·75	4·18	..	..	..	..	172·42	13·18	12·80	1·50	0·20	267·04	..	..	20·17	588·24
Heathcote County Council	..	..	6·99	..	..	..	..	..	..	..	..	27·25	0·18	..	0·98	35·40
Kaiapoi Borough Council	..	..	..	..	..	..	..	..	1·06	..	..	11·06	..	7·88	..	20·00
Lyttelton Borough Council	..	..	2·56	..	..	..	..	..	..	..	..	7·30	..	..	0·22	10·08
Malvern Power Board	..	..	..	..	..	..	155·50	..	..	..	..	30·00	..	..	0·50	186·00
North Canterbury Power Board	..	..	342·78	14·16	..	..	45·41	..	25·76	..	..	26·96	..	87·58	0·29	542·94
Otago Power Board	40·35	..	89·87	..	..	..	194·21	0·50	..	..	..	46·10	..	166·38	..	537·41
Rangiora Borough Council	..	..	..	..	..	..	..	..	2·21	0·58	..	7·39	0·10	3·24	0·09	13·61
Riccarton Borough Council	..	..	..	..	..	..	..	..	..	..	..	18·25	..	..	..	18·25
South Canterbury Power Board	..	..	31·74	83·50	..	..	559·00	3·50	..	..	..	121·50	0·50	..	1·64	801·38
Springs-Ellesmere Power Board	..	..	37·71	6·50	..	..	39·94	..	129·12	..	..	115·26	..	..	0·45	328·98
Sumner Borough Council	..	..	1·00	..	..	..	..	..	2·50	..	..	6·00	..	..	0·15	9·65
Timaru Borough Council	..	..	..	1·19	..	..	..	..	5·06	3·60	..	46·65	..	..	2·75	59·25
Waitaki Power Board	..	..	153·50	0·70	..	..	189·09	..	3·45	..	..	121·78	..	..	0·27	468·79
Waimairi County Council	..	..	..	..	..	..	30·00	1·00	25·62	..	..	67·00	..	22·75	0·90	147·27
Totals	159·10	4·18	784·63	125·05	0·7	0·62	2,173·28	24·28	254·34	5·68	0·20	1,317·85	0·78	287·83	100·01	5,238·53

Grand total, 17,440 miles.

Table VIII.—Electric-power Districts of New Zealand as constituted at 31st March, 1937.

Name of Board.	Proclamation affecting Constitution gazetted.	Members on Board.	Approximate Area.		Population.		Value of Rateable Property.			Valuation Basis used for Rating Purposes.	Total Amount of Loans authorized.	Total Votes cast for Loan Polls.		Number of Ratepayers.
							Used as Rating Basis.	Unimproved.						
			District.	Outer Area.	District.	Outer Area.	District.	District.	Outer Area.			For.	Against.	
		Number.	Sq. Miles.	Sq. Miles.	Number.	Number.	£	£	£		£	Number.	Number.	
1. Ashburton	17/11/21	12	1,193	1,271	18,870	501	11,500,000	8,314,594	700,000	Capital	411,150	2,999	706	4,175
2. Auckland	1/4/22 7/9/22 21/8/24 15/7/25 12/11/25 29/7/26	12	325	..	225,000	..	78,840,179	50,491,865	..	Capital	2,542,500	11,004	1,367	35,000
3. Banks Peninsula	8/1/20 24/11/21	7	387	..	3,777	..	3,582,826	3,545,448	..	Capital	114,680	658	113	1,098
4. Bay of Islands(1)	4/3/37	6	1,456	2,030	17,434	9,404	1,367,260	1,367,260	531,097	Unimproved ..	..	Poll not yet taken.		3,344
5. Bay of Plenty	20/8/25	7	536	2,678	10,385	1,815	1,497,032	1,497,032	188,502	Unimproved ..	206,000	654	153	2,294
6. Buller(1)	11/5/22	5	1,987	..	9,197	..	696,374	696,374	..	Unimproved ..	..	Poll not yet taken.		..
7. Cambridge	8/1/20 6/9/23	8	137	..	6,000	..	2,559,567	1,550,262	..	Capital	122,835	749	123	1,620
8. Central Hawke's Bay ..	19/10/22 7/4/27 28/8/30	10	1,350	..	11,000	..	5,589,823	5,589,823	..	Unimproved ..	150,000	543	41	2,730
9. Central Waikato	8/7/20 7/9/22 6/3/24 7/8/24 8/1/25 3/12/25 3/9/27 27/3/30	10	985	155	19,100	N.A.†	8,824,339	4,663,847	N.A.†	Capital	419,000	2,004	168	4,500
10. Dannevirke	11/8/21	10	578	118	12,114	426	3,582,183	3,582,183	466,663	Unimproved ..	224,000	1,587	330	4,452
11. Franklin	2/10/24 28/7/27 31/10/29	9	628	58	19,138	547	8,089,711	4,926,883	111,365	Capital	404,820	2,471	478	5,939
12. Golden Bay	18/6/25 4/5/35 21/7/36	5	62	956	1,400	1,950	493,407	264,659	302,525	Capital	29,500	418	98	423
13. Grey	26/10/22	9	702	810	14,320	768	2,458,847	652,097	118,500	Capital	315,385	3,095	884	3,353
14. Hawke's Bay	19/6/24 3/2/27 7/4/27 28/8/30	9	1,682	2	45,034	1,165	9,502,557	9,502,557	115,817	Unimproved ..	438,910	681	68	10,307
15. Horowhenua	1/12/21	9	630	..	17,350	..	6,898,987*	3,403,255	..	Capital	260,000	973	26	3,780(3)
16. Hutt Valley	6/7/22 11/12/24	11	530	..	47,000	..	5,386,273	5,386,273	..	Unimproved ..	390,000	2,333	343	13,139

(For notes see p. 113.)

TABLE VIII.—ELECTRIC-POWER DISTRICTS OF NEW ZEALAND AS CONSTITUTED AT 31ST MARCH, 1937—*continued.*

Name of Board.	Proclamation affecting Constitution gazetted.	Members on Board.	Approximate Area.		Population		Value of Rateable Property.			Valuation Basis used for Rating Purposes.	Total Amount of Loans authorized.	Total Votes cast for Loan Polls.		Number of Ratepayers.
							Used as Rating Basis.	Unimproved.						
			District.	Outer Area.	District.	Outer Area.	District.	District.	Outer Area.			For.	Against.	
		Number.	Sq. Miles.	Sq. Miles.	Number.	Number.	£	£	£		£	Number.	Number.	
17. Lake Wakatipu(1)	1/2/34	7	73	3,800	1,700	1,200	..	171,920	321,690	..	..	Poll not yet taken.		474
18. Malvern	28/6/23 17/3/30	6	308	1,773	3,550	1,500	2,812,044	2,078,625	N.A.†	Capital	65,000	508	33	1,035
19. Manawatu-Oroua	1/12/21 20/6/29 1/11/34	12	1,301	..	43,059	..	12,918,565	12,918,565	..	Unimproved ..	550,000	1,144	96	9,100
20. Marlborough	25/10/23	8	3,218	..	14,530	..	7,449,979	4,258,916	..	Capital	349,500	1,587	431	3,760
21. North Auckland ..	29/3/23 5/12/29 5/3/31 13/12/34	12	2,211	5	27,031	7,154	3,581,247	3,581,247	788,782	Unimproved ..	297,000	3,512	958	7,021
22. North Canterbury	1/2/34 11/1/34	8	1,628	2,948	11,734	7,551	9,190,828	7,619,765	4,388,264	Capital	210,700	653	150	2,899
23. Opunake	18/8/21 19/3/25 20/8/25	7	230	10	5,647	70	2,198,522	1,162,972	..	Capital	95,000	504	107	969
24. Otago Central	26/10/22 4/12/24 19/7/28	9	306	2,378	3,585	1,317	742,782	296,380	727,447	Capital	102,000	688	32	858
25. Otago	18/10/23 23/12/26 1/11/28 26/4/29	9	1,391	890	17,931	6,251	4,797,711	3,061,588	1,634,860	Capital	310,500	1,358	206	5,535
26. Poverty Bay	20/12/23	11	1,747	..	25,510	..	14,461,734	5,463,039	..	Capital	379,750	2,319	530	8,173
27. Reefton(1)	30/6/21	5	24	..	1,639	..	178,055	38,054	..	Capital	..	Poll not yet taken.		..
28. South Canterbury	26/10/22 8/3/28 13/12/28	12	1,673	3,579	37,486	6,980	13,311,561	11,518,975	2,283,540	Capital	380,220	1,919	587	6,410
29. South Taranaki	30/4/25 5/2/31	10	434	46	20,000	1,500	9,059,095	5,296,444	79,442	Capital	227,500	1,237	300	3,847
30. Springs-Ellesmere	8/7/20 29/3/23 23/8/23 17/3/30 5/2/31 6/8/31	5	524	..	12,330	..	7,856,719	5,678,061	32,000	Capital	166,520	1,352	105	3,133

(For notes see p. 113.)

TABLE VIII.—ELECTRIC-POWER DISTRICTS OF NEW ZEALAND AS CONSTITUTED AT 31ST MARCH, 1937—*continued.*

Name of Board.	Proclamation affecting Constitution gazetted.	Members on Board.	Approximate Area.		Population		Value of Rateable Property.			Valuation Basis used for Rating Purposes.	Total Amount of Loans authorized.	Total Votes cast for Loan Polls.		Number of Ratepayers.
							Used as Rating Basis.	Unimproved.						
			District.	Outer Area.	District.	Outer Area.	District.	District.	Outer Area.			For.	Against.	
		Number.	Sq. Miles.	Sq. Miles.	Number.	Number.	£	£	£		£	Number.	Number.	
31. Taranaki	19/5/22 6/5/26 20/5/26 5/2/31 2/11/33	8	355	1,333	13,985	8,015	6,141,672	2,865,396	3,109,336	Capital	449,800	1,165	263	2,150
32. Tararua	23/3/22	10	700	524	8,115	1,805	2,815,000	2,815,000	1,262,581	Unimproved ..	200,000	714	83	3,600
33. Tauranga	14/6/23 16/7/31 1/6/33	7	646	3	9,564	4,373	1,004,372	1,004,372	5,107 17	Unimproved ..	184,500	1,555	342	2,563
34. Te Awamutu	8/1/20 27/11/24 28/1/37	8	330	60	9,372	N.A.†	1,849,902	1,849,902	N.A.†	Unimproved ..	186,000	814	148	2,268
35. Teviot	22/7/20 6/11/24	7	102	..	1,880	..	176,839	255,661	..	Unimproved ..	55,500	280	32	400
36. Thames Valley	8/1/20 6/9/23 22/12/24 1/6/33	12	2,295	6	40,260	3,500	14,095,473	6,556,410	44,435	Capital	925,000	3,917	1,087	13,200
37. Waimea	2/5/29	7	434	1,126	10,000	14,000	2,582,734	N.A.†	N.A.†	Capital	154,500	3,062	697	2,723
38. Wairarapa	25/3/20 20/5/26 22/7/26 4/11/26 3/2/27 17/10/29	9	637	1,359	19,600	5,770	10,705,778	5,731,361	2,697,075	Capital	333,100	2,295	312	5,472
39. Wairere	18/1/23 4/11/26 21/3/29 24/9/31 25/6/36	7	455	25	2,500	200	717,137	717,137	163,379	Unimproved ..	65,850	176	19	760
40. Wairoa	29/7/20	10	1,354	..	6,970	..	4,171,231	1,612,815	..	Capital	100,000	504	31	1,551
41. Waitaki	9/8/23 5/4/28 18/10/23	9	520	1,853	17,500	2,500	5,747,283	4,406,970	239,322	Capital	210,650	1,959	222	4,752
42. Waitemata	27/11/24 26/8/26 7/3/29 24/1/35	12	1,106	..	45,850	..	13,903,497	5,821,648	..	Capital	495,000	11,326	2,214	16,206*
43. Waitomo	6/3/24 28/1/37	7	160	1,100	6,670	2,000	801,312	801,312	N.A.†	Unimproved ..	143,400	784	109	1,634
44. Wanganui-Rangitikei ..	1/12/21 23/12/26 20/6/29 6/11/34	12	1,648	972	52,000	3,000	22,099,617	6,568,540	1,408,210	Capital	375,000	1,315	214	10,350
45. Westland(2)	28/10/20	9	900	..	3,462	..	401,319	220,810	..	..	..	Poll not yet taken.		683
Totals, 1936–37(4) ..	..	394	39,878	31,868	950,579	95,262	326,641,373	209,806,297	22,231,939	..	13,040,770	76,816	14,206	216,780
Totals, 1935–36 ..	..	401	46,090	34,209	992,268	92,568	335,264,752	222,700,816	25,472,712	..	14,410,010	80,552	14,091	228,218

(1) Not yet actively functioning. (2) License delegated to Westland Power, Ltd. (3) 1931 figures. Later return not furnished. (4) The fact that the totals for 1936–37 are lower generally than those for 1935–36 is accounted for by the disappearance of Southland from the list of Power Boards. The Southland scheme, now known as the "Southland Electric-power Supply," was taken over by the Public Works Department on 13th October, 1936. * 1934–35 figures. † N.A.=not available.

Total Area of Dominion=103,415 square miles.
Total Unimproved Value of Land in the Dominion (1935)=£301,137,513.

TABLE IX.—STATISTICS OF POPULATION, CONSUMERS, SYSTEM VOLTAGES, ROUTE-MILES OF LINES, ETC., FOR THE YEAR ENDED 31ST MARCH, 1937.

NOTE.—In the column describing the Source of Supply the following abbreviations are used: G.N. = Government supply, North Island system; G.S. = Government supply, South Island system; I. = Independent supply (own generating-plant); B. = Bulk supply from another authority.

Supply Authority.	Source of Supply.	Year when Supply commenced.	Population included in Area of Supply.	Number of Consumers.	Ratio of Consumers to Population in Area of Supply.	Voltage.				Distribution Transformers.		Route-miles of Lines.	Consumers per Route-mile of Line.	Static Head.	Street Lighting System.
						Generation.	Transmission.	Primary Distribution.	Secondary Distribution (and System of Supply).	Number.	Total Kv.a.				
PUBLIC WORKS DEPARTMENT.					%									Ft.	
1. Arapuni-Mangahao-Waikaremoana	I.	1921	..	308	..	11,000 6,600 5,000	110,000 50,000	11,000 3,300	400/230 A.C.	53	5,062	1,264	..	Arapuni=175 Hora Hora=27 Mangahao=896 Waikaremoana=676	..
2. Coleridge-Waitaki ..	I.	1915	..	138	..	11,000 6,600	110,000 66,000 33,000	11,000 6,600	400/230 A.C.	64	4,735	658	..	Coleridge=480 Waitaki=70	..
3. Southland Electric-power Supply[5]	I.	1925	48,875	10,638	21·76	6,600	66,000	11,000 3,300	400/230 A.C.	1,572	18,229	2,416	4·4	Monowai=154	Series and Parallel.
Totals, P.W.D. ..	..	..	48,875	11,084	..	..	..	..	..	1,689	28,026	4,338	..	..	..
ELECTRIC-POWER BOARDS.															
1. Ashburton	G.S.	1923	18,870	4,226	22·40	400 (*s*)	..	11,000 6,600	400/230 A.C.	857	8,107	915	4·6	..	Series.
2. Auckland	G.N.	1908	225,000	56,089	24·93	6,600 (*s*)	22,000	11,000 6,600	400/230 A.C. 460/230 D.C.	922	42,798	1,160	48·4	..	Series.
3. Banks Peninsula	G.S.	1921	3,777	1,039	27·51	3,300 (*s*)	33,000	11,000 6,600 3,300	400/230 A.C.	174	1,556	206	5·0	310	Parallel.
4. Bay of Islands[6]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5. Bay of Plenty	G.N.	1928	10,385	1,735	16·70	..	..	11,000	400/230 A.C.	345	4,480	270	6·4	..	Series.
6. Buller[1]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Cambridge	G.N.	1921	6,000	1,494	24·90	..	..	11,000 3,300	400/230 A.C.	137	1,896	191	7·8	..	Series.
8. Central Hawke's Bay ..	G.N.	1925	11,000	1,815	16·50	..	..	11,000 6,600 3,300	400/230 A.C.	251	3,703	234	7·8	..	Parallel.
9. Central Waikato	G.N.	1921	19,400	5,719	29·48	..	..	11,000 3,300	400/230 A.C.	372	8,250	752	7·6	..	Parallel.
10. Dannevirke	G.N.	1925	12,114	2,885	23·82	..	..	11,000 6,600	400/230 A.C.	260	2,578	336	8·6	..	Series.
11. Franklin	G.N.	1925	19,138	4,267	22·29	..	..	11,000	400/230 A.C.	413	7,052	632	6·8	..	Parallel.
12. Golden Bay	I.	1929	1,520	417	27·45	400	..	6,600	400/230 A.C.	60	1,039	62	6·7	330	Parallel.
13. Grey	I.	1926	14,750	3,930	26·65	3,300	33,000	11,000	400/230 A.C.	133	6,480	229	17·0	42	Series.
14. Hawke's Bay	G.N.	1927	29,732	7,186	24·17	3,300 (*s*)	..	11,000 3,300	400/230 A.C. 460/230 D.C.	266	6,475	377	19·0	..	Series.
15. Horowhenua	G.N.	1924	17,350	4,839	27·89	..	..	11,000	400/230 A.C.	191	6,210	331	14·6	..	Series.
16. Hutt Valley	G.N.	1925	47,000	12,823	27·30	..	..	11,000 6,600	400/230 A.C.	170	11,777	300	42·7	..	Series.
17. Lake Wakatipu[1]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18. Malvern	G.S.	1925	3,550	698	19·66	..	..	6,600	400/230 A.C.	186	1,328	186	3·8	..	Parallel.

(For notes, see page 118.)

TABLE IX.—STATISTICS OF POPULATION, CONSUMERS, SYSTEM VOLTAGES, ROUTE-MILES OF LINES, ETC., FOR THE YEAR ENDED 31ST MARCH, 1937—*continued*.

G.N.=Government supply, North Island system. G.S.=Government supply, South Island system. I.=Independent supply (own generating-plant). B.=Bulk supply from another authority.

Supply Authority.	Source of Supply.	Year when Supply commenced.	Population included in Area of Supply.	Number of Consumers.	Ratio of Consumers to Population in Area of Supply.	Voltage.				Distribution Transformers.		Route-miles of Lines.	Consumers per Route-mile of Line.	Static Head.	Street Lighting System.
						Generation.	Transmission.	Primary Distribution.	Secondary Distribution (and System of Supply).	Number.	Total Kv.a.				
ELECTRIC-POWER BOARDS—*contd.*					%									Ft.	
19. Manawatu-Oroua ..	G.N.	1924	20,868	5,245	25·13	..	..	11,000 3,300	400/230 A.C.	453	9,380	626	8·4	..	Series.
20. Marlborough	I.	1927	14,530	2,996	20·62	6,600	33,000	11,000 6,600	400/230 A.C.	210	3,504	285	10·5	100	Series.
21. North Auckland[2] ..	G.N.	1936	27,031	523	1·94	..	..	11,000	400/230 A.C.	61	888	97	5·4	..	..
22. North Canterbury ..	G.S.	1928	11,734	2,458	20·94	..	..	11,000 6,600 3,300	400/230 A.C.	414	4,124	543	4·5	..	Parallel.
23. Opunake	I. & G.N.	1924	5,647	1,063	18·82	6,600	..	6,600	400/230 A.C.	97	1,070	159	6·7	47	Series.
24. Otago Central	I.	1925	3,585	1,037	28·92	6,600	33,000	11,000 6,600	400/230 A.C.	135	1,358	179	5·8	987	Parallel.
25. Otago	B.	1926	17,931	4,338	24·20	..	33 000	11,000 6,600	400/230 A.C.	315	3,462	537	8·0	..	Series.
26. Poverty Bay	G.N.	1912	25,510	5,408	21·20	6,600 (*s*)	..	11,000 6,600	400/230 A.C. 460/230 D.C.	316	6,714	389	13·9	..	Series.
27. Reefton[1]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28. South Canterbury ..	G.S.	1925	19,986	4,512	22·58	400 (*s*)	..	11,000 6,600	400/230 A.C.	718	7,916	801	5·6	66	Series.
29. South Taranaki	G.N.	1929	20,000	3,531	17·65	5,500 (*s*)	..	11,000	400/230 A.C.	232	4,451	297	11·9	57	Series.
30. Springs-Ellesmere ..	G.S.	1922	12,330	2,671	21·65	..	..	11,000 6,600 3,300	400/230 A.C.	442	3,946	329	8·1	..	Series and Parallel.
31. Taranaki	I. & G.N.	1927	13,985	2,715	19·41	6,600	33,000	11,000 6,600	400/230 A.C.	345	6,176	424	6·4	300	Series.
32. Tararua	G.N.	1925	8,115	1,907	23·50	..	..	11,000 3,300	400/230 A.C.	288	2,715	266	7·2	..	Series.
33. Tauranga	B.	1926	9,564	1,641	17·15	..	33,000	11,000–3 ph. 6,350–1 ph. 3,300–3 ph.	400/230 A.C. 460/230 1 ph. 3 wire A.C.	305	3,720	472	3·5	..	Parallel.
34. Te Awamutu	G.N.	1921	9,372	2,101	22·42	..	..	11,000 3,300	400/230 A.C.	223	2,717	329	6·4	..	Series.
35. Teviot	I.	1924	1,880	435	23·00	3,300	..	11,000 6,600 3,300	400/230 A.C.	156	1,099	72	6·0	380	Parallel.
36. Thames Valley	G.N.	1921	33,010	8,461	25·62	..	..	11,000 3,300	400/230 A.C.	515	13,603	857	9·9	..	Parallel.
37. Waimea	I. & B.	1912	9,235	2,023	21·86	400 3,300 2,500	..	11,000 2,500	400/230 A.C.	90	1,480	132	15·3	960/16/10	Series and Parallel.
38. Wairarapa	G.N.	1923	19,600	5,383	27·48	3,300 (*s*)	..	11,000 3,300	400/230 A.C.	332	9,420	544	9·9	429/290	Series and Parallel.
39. Wairere	I.	1925	2,500	350	14·00	6,600	..	6,600	400/230 A.C.	157	1,244	118	3·0	65	Parallel.
40. Wairoa	G.N.	1923	6,970	439	6·30	..	..	11,000 3,300	400/230 A.C.	90	2,502	99	4·4	..	Parallel.

(For notes, see page 118.)

TABLE IX.—STATISTICS OF POPULATION, CONSUMERS, SYSTEM VOLTAGES, ROUTE-MILES OF LINES, ETC., FOR THE YEAR ENDED 31ST MARCH, 1937—*continued.*

G.N. = Government supply, North Island system. G.S. = Government supply, South Island system. I. = Independent supply (own generating-plant). B. = Bulk supply from another authority.

Supply Authority.	Source of Supply.	Year when Supply commenced.	Population included in Area of Supply.	Number of Consumers.	Ratio of Consumers to Population in Area of Supply.	Voltage.				Distribution Transformers.		Route-miles of Lines.	Consumers per Route-mile of Line.	Static Head.	Street Lighting System.
						Generation.	Transmission.	Primary Distribution.	Secondary Distribution (and System of Supply).	Number.	Total Kv.a.				
ELECTRIC-POWER BOARDS—*contd.*					%									Ft.	
41. Waitaki	G.S.	1926	17,500	4,230	24·20	3,300 (*s*)	..	11,000 6,600 3,300	400/230 A.C.	462	4,638	469	9·0	250	Series.
42. Waitemata	G.N.	1926	45,850	12,231	26·67	..	..	11,000	400/230 A.C.	318	9,695	789	15·5	..	Parallel.
43. Waitomo	G.N.	1926	6,670	1,496	22·43	..	..	11,000	400/230 A.C.	141	2,606	138	10·8	..	Parallel.
44. Wanganui-Rangitikei	G.N.	1924	52,380	10,829	20·65	3,300 (*s*)	..	11,000 6,600 3,300	400/230 A.C. 500 D.C. (Trams)	601	11,537	829	13·1	..	Series.
45. Westland[3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Totals, Power Boards	..	..	855,369	197,182	23·05	..	..	..	..	12,153	233,694	15,961	12·4	..	..
OTHER LOCAL AUTHORITIES.															
City Councils.															
1. Christchurch	G.S.	1903	98,500	30,942	31·40	460 D.C. (*s*)	..	11,000 3,300	400/230 A.C. 460/230 D.C.	255	32,230	348	89·0	..	Series.
2. Dunedin	I. & G.S.	1907	87,500	28,472	32·54	6,600 2,400 550 D.C. (*s*)	35,000	6,600 3,300	400/230 A.C. 500 D.C. (Trams)	758	28,090	588	48·4	700	Series.
3. Invercargill	B.	1914	22,000	6,182	28·10	3,300 (*s*) 400 (*s*) 600 D.C. (*s*)	..	11,000 3,300	400/230 A.C. 500 D.C. (Trams)	66	3,705	81	76·4	..	Series.
4. Nelson	I.	1923	11,214	3,219	28·70	3,300	..	3,300	400/230 A.C.	15	1,705	48	67·1	..	Series.
5. Palmerston North	B.	1924	22,191	6,188	27·90	3,300 (*s*)	..	11,000 3,300	400/230 A.C.	37	3,675	77	80·4	..	Parallel.
6. Wellington	G.N.	1907	125,000	36,764	29·42	11,000 (*s*)	..	11,000 3,300	400/230 A.C. 500 D.C. (Trams)	99	34,010	364	101·0	..	Parallel.
Totals, City Councils	..	..	366,405	111,767	30·50	..	..	..	..	1,230	103,415	1,506	74·2	..	..
Borough Councils.															
1. Bluff	B.	1903	2,036	531	26·10	..	..	3,300	400/230 A.C.	16	596	11	48·3	..	Series.
2. Hamilton	G.N.	1913	16,100	4,866	30·22	..	..	11,000	400/230 A.C.	39	3,600	60	81·0	..	Parallel.
3. Inglewood	B.	1905	1,300	441	33·90	..	..	3,300	400/230 A.C.	3	175	8	55·1	..	Parallel.
4. Kaiapoi	B.	1917	1,800	500	27·80	..	..	3,300	400/230 A.C.	2	240	15	33·4	..	Parallel.
5. Lyttelton	G.S.	1918	3,300	940	28·50	..	..	11,000	400/230 A.C.	8	600	10	94·0	..	Series.
6. Napier	B.	1913	15,302	4,868	31·83	3,300 (*s*)	..	3,300	400/230 A.C.	30	4,900	43	113·3	..	Parallel.
7. New Plymouth	I. & G.N.	1905	21,000	6,672	31·78	6,600	..	11,000	400/230 A.C. 500 D.C. (Trams)	230	10,650	341	19·6	240/120	Series.
8. Ohakune	B. & I.	1914	1,940	510	26·28	2,400 (*s*)	..	6,600 2,400	400/230 A.C.	12	220	19	26·9	42	Parallel.
9. Patea	B. & I.	1901	2,500	423	16·93	3,300 (*s*)	..	3,300	400/230 A.C.	17	426	18	23·5	78	Parallel.

(For notes, see page 118.)

TABLE IX.—STATISTICS OF POPULATION, CONSUMERS, SYSTEM VOLTAGES, ROUTE-MILES OF LINES, ETC., FOR THE YEAR ENDED 31ST MARCH, 1937—*continued.*

G.N.=Government supply, North Island system. G.S.=Government supply, South Island system. I.=Independent supply (own generating-plant). B.=Bulk supply from another authority.

Supply Authority.	Source of Supply.	Year when Supply commenced.	Population included in Area of Supply.	Number of Consumers.	Ratio of Consumers to Population in Area of Supply.	Voltage.				Distribution Transformers.		Route-miles of Lines.	Consumers per Route-mile of Line.	Static Head.	Street Lighting System.
						Generation.	Transmission.	Primary Distribution.	Secondary Distribution (and System of Supply).	Number.	Total Kv.a.				
OTHER LOCAL AUTHORITIES—*continued.*					%									Ft.	
Borough Councils—continued.															
10. Picton	I.	1917	1,400	400	28·60	460	..	..	460/230 D.C.	..	..	11	36·4	279	Parallel.
11. Queenstown	I.	1924	900	274	30·45	3,300	..	3,300	400/230 A.C.	2	60	7	39·0	510	Parallel.
12. Raetihi	I.	1917	4,500	432	9·60	6,600 / 3,300 (*s*)	..	6,600	400/230 A.C.	18	451	28	15·4	380	Parallel.
13. Rangiora	B.	1919	2,236	723	32·33	..	..	3,300	400/230 A.C.	6	327	14	51·6	..	Series.
14. Riccarton	G.S.	1916	5,300	1,571	29·64	..	..	3,300	400/230 A.C.	8	850	18	87·3	..	Parallel.
15. Ross[4]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16. Rotorua (Tourist Department)	G.N.	1901	11,400	2,351	20·62	6,600 (*s*)	..	6,600 / 3,300	400/230 A.C. / 200/115 A.C.	121	1,580	69	34·1	14	Parallel.
17. Stratford	B.	1898	3,753	1,122	29·90	..	..	6,600	400/230 A.C.	10	900	17	66·0	..	Parallel.
18. Sumner	G.S.	1918	3,247	1,087	33·48	..	..	11,000 / 3,300	400/230 A.C.	7	555	10	108·7	..	Series.
19. Taihape	I. & B.	1913	2,182	577	26·44	460/230	..	..	460/230 D.C.	..	..	10	57·7	30	Parallel.
20. Taumarunui	I.	1924	5,600	1,082	19·32	3,300	..	6,600 / 3,300	400/230 A.C.	17	960	18	60·1	25	Parallel.
21. Tauranga	I.	1915	3,993	1,219	30·55	3,300	50,000 / 33,000	11,000 / 3,300	400/230 A.C.	12	1,200	64	19·1	110/80	Parallel.
22. Te Aroha	B.	1906	2,370	754	31·81	3,300 (*s*)	..	3,300	400/230 A.C.	9	560	19	39·7	600	Parallel.
23. Te Puke	B.	1921	980	328	33·46	..	..	3,300	400/230 A.C.	4	338	12	27·3	..	Series.
24. Thames	B.	1914	4,700	1,198	25·50	3,300 (*s*) / 400 (*s*)	..	11,000 / 3,300	400/230 A.C.	17	715	22	54·5	130	Parallel.
25. Timaru	B.	1908	17,500	4,754	27·18	..	..	11,000 / 3,300	400/230 A.C.	22	3,210	59	80·6	..	Series.
26. Wairoa	B.	1913	2,519	730	29·00	..	..	3,300	400/230 A.C.	11	650	15	48·7	..	Parallel.
27. Waitara	B.	1905	1,977	564	28·52	..	..	..	400/230 A.C.	3	150	12	47·0	..	Parallel.
28. Westport	I.	1925	4,500	1,091	24·25	400	..	6,600	400/230 A.C.	8	390	20	54·6	430	Parallel.
29. Whakatane	I.	1922	1,750	547	31·28	3,300	22,000	3,300	400/230 A.C.	8	580	72	7·6	258	Parallel.
30. Whangarei	B.	1915	7,900	2,290	28·98	..	..	2,200	400/230 A.C.	22	1,790	39	58·7	..	Series & Parallel.
Totals, Borough Councils	..	..	153,985	42,845	27·82	..	..	..	..	662	36,673	1,061	40·4	..	..
Town Boards.															
1. Havelock North[7]	I. & B.	1916	1,263	318	25·17	3,300	..	3,300	400/230 A.C.	3	160	17	18·7	50	Parallel.
2. Kamo	B.	1923	600	127	21·16	..	..	2,200	400/230 A.C.	3	240	6	21·7	..	Parallel.
3. Kaponga	I. & B.	1916	1,200	395	32·92	3,300	..	3,300	400/230 A.C.	30	469	51	7·7	31	Parallel.
4. Mangaweka	B.	1913	432	124	28·70	..	..	2,400	400/230 A.C.	7	70	10	12·4	..	Parallel.
5. Manunui	B.	1929	775	166	21·40	..	..	3,300	400/230 A.C.	2	25	5	33·2	..	Parallel.
Totals, Town Boards	..	..	4,270	1,130	26·47	..	..	..	..	45	964	89	12·7	..	..

(For notes, see page 118.)

TABLE IX.—STATISTICS OF POPULATION, CONSUMERS, SYSTEM VOLTAGES, ROUTE-MILES OF LINES, ETC., FOR THE YEAR ENDED 31ST MARCH, 1937—*continued*.

G.N.=Government supply, North Island system. G.S.=Government Supply, South Island system. I.=Independent supply (own generating-plant). B.=Bulk supply from another authority.

Supply Authority.	Source of Supply.	Year when Supply commenced.	Population included in Area of Supply.	Number of Consumers.	Ratio of Consumers to Population in Area of Supply.	Voltage.				Distribution Transformers.		Route-miles of Lines.	Consumers per Route-mile of Line.	Static Head.	Street Lighting System.
						Generation.	Transmission.	Primary Distribution.	Secondary Distribution (and System of Supply).	Number.	Total Kv.a.				
OTHER LOCAL AUTHORITIES—*continued.*					%									Ft.	
County Councils.															
1. Heathcote	G.S.	1914	6,000	1,317	21·95	..	..	11,000 / 3,300	400/230 A.C.	17	1,178	35	37·6	..	Series.
2. Kaikoura	I.	1922	630	169	26·82	3,300	..	3,300	400/230 A.C.	6	43	5	33·8	..	Series.
3. Murchison	I.	1922	540	188	34·80	3,300	..	3,300	400/230 A.C.	12	145	16	11·8	105	Parallel.
4. Uawa	I.	1925	400	101	25·25	230	..	..	230 D.C.	..	..	3	33·7	..	Parallel.
5. Waimairi	B.	1917	14,060	3,633	25·84	..	..	6,600 / 3,300	400/230 A.C.	71	3,184	147	24·7	..	Series.
Totals, County Councils	..	..	21,630	5,408	25·00	..	..	..	..	106	4,550	206	26·3	..	..
Totals, other Local Authorities	..	..	546,290	161,150	29·50	..	..	..	..	2,043	145,602	2,862	56·3	..	..
COMPANIES.															
1. Alderton Utility Co. ..	I.	1930	625	71	11·36	400	..	6,350	230 A.C.	17	147	12	5·9	123	..
2. Kanieri Electric, Ltd. ..	I.	1921	2,692	770	28·60	2,400	..	11,000	400/230 A.C.	6	1,580	29	26·6	250/110	Series.
3. Reefton Electric Light and Power Co., Ltd.	I.	1887	1,500	341	23·73	230	..	..	230 D.C.	..	..	7	48·7	27	Parallel.
4. Rawene Motors, Ltd.[8] ..	I.	1926	300	52	17·33	230	..	..	230 D.C.	..	..	1	52·0	..	Parallel.
5. Wilson's (N.Z.) Portland Cement, Ltd.	I.	1916	500	182	36·40	5,500	22,000	2,200	400/230 A.C.	36	514	45	..	130	..
6. Westland Power, Ltd. ..	I.	1928	5,500	195	3·55	6,600 / 400	..	11,000 / 6,600	400/230 A.C.	26	2,370	67	2·9	260/105	..
Totals, Companies ..	..	..	11,117	1,611	14·50	..	..	..	..	85	4,611	161	10·0	..	..
Totals, all Supply Authorities	..	..	1,461,651	371,027	25·40	..	..	..	..	15,970	411,933	23,322	15·9	..	..

NOTES.—(*s*)=Standby supply. [1] Not actively functioning. [2] Commenced supplying power on 19th December, 1936. [3] License delegated to Westland Power, Ltd. [4] No returns received. [5] Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. [6] New Electric-power district constituted 3rd March, 1937, but Board not yet actively functioning as a supply authority. [7] Taken over by Hawke's Bay Electric-power Board on 1st April, 1937. [8] Formerly carried on under the name of P. Spender.

Total Population of Dominion at 30th September, 1936: 1,577,109.
Ratio of Total Population in Areas of Supply to Total Population of Dominion: 92·7 per cent.

Table X.—Results of Generation and Distribution for Year ended 31st March, 1937.

Note.—In the columns detailing the capacity of generating plant the following symbols are used to denote the type of prime mover: * Water; † Steam; ‡ Oil; § Gas.

Supply Authority.	Capacity of Generating Plant. Main Plant.	Capacity of Generating Plant. Standby Plant.	Maximum Load.	Connected Load. Including Bulk Supply.	Connected Load. Excluding Bulk Supply.	Demand Factor.	Units. Generated. Water.	Steam.	Oil.	Gas.	Purchased.	Total generated and purchased.	Sold. Including Bulk Supply for Resale.	Sold. Retail to Consumers.	Non-productive.[14]	Percentage Non-productive.	Units sold (Average). Annual Load Factor.	Per Head of Population.	Per Consumer (exclde. Bulk and Traction Supplies).	Per £1 of Distribution Capital.[22]	Average Maximum Demand per Consumer.	No.
Public Works Department.	Kw.	Kv.a.	Kw.	Kv.a.	Kw.	Kw.	Kw.	%	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	%	%	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.	
1. Arapuni-Mangaha - Waikaremoana	122,600*	148,810	3,750‡ 1,500†	4,689 1,875	124,460	923,674	20,514	13·47	688,704,277[11]	..	..	..	688,704,277	625,673,473	32,660,596	63,030,804	9·15	63·20	..	..	244	..	1
Coleridge-Waitaki	64,500*	73,972	5,760‡ 1,100†[9]	7,200 1,100	44,520	407,187	25,281	10·93	189,999,060	..	280,940	..	190,280,000	166,406,285	19,153,577	23,873,715	12·55	48·80	..	..	136	..	2
Southland Electric-power Supply[1]	6,000*	7,050	..	..	7,400	59,043	39,863	12·53	15,110,950	73,660[25]	..	..	15,184,610	11,178,404	8,110,143	4,006,206	26·38	50·40[26]	323[24]	1,487[24]	26[24]	0·467	3
Totals, P.W.D. ..	193,100	229,832	12,110	14,864	..	..	85,658	..	893,814,287	73,660	280,940	..	894,168,887	803,258,162	59,924,316	90,910,725	10·17	..	..	..	171	..	
‖ Southland (1st April to 12th October, 1936)	..	..	..	..	..	..	..	..	16,198,650	..	..	..	23,952	16,222,602	11,993,608	7,702,589	4,228,994	26·05	..	..	..	..	..	
Electric-power Boards.																							
1. Ashburton	..	..	160‡	200	1,929	..	17,136	11·25	..	..	27,801	..	8,666,000	8,693,801	..	6,708,536	1,985,265	22·85	51·45	355	1,587	23	0·456	1
2. Auckland	..	..	35,550† 5,610†	43,940 D.C.	41,784	..	249,064	16·78	..	..	..	..	192,937,400	192,937,400	..	165,235,530	27,701,870	14·35	52·70	734	2,600	116	0·602[23]	2
3. Banks Peninsula	..	..	72*[10]	90	539	..	4,921	10·95	72,328	..	..	..	2,471,893	2,544,221	..	1,875,422	668,799	26·28	53·88	497	1,805	24	0·519	3
4. Bay of Islands[2]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5. Bay of Plenty	..	..	..	..	1,509	..	7,769	19·42	..	..	..	..	10,478,688	10,478,688	..	9,299,072	1,179,616	11·25	79·30	895	5,360	61	0·870	5
6. Buller[3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7. Cambridge	..	..	..	..	1,002	..	3,960	25·30	..	..	..	..	6,234,170	6,234,170	..	5,174,370	1,059,800	17·00	71·00	862	3,463	60	0·671	7
8. Central Hawke's Bay ..	..	..	..	..	950	..	6,181	15·37	..	..	..	..	5,096,101	5,096,101	..	4,549,974	546,127	10·71	61·21	414	2,507	39	0·523	8
9. Central Waikato	..	..	..	..	3,012	21,949	21,939	13·72	..	..	..	..	18,588,840	18,588,840	15,840,205	15,818,990	2,748,635	14·79	70·45	815	2,766	48	0·526	9
10. Dannevirke	..	..	..	..	932	..	9,074	10·27	..	..	..	..	5,219,000	5,219,000	..	4,820,231	398,769	7·64	64·00	398	1,671	25	0·324	10
11. Franklin	..	..	187§	220	2,772	..	15,085	18·38	..	..	..	..	17,123,043	17,123,043	..	14,544,562	2,578,481	15·06	70·52	760	3,408	56	0·650	11
12. Golden Bay	175*	250	..	..	198	..	1,158	17·10	845,360	..	..	..	9,357	854,717	..	698,247	156,470	18·30	49·30	460	1,675	45	0·475	12
13. Grey	3,060*	3,600	..	..	2,376	..	12,985	18·30	12,250,090	..	..	..	..	12,250,090	..	9,820,604	2,429,486	19·83	58·90	666	2,500	67	0·605	13
14. Hawke's Bay	..	..	520‡ 567‡	650 D.C.	5,004	43,066	30,203	11·62	..	..	1,200	..	28,500,866	28,502,066	26,072,847	15,965,085	2,429,220	8·52	65·02	537	2,222	95	0·446	14
15. Horowhenua	..	..	..	..	2,616	..	16,939	15·44	..	..	..	..	12,931,800	12,931,800	..	11,466,707	1,465,093	11·33	56·40	661	2,370	66	0·540	15
16. Hutt Valley	..	..	..	..	5,940	..	51,768	11·48	..	..	..	..	29,271,584	29,271,584	..	24,807,668	4,463,916	15·24	56·30	528	1,934	102	0·463	16
17. Lake Wakatipu[3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17
18. Malvern	..	..	..	..	227	..	2,907	7·81	..	..	..	..	1,010,136	1,010,136	..	727,500	282,636	27·98	50·80	205	1,042	13	0·325	18
19. Manawatu-Oroua	..	..	..	..	5,160	45,846	22,131	11·25	..	..	..	..	31,755,693	31,755,693	29,935,206	15,055,288	1,820,487	5·73	70·25	721	2,870	73	0·558	19
20. Marlborough	1,000*	1,250	456‡	570	960	..	11,480	8·36	5,058,930	..	111,940	..	..	5,170,870	..	3,946,542	1,224,328	23·67	61·49	272	1,317	23	0·320	20
21. North Auckland[4]	..	..	..	..	180	..	2,582	6·97	..	..	..	..	129,906	129,906	..	104,285	25,621	19·72	..	..	..	..	0·344	21
22. North Canterbury	..	..	..	..	1,386	12,773	9,592	10·85	..	..	..	..	6,598,400	6,598,400	5,423,848	4,244,525	1,174,552	17·80	54·35	362	1,727	33	0·426	22
23. Opunake	315*	450	148‡	185	497	..	3,087	16·09	967,089[12]	..	30,165	..	1,132,850	2,130,104[12]	..	1,663,257	466,847	21·91	48·92	295	1,565	29	0·467	23
24. Otago Central	1,600*	2,000	..	..	570	..	2,386	23·90	2,775,000	..	..	..	..	2,775,000	..	2,378,762	396,238	14·28	55·60	653	2,292	30	0·550	24
25. Otago	..	..	..	..	1,756	..	12,965	13·55	..	..	..	..	7,768,745	7,768,745	..	5,914,214	1,854,531	24·87	50·50	330	1,363	26	0·405	25
26. Poverty Bay	..	..	680‡ 300‡	850 D.C.	2,124	..	24,091	8·82	..	..	65,900	..	12,218,672	12,284,572	..	10,549,098	1,735,474	14·13	66·02	414	1,950	43	0·393	26
27. Reefton[3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27
28. South Canterbury ..	..	..	29*	36	3,976	32,892	15,276	12·10	4,068	..	..	..	18,455,200	18,459,268	16,434,269	7,916,269	2,024,999	10·97	53·00	396	1,755	60	0·429	28
29. South Taranaki	..	..	555* 485‡	692 607	1,801	11,315	10,679	15·92	1,991,200	..	60,000	..	6,730,582	8,781,782	7,336,004	6,887,072	1,445,778	16·45	55·66	367	1,950	62	0·488	29
30. Springs-Ellesmere	..	..	..	..	1,280	..	10,531	12·15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	30
31. Taranaki	3,200*	3,600	..	..	2,520	15,772	9,269	15·98	14,328,150	..	..	..	6,485,112	6,485,112	..	5,448,189	1,036,923	15·99	57·84	442	2,041	39	0·480	31
32. Tararua	..	..	..	..	821	..	7,951	10·33	..	..	..	..	123,547	14,451,697	11,122,605	6,679,115	3,329,092	23·04	65·50	478	2,460	55	0·544	32
33. Tauranga	..	..	..	..	..	..	6,884	..	..	..	..	..	4,204,751	4,204,751	..	3,780,299	424,452	10·09	58·50	466	1,982	33	0·430	33
34. Te Awamutu	..	..	..	..	1,382	..	8,379	16·49	..	..	..	..	6,032,175	6,032,175	..	5,989,615	42,560	..	..	626	3,650	44	..	34
35. Teviot	750*	939	..	..	440	..	1,565	28·11	1,876,390	..	..	..	7,932,684	7,932,684	..	6,794,869	1,137,815	14·34	65·58	725	3,234	41	0·658	35
36. Thames Valley	..	..	..	..	5,132	38,031	33,614	13·50	..	..	..	..	..	1,876,390	..	1,572,627	303,763	16·18	48·70	837	3,640	49	1·018	36
37. Waimea	390*	482	110‡	137	310	..	4,823	6·43	1,243,125	..	7,346	..	33,491,064	33,491,064	29,185,979	26,603,099	4,305,085	12·85	74·50	806	3,143	41	0·547	37
38. Wairarapa	..	..	837*	1,188	2,178	..	23,447	9·29	2,395,301[13]	..	..	..	101,669	1,352,140	..	973,731	378,409	28·00	49·80	105	481	22	0·153	38
39. Wairere	490*	700	..	..	328	..	2,156	15·22	1,781,850	..	..	..	10,236,062	12,631,363[13]	..	10,863,472	1,767,891	13·99	66·20	554	2,018	58	0·278	39
40. Wairoa	..	..	..	..	888	5,584	2,542	15·90	..	..	..	..	..	1,781,850	..	1,310,162	471,688	26·47	62·00	524	3,743	52	0·937	40
41. Waitaki	..	..	120* 192‡	150 240	2,086	..	15,897	13·12	119,663	..	36,471	..	4,376,408	4,376,408	3,824,724	1,593,984	551,684	12·61	56·30	229	3,630	71	0·784	41
42. Waitemata	..	..	..	..	4,213	..	42,256	9·97	..	..	..	..	9,577,600	9,733,734	..	8,346,025	1,387,709	14·26	53·30	447	1,973	57	0·493	42
43. Waitomo	..	..	..	..	1,018	..	6,214	16·38	..	..	..	..	22,839,730	22,839,730	..	20,061,745	2,777,985	12·16	61·90	437	1,639	51	0·345	43
44. Wanganui-Rangitikei ..	..	..	1,500†	1,875	5,036	41,919	41,586	12·01	..	..	..	..	4,920,188	4,920,188	..	4,211,660	708,528	14·40	55·20	632	2,395	52	0·680	44
45. Westland[5]	..	..	..	..	..	..	..	..	..	..	..	..	26,732,615	26,732,615	23,142,830	22,915,580	3,589,785	13·43	60·59	438	2,020	66	0·436[23]	45
Totals, Power Boards ..	10,980	13,271	48,078	51,630	..	..	782,472	..	43,214,287	..	340,823	..	560,382,531	603,937,641	..	477,315,982	84,476,407	13·99[15]	..	559	2,318	57	..	

(For notes see page 121.)

‖ Return of units generated, units sold, etc., for final period of operation under Southland Electric-power Board.

TABLE X.—RESULTS OF GENERATION AND DISTRIBUTION FOR YEAR ENDED 31ST MARCH, 1937—*continued.*

NOTE.—In the columns detailing the capacity of generating plant the following symbols are used to denote the type of prime mover: * Water; † Steam; ‡ Oil; § Gas.

Supply Authority.	Capacity of Generating Plant.				Maximum Load.	Connected Load.		Demand Factor.	Units.										Annual Load Factor.	Units sold (Average).			Average Maximum Demand per Consumer.	No.
	Main Plant.		Standby Plant.			Including Bulk Supply.	Excluding Bulk Supply.		Generated.				Purchased.	Total generated and purchased.	Sold.		Non-productive.[14]	Percentage Non-productive.		Per Head of Population.	Per Consumer (excldg. Bulk and Traction Supplies).	Per £1 of Distribution Capital.[22]		
									Water.	Steam.	Oil.	Gas.			Including Bulk Supply for Resale.	Retail to Consumers.								
OTHER LOCAL AUTHORITIES. *City Councils.*	Kw.	Kv.a.	Kw.	Kv.a.	Kw.	Kw.	Kw.	%	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	%	%	Kw. hrs.	Kw.-hrs.	Kw.-hrs.	Kw.	
1. Christchurch	..	..	400†	D.C.	19,170	162,044	145,288	11·83	..	..	..	..	78,550,494	78,550,494	70,251,135	63,379,190	8,299,359	10·56	46·80	644	2,050	90	0·568	1
2. Dunedin	17,400*	21,750	1,875†	2,340	18,311	102,342	89,377	17·90	71,032,514	397,620	11,995	..	6,715,200	78,157,329	67,433,919	59,665,174	10,723,410	13·72	48·72	682	1,930	89	0·527[23]	2
			860‡	D.C.																				
3. Invercargill	..	..	1,525†	1,874	2,160	..	17,434	12·38	..	3,300	..	..	6,801,960	6,805,260	..	5,845,507	959,753	14·10	36·00	266	847	71	0·314[23]	3
			450†	D.C.																				
4. Nelson	750†	937	500†	624	920	..	9,534	9·65	..	2,523,682	..	..	..	2,523,682	1,979,701	1,878,032	543,981	21·56	31·30	168	584	37	0·286	4
5. Palmerston North	..	..	2,000‡	2,500	3,187	..	23,716	13·44	..	..	704,007	111,138	14,879,918	15,695,063	..	13,799,701	1,895,362	12·07	56·05	622	2,230	135	0·515	5
			816§	1,020																				
6. Wellington	..	..	9,000†	11,250	23,150	..	152,250	15·21	..	1,874,601	..	..	80,948,100	82,822,701	..	73,280,897	9,541,804	11·52	40·86	503	1,708	87	0·521[23]	6
			1,000†	D.C.																				
Totals, City Councils	18,150	22,687	18,426	19,608	..	..	437,599	..	71,032,514	4,799,203	716,002	111,138	187,895,672	264,554,529	..	217,848,501	31,963,669	12·08[17]	..	594	1,805	83	..	
Borough Councils.																								
1. Bluff	..	..	..	..	272	..	1,746	15·58	..	..	..	..	542,320	542,320	..	468,316	74,004	13·65	22·76	230	882	60	0·512	1
2. Hamilton	..	..	..	..	2,070	..	14,107	14·67	..	..	..	..	7,610,600	7,610,600	..	7,015,493	595,107	7·82	42·00	436	1,442	112	0·425	2
3. Inglewood	..	..	..	..	158	..	1,821	8·68	..	..	..	..	699,560	699,560	..	637,320	62,240	8·90	50·55	490	1,445	107	0·358	3
4. Kaiapoi	..	..	..	..	136	..	987	13·78	..	..	..	..	420,695	420,695	..	402,160	18,535	4·41	35·30	223	804	39	0·272	4
5. Lyttelton	..	..	..	..	276	..	3,632	7·60	..	..	..	..	1,191,880	1,191,880	..	1,052,866	139,014	11·67	49·30	319	1,119	96	0·294	5
6. Napier	..	..	400‡	500	1,724	..	11,985	14·38	..	..	630	..	9,910,700	9,911,330	..	9,326,189	585,141	5·90	65·70	610	1,915	147	0·354	6
7. New Plymouth	3,500*	4,375	1,200*	1,500	4,100	..	27,460	14·93	14,294,950	..	..	..	5,560,510	19,855,460	17,591,800	16,980,800	2,263,660	11·40	55·30	809	2,426	150	0·526[23]	7
			350‡	437																				
8. Ohakune	..	..	96*	120	102	..	806	12·65	1,760	..	520	..	430,350	432,630	..	364,888	67,742	15·66	48·40	188	716	140	0·200	8
			113‡	141																				
9. Patea	..	..	88*	110	162	..	636	25·47	236,549	..	1,053	..	448,932	686,534	..	633,998	52,536	7·65	48·40	254	1,500	67	0·383	9
			64‡	80																				
10. Picton	125‡	D.C.	16*	D.C.	85	..	688	12·35	..	..	185,030	..	..	185,030	..	152,871	32,159	17·37	24·85	109	382	21	0·212	10
11. Queenstown	60*	75	..	..	80	..	485	16·49	202,080	..	..	..	..	202,080	..	170,340	31,740	15·70	28·83	189	621	43	0·292	11
	128‡	160																						
12. Raetihi	280*	350	96*	120	250	2,379	1,573	10·52	1,034,860	..	..	..	..	1,034,860	977,056	546,706	57,804	5·59	47·22	121	1,265	69	0·343	12
13. Rangiora	..	..	..	..	204	..	2,194	9·30	..	..	..	..	758,628	758,628	..	667,290	91,338	12·04	42·50	299	923	72	0·282	13
14. Riccarton	..	..	..	..	724	..	7,196	10·05	..	..	..	..	3,281,020	3,281,020	..	2,943,391	337,629	10·28	51·70	555	1,873	127	0·497	14
15. Ross[6]	2*	D.C.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16. Rotorua (Tourist Dept.)	..	..	200*	250	922	..	6,429	14·33	242,521	..	..	..	3,799,904	4,042,425	..	2,886,877	1,155,548	28·58	50·10	253	1,228	50	0·392	16
17. Stratford	..	..	..	..	620	..	2,825	21·95	..	..	..	..	2,864,500	2,864,500	..	2,256,972	607,528	21·20	52·70	601	2,010	106	0·553	17
18. Sumner	..	..	..	..	291	..	2,759	10·55	..	..	..	..	1,511,875	1,511,875	..	1,364,690	147,185	9·74	59·25	420	1,255	127	0·268	18
19. Taihape	150*	D.C.	75§	D.C.	226	..	1,222	18·49	638,550	..	..	1,500	25,300	665,350	..	596,289	69,061	10·38	33·60	273	1,033	85	0·394	19
20. Taumarunui	425*	500	..	..	390	2,506	2,377	15·57	1,466,568	..	..	..	..	1,466,568	1,195,443	1,160,570	271,125	18·49	42·90	207	1,073	61	0·333	20
21. Tauranga	3,040*	3,500	640*	800	2,668	11,122	3,000	24·00	14,360,141	..	..	..	13,360	14,373,501	10,548,277	3,800,926	3,825,224	26·60	61·50	952	3,120	233	..	21
22. Te Aroha	..	..	133*	166	289	..	2,571	11·24	193,022	..	..	..	1,142,290	1,335,312	..	1,181,993	153,319	11·48	52·74	498	1,567	72	0·383	22
23. Te Puke	..	..	..	..	158	..	1,238	12·76	..	..	..	..	715,176	715,176	..	708,381	6,795	..	51·67	723	2,160	59	0·482	23
24. Thames	..	..	120*	150	281	..	1,846	15·22	112,620	..	104,818	..	1,440,590	1,658,028	..	1,537,920	120,108	7·24	67·40	327	1,283	134	0·234	24
			262‡	327																				
25. Timaru	..	..	..	..	2,043	..	17,615	11·60	..	..	..	..	8,518,000	8,518,000	..	7,034,700	1,483,300	17·42	47·60	402	1,480	89	0·430	25
26. Wairoa	..	..	..	..	544	..	3,042	17·89	..	..	..	..	2,230,740	2,230,740	..	2,069,694	161,046	7·22	46·82	822	2,834	288	0·745	26
27. Waitara	..	..	..	..	163	..	1,067	15·28	..	..	..	..	582,000	582,000	..	527,979	54,021	9·28	40·75	268	936	100	0·289	27
28. Westport	200*	250	210§	265	318	..	2,452	12·97	832,950	..	..	81,869	..	914,819	..	767,503	147,316	16·10	32·85	171	704	61	0·291	28
29. Whakatane	390*	538	..	..	330	..	2,134	15·47	1,500,000	..	..	..	..	1,500,000	..	1,280,664	219,336	14·62	51·90	732	2,340	86	0·603	29
30. Whangarei	..	..	..	..	846	7,590	7,160	11·14	..	..	..	..	3,169,250	3,169,250	2,709,892	2,517,060	459,358	11·02	42·76	319	1,099	39	0·369	30
Totals, Borough Councils	8,300	9,748	4,063	4,966	..	..	133,053	..	35,116,571	..	292,051	83,369	56,868,180	92,360,171	..	71,054,846	13,288,919	14·39[17]	..	462	1,640	97	..	

(For notes see page 121.)

TABLE X.—RESULTS OF GENERATION AND DISTRIBUTION FOR YEAR ENDED 31ST MARCH, 1937—*continued.*

NOTE.—In the columns detailing the capacity of generating plant the following symbols are used to denote the type of prime mover: * Water; † Steam; ‡ Oil; § Gas.

Supply Authority.	Capacity of Generating Plant. Main Plant.		Capacity of Generating Plant. Standby Plant.		Connected Load. Maximum Load.	Connected Load. Including Bulk Supply	Connected Load. Excluding Bulk Supply.	Demand Factor.	Units. Generated. Water.	Steam.	Oil.	Gas.	Purchased.	Total generated and purchased.	Sold. Including Bulk Supply for Resale.	Sold. Retail to Consumers.	Non-productive.[14]	Percentage Non-productive.	Annual Load Factor.	Units sold (Average). Per Head of Population.	Per Consumer (excldg. Bulk and Traction Supplies).	Per £1 of Distribution Capital.[22]	Average Maximum Demand per Consumer.	No.
OTHER LOCAL AUTHORITIES—*ctd.* *Town Boards.*	Kw.	Kv.a.	Kw.	Kv.a.	Kw.	Kw.	Kw.	%	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	%	%	Kw.-hrs.	Kw.-hrs.	Kw.-hrs.	Kw.	
1. Havelock North[7]	144*	160	..	..	122	..	878	13·90	372,117	..	..	..	197,061	569,178	..	528,220	40,958	7·20	53·25	418	1,662	62	0·384	1
2. Kamo	..	..	..	..	128	..	430	29·80	..	..	..	..	192,832[16]	192,832	..	192,832[16]	..	..	..	321	1,518	76	1·007	2
3. Kaponga	96*	120	..	..	220	..	790	27·86	575,180	..	..	..	297,430	872,610	..	692,850	179,760	20·60	45·30	578	1,754	37	0·557	3
4. Mangaweka	..	..	..	..	36	..	319	11·28	..	..	..	..	201,950	201,950	..	161,150	40,800	20·22	64·00	373	1,300	62	0·290	4
5. Manunui	..	..	..	..	25	..	129	19·38	..	..	..	..	34,873	34,873	..	31,821	3,052	8·75	15·93	41	192	11	0·151	5
Totals, Town Boards	240	280	..	..	..	..	2,546	..	947,297	..	..	..	924,146	1,871,443	..	1,606,873	264,570	14·13[17]	..	376	1,422	46	..	
County Councils.																								
1. Heathcote	..	..	..	..	754	..	6,279	12·00	..	..	..	..	2,609,279	2,609,279	..	2,283,119	326,160	12·50	39·50	381	1,733	91	0·572	1
2. Kaikoura	48‡	60	37§	47	45	..	150	30·00	..	..	47,806	14,200	..	62,006	..	44,255	17,751	28·63	15·73	70	262	14	0·266	2
3. Murchison	80*	100	..	..	67	..	390	17·18	217,590	..	..	..	..	217,590	..	163,993	53,597	24·63	37·10	304	872	22	0·357	3
4. Uawa	30‡	D.C.	..	..	20	..	76	26·33	..	..	25,780	..	..	25,780	..	17,826	7,954	30·85	14·72	45	177	9	0·198	4
5. Waimairi	..	..	..	..	1,592	..	17,260	9·22	..	..	..	..	7,005,116	7,005,116	..	6,304,605	700,511	10·00	50·20	448	1,734	99	0·448	5
Totals, County Councils	158	160	37	47	..	..	24,155	..	217,590	..	73,586	14,200	9,614,395	9,919,771	..	8,813,798	1,105,973	11·15[17]	..	408	1,630	87	..	
Totals, other Local Authorities	26,848	32,875	22,526	24,621	..	..	597,353	..	107,313,972	4,799,203	1,081,639	208,707	255,302,393	368,705,914	..	299,324,018	46,623,131	12·64[17]	..	548	1,754	86	..	
COMPANIES.																								
1. Alderton Utility Co.	88*	100	..	..	90	..	280	32·13	276,954	..	..	..	..	276,954	..	230,795	46,159	16·67	35·23	369	3,250	87	1·267	1
2. Kanieri Electric, Ltd.	1,500*	1,806	150‡	167	1,140	..	2,277	50·00	4,825,500	..	2,775	..	..	4,828,275	..	4,058,330	769,945	15·95	48·35	349[19]	1,219[19]	237	0·506	2
3. Reefton Electric Light and Power Co., Ltd.	98*	D.C.	80‡	D.C.	120	..	183	65·60	188,023	..	..	..	..	188,023	..	141,017	47,006	25·00	17·88	94	414	23	0·352	3
4. Rawene Motors, Ltd.[8]	19‡	D.C.	..	..	13	..	83	15·67	..	..	17,253	..	..	17,253	..	16,925	328	..	15·15	56	326	85	0·250	4
5. Wilson's (N.Z.) Portland Cement, Ltd.	2,000*	2,500	3,190†	3,750	2,200	14,001	6,411	15·72	10,994,300	..	..	..	..	10,994,300	9,724,971	6,555,721	1,269,329	11·55	57·05	298[20]	819[20]	432	..	5
6. Westland Power, Ltd.	876*	1,008	625† 200‡	625 250	830	..	1,770	46·90	3,022,286	84,500	16,000	..	..	3,122,786	..	2,560,682	562,104	18·00	43·00	169[21]	4,770[21]	89	..	6
Totals, Companies	4,581	5,414	4,245	4,792	..	..	11,004	..	19,307,063	84,500	36,028	..	..	19,427,591	..	13,563,470	2,694,871	13·87[17]	..	217	1,493	175	..	
Totals, all Supply Authorities	235,509	281,392	86,959	95,907	..	..	1,476,487	..	1,079,848,259	4,957,363	1,739,430	208,707	815,708,876	..	..	..	857,830,375	228,934,128	21·06[18]	..	547	2,154	52	..	

TABLE A.—SUMMARY OF TOTALS RELEVANT TO TABLE X.

Supply Authority.	Units generated.	Population included in Area of Supply.	Number of Consumers.	Capital invested in Transmission and Distribution Systems.
	Kw.-hrs.	No.	No.	£
Public Works Department	894,168,887	48,875	11,084	4,697,611
Electric-power Boards	59,753,760	855,369	197,182	8,405,764
Other Local Authorities—				
City Councils	76,658,857	366,405	111,767	2,614,118
Borough Councils	35,491,991	153,985	42,845	734,152
Town Boards	947,297	4,270	1,130	35,181
County Councils	305,376	21,630	5,408	101,159
Totals for other Local Authorities	113,403,521	546,290	161,150	3,484,610
Companies	19,427,591	11,117	1,611	77,520
Totals for all Supply Authorities	1,086,753,759	1,461,651	371,027	16,665,505

NOTES TO TABLE X.

	Based on Total Units Sold (857,830,375).	Based on Total Units Sold less Units supplied for Traction, Mining, and Cement Manufacture.
Units sold per head of population	**587**	**547**
Units sold per consuner	**2,312**	**2,154**

NOTES.—[1] Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. [2] New Electric-power district constituted 3rd March, 1937, but Board not yet functioning as a supply authority. [3] Not actively functioning. [4] Commenced supplying power on 19th December, 1936. [5] License delegated to Westland Power, Ltd. [6] No returns received. [7] Taken over by Hawke's Bay Power Board on 1st April, 1937. [8] Formerly carried on under the name of P. Spender. [9] Christchurch Tramway Board's standby steam station available for general supply when required. [10] Limited to 30 kw. by Pelton-wheel capacity. [11] Includes the following units generated for the Public Works Department: By Wairarapa Power Board—2,165,253; by Opunake Power Board—329,004: total, 2,494,257. [12] 329,004 units generated for the Public Works Department are included in the Public Works Department totals, but not in Power Board totals. [13] 2,165,253 units generated for the Public Works Department are included in the Public Works Department totals, but not in Power Board totals. [14] Includes units lost in transmission and distribution, units used free of charge, units supplied to station auxiliaries, &c. [15] Kamo Town Board pays on units measured at consumers' meters; losses included in those of Whangarei Borough Council's system. [17] Percentage of total units generated and purchased. [18] Percentage of total units generated—*i.e.*, 1,086,753,759. [19] Excludes units supplied for gold-dredging (3,119,800). [20] Excludes units supplied to Whangarei (3,169,250) and to cement works (6,406,303). [21] Excludes units supplied for gold-mining (1,630,682). [22] To nearest unit. [23] Excludes maximum load of tramway systems. [24] Based on total units sold retail during year (15,812,732). [25] Generated for Public Works Department by Invercargill steam station. [26] Based on period 13th October, 1936, to 31st March, 1937 (4,056 hrs).

Table XI.—Financial Results of Operation for the Year ended 31st March, 1937.

(For Appropriations and Reserves see Table XII.)

Supply Authority.	Capital Outlay on Electric-supply System.	Loan Liability.	Revenue.					Working Expenses.						Capital Charges.						Total Annual Costs.	Net Results.		Amount collected by Rates to make up Deficiencies.	No.
			Sale of Electricity.		Profits from Trading Account.	Other Sources (not including Rates).	Total.	Cost of Power.		Cost of Transmission and Distribution.	Management and General.	Total.	Per Cent. of Revenue.	Interest.	Sinking Fund.	Depreciation.	Other Capital Charges.	Total.	Per Cent. of Capital Outlay.		Profit.	Loss.		
			Retail.	Bulk for Resale.				Generated. [23]	Purchased.															
PUBLIC WORKS DEPARTMENT.	£	£	£	£	£	£	£	£	£	£	£	£	%	£	£	£	£	£	%	£	£	£	£	
1. Arapuni-Mangahao-Waikaremoana	8,976,196	8,510,234	40,409	337,739	..	9,262	887,410	48,803	..	55,804	39,708	144,315	16·26	391,241	..	10,464	97,250 [10]	498,955	5·56	643,270	244,140	..	..	1
2. Coleridge-Waitaki	4,499,767	3,841,434	45,737	210,982	422	2,673	259,814	23,688	..	26,857	14,730	65,275	25·13	177,126	..	79,653	26,420 [11]	283,199	6·29	348,474	..	88,610	..	2
3. Southland Electric-power Supply [1]	1,649,457	1,554,147	56,125	10,094	..	2,975	69,194	4,257	..	8,995	7,302	20,554	29·76	35,514	..	32,622	..	68,136	4·13	88,690	..	19,496	..	3
Totals, P.W.D.	15,125,420	13,905,815	142,321	1,058,815	422	14,910	1,216,468	76,748	..	91,656	61,740	230,144	18·92	603,881	..	122,739	123,670	850,290	5·62	1,080,434	244,140	108,106	..	
*Southland (1st April to 12th October, 1936)	..	..	64,657	13,727	67	7,250	85,701	4,114	360	15,105	5,494	25,073	29·25	51,407	..	..	9,742	61,149	..	86,222	..	521	5,409 [15]	
ELECTRIC-POWER BOARDS.																								
1. Ashburton	331,960	347,500	48,585	..	..	703	49,268	237	13,856	5,400	3,786	23,279	47·25	15,115	1,453	2,224	5,100 [9]	23,892	7·20	47,171	2,097	..	..	1
2. Auckland	3,387,931	2,669,100	643,248	..	..	7,444	650,692	5,552 [16]	230,042	77,691	47,360 [17]	360,445 [17]	55·40	118,072 [17]	62,597 [17]	41,952 [17]	47,424 [12]	270,045 [17]	7·97	630,490 [17]	20,202	..	..	2
3. Banks Peninsula	101,541	96,900	12,634	..	138	278	13,050	104	4,212	3,629	2,042	9,987	76·53	4,395	1,954	..	..	6,349	6·25	16,336	..	3,286	2,844 [23]	3
4. Bay of Islands [2]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5. Bay of Plenty	197,259	202,700	41,860	..	1,364	1,071	44,295	..	13,245	5,782	3,869	22,896	51·70	8,826	3,067	457	..	12,350	6·26	35,246	9,049	..	..	5
6. Buller [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7. Cambridge	112,478	100,252	20,818	..	182	367	21,367	..	7,655	4,818	1,660	14,133	66·20	4,421	2,006	..	100 [12 13]	6,527	5·81	20,660	707	..	..	7
8. Central Hawke's Bay	156,484	146,430	24,213	..	..	81	24,294	..	7,802	2,568	2,654	13,024	53·61	5,866	104	540	2,815 [9]	9,425	6·02	22,449	1,845	..	..	8
9. Central Waikato	391,900	377,903	67,191	56	619	663	68,529	..	25,320	8,311	5,362	38,993	56·82	16,078	6,182	1,709	1,894 [9]	25,863	6·60	64,796	3,733	..	..	9
10. Dannevirke	221,642	216,767	31,052	..	107	203	31,362	..	7,672	4,414	3,306	15,392	49·08	9,192	3,284	1,067	130 [9]	13,673	6·17	29,065	2,297	..	..	10
11. Franklin	307,823	330,900	53,203	..	2,813	2,294	58,310	906 [16]	21,587	3,679	6,303	32,475	55·69	13,284	5,367	6,514	..	25,165	8·18	57,640	670	..	..	11
12. Golden Bay	28,028	25,000	4,553	..	92	8	4,653	335	57	444	1,272	2,108	45·30	1,075	278	160	..	1,511	5·39	3,619	1,034	..	..	12
13. Grey	205,935	305,585	46,013	..	417	487	46,917	1,590	..	2,948	9,329	13,867	29·57	14,002	6,462	..	5,700 [9]	26,164	8·84	40,031	6,886	..	..	13
14. Hawke's Bay	373,216	345,016	69,567	17,587	..	491	87,645	20	39,130	9,791	7,911	56,852	64·87	17,468	2,000	..	3,461 [9]	22,929	6·14	79,781	7,864	..	..	14
15. Horowhenua	240,084	202,023	50,006	..	412	869	51,287	..	21,869	7,873	3,839	33,581	65·48	8,546	163	..	4,804 [9]	13,513	5·63	47,094	4,193	..	..	15
16. Hutt Valley	382,138	354,186	112,918	..	561	1,031	114,510	..	48,815	13,308	12,080	74,203	64·87	16,786	1,300	2,741	4,007 [9]	24,834	6·50	99,127	15,383	..	..	16
17. Lake Wakatipu [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17
18. Malvern	71,271	73,350	7,997	..	57	263	8,317	..	1,850	2,070	1,551	5,471	65·80	3,127	886	..	..	4,013	5·63	9,484	..	1,167	2,376 [21]	18
19. Manawatu-Oroua	487,843	495,749	73,394	18,660	301	246	92,601	..	40,025	12,035	4,764	56,824	61·36	20,953	7,068	1,940	444 [9]	30,405	6·24	87,229	5,372	..	4 [21]	19
20. Marlborough	335,196	355,294	31,287	..	..	565	31,852	2,427	..	3,760	2,669	8,856	27·80	14,261	4,036	2,160	..	20,457	6·10	29,313	2,539	..	74 [20]	20
21. North Auckland [4, 19]	60,241	109,578	902	..	812	68	1,782	..	271	50	403	724	40·63	119	..	..	..	119	..	843	939	..	..	21
22. North Canterbury	182,432	169,900	26,239	3,207	176	831	30,543	..	11,248	4,952	3,479	19,679	64·40	6,694	3,047	..	..	9,741	5·34	29,420	1,123	..	..	22
23. Opunake	109,260	82,240	13,033	..	..	53	13,086	1,733	1,395	1,946	1,783	6,857	52·40	3,704	2,039	220	..	5,963	5·46	12,820	266	..	..	23
24. Otago Central	120,023	88,992	11,457	..	248	103	11,808	615	..	2,598	2,525	5,738	48·60	4,072	413	233	2,080 [9]	6,798	5·66	12,536	..	728	..	24
25. Otago	308,732	299,153	46,416	..	..	48	46,464	..	13,621	4,969	3,280	21,870	47·10	12,971	3,170	4,873	3,952 [9]	24,966	8·09	46,836	..	372	893 [22]	25
26. Poverty Bay	328,392	313,505	61,958	..	126	1,838	63,922	1,665	16,672	8,791	6,182	33,311	52·11	12,873	8,188	1,700	..	22,761	6·94	56,072	7,850	..	..	26
27. Reefton [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27
28. South Canterbury	349,073	307,600	42,423	18,739	459	1,025	62,646	..	30,776	4,735	3,131	38,642	61·70	12,950	5,565	3,511	..	22,026	6·32	60,668	1,978	..	..	28
29. South Taranaki	219,367	217,334	38,819	1,265	365	400	40,849	2,576	8,831	4,511	5,757	21,675	53·05	8,778	3,554	1,129	2,014 [9]	15,475	7·06	37,150	3,699	..	..	29
30. Springs-Ellesmere	160,766	144,500	30,681	..	11	252	30,944	..	11,902	5,268	2,632	19,802	63·99	6,162	2,814	..	..	8,976	5·58	28,778	2,166	..	..	30
31. Taranaki	483,744	457,643	40,297	9,179	..	372	49,848	1,900	1,778	6,551	5,917	16,146	32·40	19,307	..	..	8,307 [9]	27,614	5·71	43,760	6,088	..	56 [20]	31
32. Tararua	173,083	176,300	26,043	..	511	228	26,782	..	7,067	3,885	2,425	13,377	50·00	6,989	1,957	654	1,100 [9]	10,700	6·18	24,077	2,705	..	..	32
33. Tauranga	147,803	150,508	27,537	..	296	876	28,709	..	8,671	5,212	2,925	16,808	58·55	6,044	60	800	3,503 [9]	10,407	7·04	27,215	1,494	..	..	33
34. Te Awamutu	196,100	164,300	32,188	..	11	126	32,325	..	11,569	4,587	2,856	19,012	58·80	6,865	..	..	2,879 [9]	9,744	4·97	28,756	3,569	..	..	34
35. Teviot	58,749	53,700	5,311	..	2	133	5,446	379	..	663	1,171	2,213	40·63	2,299	..	29	808 [9]	3,136	5·33	5,349	97	..	..	35
36. Thames Valley	805,743	817,297	120,794	5,367	..	1,319	127,480	..	43,408	17,653	9,192	70,253	55·10	39,170	3,668	..	11,102 [9]	53,940	6·70	124,193	3,287	..	..	36
37. Waimea	89,272	82,713	15,886	..	..	729	16,615	1,533	1,047	2,332	2,971	7,883	47·45	4,200	..	951	1,550 [9]	6,701	7·50	14,584	2,031	..	25 [21]	37
38. Wairarapa	352,640	350,906	54,799	..	1,210	783	56,792	1,187	13,125	3,531	10,390	28,233	49·71	14,680	4,989	3,113	44 [9]	22,826	6·47	51,059	5,733	..	..	38
39. Wairere	56,130	57,400	5,204	..	53	211	5,468	302	..	1,000	1,135	2,437	44·57	2,128	731	..	..	2,859	5·70	5,296	172	..	..	39
40. Wairoa	65,230	66,744	8,400	5,590	..	316	14,306	..	7,660	1,249	1,062	9,971	69·70	2,962	600	..	836 [9]	4,398	6·74	14,369	..	63	1,832 [21]	40
41. Waitaki	188,820	191,350	36,333	..	1,335	253	37,921	1,275	13,778	5,282	2,311	22,646	59·70	7,478	2,961	1,291	..	11,730	6·22	34,376	3,545	..	..	41
42. Waitemata	490,279	462,210	91,523	..	867	1,192	93,582	..	34,387	16,306	9,853	60,546	64·70	18,732	2,758	1,878	6,064 [9]	29,432	6·00	89,978	3,604	..	..	42
43. Waitomo	107,136	115,346	20,595	..	281	30	20,906	..	7,857	2,374	1,771	12,002	57·40	4,747	1,318	151	341 [9]	6,557	6·12	18,559	2,347	..	..	43
44. Wanganui-Rangitikei	529,453	499,731	108,852	443	..	1,491	110,786	880 [16]	38,810	11,335	9,074	60,099	54·10	22,417	2,090	15,940	9,589 [9]	50,036	9·45	110,135	651	..	..	44
45. Westland [23]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45
Totals, Power Boards ..	12,999,177	12,023,605	2,204,209	80,183	13,826	29,741	2,327,959	25,016	767,010	288,391	211,923	1,292,340	55·50	517,906	158,129	97,937	130,048	904,020	6·96	2,196,360	137,215	5,616	8,104	

(For notes see page 124.)

* Revenue and Expenditure returns for final period of operation under Southland Electric-power Board.

Table XI.—Financial Results of Operation for the Year ended 31st March, 1937—*continued.*

(For Appropriations and Reserves see Table XII.)

Supply Authority.	Capital Outlay on Electric-supply System.	Loan Liability.	Revenue.					Working Expenses.						Capital Charges.						Total Annual Costs.	Net Results.		Amount collected by Rates to make up Deficiencies	No.
			Sale of Electricity.		Profits from Trading Account.	Other Sources (not including Rates).	Total.	Cost of Power.		Cost of Transmission and Distribution.	Management and General.	Total.	Per Cent. of Revenue.	Interest.	Sinking Fund.	Depreciation.	Other Capital Charges.	Total.	Per Cent. of Capital Outlay.		Profit.	Loss.		
			Retail.	Bulk for Resale.				Generated.[2,3]	Purchased.															
OTHER LOCAL AUTHORITIES.																								
City Councils.	£	£	£	£	£	£	£	£	£	£	£	£	%	£	£	£	£	£	%	£	£	£	£	
1. Christchurch	818,256	292,553	233,604	10,049	1,869	5,766	251,288	..	91,000	49,891	24,515	165,406	65·80	9,649	4,463	33,540	1,072[12]	48,724	5·96	214,130	37,158	..	..	1
2. Dunedin	1,651,217	1,295,000	234,277	13,621	..	2,149	250,047	13,080	13,650	31,296	18,232	76,858	30·75	52,495	25,864	31,056	3,509[12]	112,924	6·84	189,782	60,265	..	..	2
3. Invercargill	138,752	108,585	52,686	..	..	1,712	54,398	2,772	21,303	4,097	5,416	33,588	61·75	3,052	..	471	1,442[9]	4,965	3·58	38,553	15,845	..	..	3
4. Nelson	118,158	55,400	28,418	1,047	153	964	30,582	12,148	..	2,408	2,797	17,353	56·74	3,324	1,108	3,225	814[12]	8,471	7·16	25,824	4,758	..	..	4
5. Palmerston North	259,882	172,659	60,844	..	371	105	61,320	3,738	21,851[1,8]	2,973	4,422	32,984	53·80	7,600	3,155	4,068	..	14,823	5·71	47,807	13,513	..	..	5
6. Wellington	1,288,967	386,135	329,791	..	..	5,815	335,606	19,077	107,096	51,601	39,445	217,219	64·70	20,825	4,842	2,873	22,660[1,8]	51,200	3·97	268,419	67,187	..	..	6
Totals, City Councils	4,275,232	2,310,332	939,620	24,717	2,393	16,511	983,241	51,415	254,900	142,266	94,827	543,408	55·30	96,045	39,432	75,233	29,497	241,107	5·64	784,515	198,726	..	..	
Borough Councils.																								
1. Bluff	10,760	7,446	4,470	..	..	307	4,777	..	2,518	286	856	3,660	75·60	337	205	91	..	633	5·88	4,293	484	..	..	1
2. Hamilton	63,950	45,100	41,814	..	..	171	41,985	..	14,547	7,289	2,053	23,889	56·87	1,959	2,348	..	..	4,307	6·74	28,196	13,789	..	..	2
3. Inglewood	9,050	10,447	4,332	..	352	..	4,684	..	1,615	893	422	2,930	62·53	448	340	50	106[12]	944	10·43	3,874	810	..	..	3
4. Kaiapoi	10,918	6,715	3,254	..	310	..	3,564	..	1,294	623	336	2,253	63·20	284	134	177	..	595	5·45	2,848	716	..	..	4
5. Lyttelton	13,024	4,000	6,804	..	9	..	6,813	..	2,685	1,426	383	4,494	66·00	228	117	256	..	601	4·61	5,095	1,718	..	..	5
6. Napier	120,367	134,032	43,249	..	..	1,408	44,657	13	16,624	4,613	3,973	25,223	56·50	5,696	1,688	2,183	..	9,562	7·40	34,785	9,872	..	..	6
7. New Plymouth	355,359	252,868	71,046	950	1,433	1,103	74,532	3,923	8,490	17,875	3,353	33,641	45·20	11,985	1,468	500	5,127[12,9]	19,080	5·37	52,721	21,811	..	..	7
8. Ohakune	9,405	12,185	3,589	..	31	..	3,620	83	503	427	640	1,653	45·70	526	336	50	..	912	9·70	2,565	1,055	..	..	8
9. Patea	18,266	13,072	4,749	..	25	22	4,796	291	1,265	523	805	2,884	60·20	563	156	40	120[9]	897	4·91	3,781	1,015	..	..	9
10. Picton	18,349	14,520	3,326	..	..	9	3,335	1,628	..	897	378	2,903	87·05	624	209	400	..	1,233	6·72	4,136	..	801	99	10
11. Queenstown	13,841	11,305	1,928	..	..	91	2,019	142	..	83	270	495	24·52	480	221	124	..	825	5·96	1,320	699	..	..	11
12. Raetihi	23,088	21,919	4,069	503	77	244	4,893	258	..	1,348	513	2,119	43·35	952	460	73	..	1,485	6·43	3,604	1,289	..	..	12
13. Rangiora	9,270	4,320	5,630	..	..	45	5,675	..	2,003	1,205	1,266	4,474	78·90	183	..	335	..	518	5·59	4,992	683	..	..	13
14. Riccarton	23,138	5,200	12,686	..	310	..	12,996	..	6,152	2,081	2,270	10,503	80·80	229	156	564	..	949	4·10	11,452	1,544	..	..	14
15. Ross[5]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16. Rotorua (Tourist Department)	79,692	80,225	24,060	..	..	780	24,840	501	7,641	5,619	1,380	14,541	58·50	3,882	1,553	1,553	..	6,988	8·77	21,529	3,311	..	..	16
17. Stratford	28,263	42,361	14,073	..	..	..	14,073	..	5,029	1,280	900	7,209	51·23	1,827	..	250	1,083[9]	3,160	11·18	10,369	3,704	..	..	17
18. Sumner	15,716	6,989	6,188	..	12	..	6,200	..	2,985	1,243	704	4,932	79·50	305	..	345	..	650	4·13	5,582	618	..	..	18
19. Taihape	10,574	14,460	5,417	..	..	..	5,417	840	90	732	625	2,287	42·23	621	109	508	86[9]	1,324	12·52	3,611	1,806	..	..	19
20. Taumarunui	65,441	50,423	11,245	391	..	407	12,043	931	..	1,281	1,567	3,779	31·40	2,200	..	..	1,146[9]	3,346	5·12	7,125	4,918	..	..	20
21. Tauranga	166,048	130,811	13,173	9,935	..	982	24,090	2,287	28	4,070	1,630	8,015	33·30	5,680	2,054	1,000	2,669[9]	11,403	6·87	19,418	4,672	..	..	21
22. Te Aroha	17,120	7,142	7,933	..	..	17	7,950	608	2,900	1,804	481	5,793	72·86	415	52	350	..	817	4·77	6,610	1,340	..	..	22
23. Te Puke	12,554	6,962	4,030	..	..	57	4,087	..	1,264	368	337	1,969	48·20	298	..	250	144[9]	692	5·52	2,661	1,426	..	..	23
24. Thames	30,460	15,961	10,768	..	..	84	10,852	1,361	2,468	2,129	1,866	7,824	72·20	452	139	..	35[14]	626	2·05	8,450	2,402	..	..	24
25. Timaru	105,458	46,300	38,906	..	..	150	39,056	..	18,739	7,068	3,383	29,190	74·70	1,970	3,302	..	..	5,272	5·00	34,462	4,594	..	..	25
26. Wairoa	11,373	15,309	8,750	..	..	79	8,829	..	5,590	357	934	6,881	77·90	648	376	..	..	1,024	9·00	7,905	924	..	..	26
27. Waitara	7,512	12,200	4,380	..	162	50	4,592	..	1,627	475	511	2,613	56·90	535	..	327	382[9]	1,244	16·57	3,857	735	..	506	27
28. Westport	34,764	28,970	8,177	..	41	46	8,264	1,746	..	1,724	696	4,166	50·41	1,270	849	357	..	2,456	7·07	6,622	1,642	..	..	28
29. Whakatane	35,081	37,191	7,003	..	81	186	7,270	542	..	640	940	2,122	29·20	1,604	789	..	..	2,393	6·82	4,515	2,755	..	..	29
30. Whangarei	76,700	28,044	18,036	848	839	2,709	22,432	..	7,128	4,583	2,212	13,923	62·10	1,294	322	1,845	..	3,461	4·52	17,384	5,048	..	..	30
Totals, Borough Councils	1,404,541	1,066,477	393,085	12,627	3,682	8,947	418,341	15,154	113,185	72,342	35,684	236,365	56·50	47,495	17,378	11,617	10,907	87,397	6·22	323,762	95,380	801	605	
Town Boards.																								
1. Havelock North[5]	26,532	11,947	3,424	..	..	15	3,439	193	964	519	344	2,020	58·80	728	119	..	543[9]	1,390	5·24	3,410	29	..	..	1
2. Kamo	2,526	1,830	1,695	..	..	8	1,703	..	848	140	63	1,051	61·70	73	101	88	..	262	10·37	1,318	390	..	18	2
3. Kaponga	16,927	15,357	5,372	..	93	478	5,943	1,643	907	1,748	716	5,014	84·37	639	465	..	143[9]	1,247	7·37	6,261	..	318	72	3
4. Mangaweka	5,757	2,150	1,098	..	50	177	1,325	..	353	358	328	1,039	77·40	91	22	..	..	113	1·96	1,152	173	..	169	4
5. Maunui	3,166	3,500	950	..	..	..	950	..	391	23	164	578	60·80	149	94	..	..	243	7·68	821	129	..	..	5
Totals, Town Boards	54,908	34,784	12,539	..	143	678	13,360	1,836	3,463	2,788	1,615	9,702	72·60	1,680	801	88	686	3,255	5·93	12,957	721	318	259	

(For notes see page 124.)

TABLE XI.—FINANCIAL RESULTS OF OPERATION FOR THE YEAR ENDED 31ST MARCH, 1937—*continued.*

(For Appropriations and Reserves see Table XII.)

Supply Authority.	Capital Outlay on Electric-supply System.	Loan Liability.	Revenue.					Working Expenses.						Capital Charges.						Total Annual Costs.	Net Results.		Amount collected by Rates to make up Deficiencies.	No.
			Sale of Electricity.		Profits from Trading Account.	Other Sources (not including Rates).	Total.	Cost of Power.		Cost of Transmission and Distribution.[23]	Management and General.	Total.	Per Cent. of Revenue.	Interest.	Sinking Fund.	Depreciation.	Other Capital Charges.	Total.	Per Cent. of Capital Outlay.		Profit.	Loss.		
			Retail.	Bulk for Resale.				Generated.[23]	Purchased.															
County Councils.	£	£	£	£	£	£	£	£	£	£	£	£	%	£	£	£	£	£	%	£	£	£	£	
1. Heathcote	25,173	20,505	11,269	..	..	61	11,330	..	6,441	1,810	778	9,029	79·75	1,058	869	..	..	1,927	7·66	10,956	374	..	..	1
2. Kaikoura	10,684	8,373	1,814	..	92	17	1,923	1,124	..	106	440	1,670	86·85	363	..	..	227[9]	590	5·52	2,260	..	337	587	2
3. Murchison	15,266	12,309	2,321	..	60	..	2,381	169	..	713	441	1,323	55·55	532	..	..	291[9]	823	5·39	2,146	235	..	..	3
4. Uawa	6,275	1,780	1,123	..	..	312	1,435	807	..	5	45	857	59·78	91	..	..	462[9]	553	8·81	1,410	25	..	..	4
5. Waimairi	63,617	34,700	21,227	33	12	106	21,378	..	10,530	2,278	1,924	14,732	68·95	1,551	1,134	4,160	..	6,845	10·76	21,577	..	199	72	5
Totals, County Councils ..	121,015	77,667	37,754	33	164	496	38,447	2,100	16,971	4,912	3,628	27,611	71·80	3,595	2,003	4,160	980	10,738	8·87	38,349	634	536	659	
Totals, other Local Authorities	5,855,696	3,489,260	1,382,998	37,377	6,382	26,632	1,453,389	70,505	388,519	222,308	135,754	817,086	56·25	149,715	59,614	91,098	42,070	342,497	5·85	1,159,583	295,461	1,655	1,523	
COMPANIES.																								
1. Alderton Utility Co.	5,425	4,585	1,072	..	..	..	1,072	58	..	26	427	511	47·70	161	..	260	..	421	7·76	932	140	..	..	1
2. Kanieri Electric, Ltd.	81,578	41,943	12,228	..	30	214	12,472	2,557	..	1,032	2,904	6,493	52·00	2,894	..	1,238	..	4,132	5·07	10,625	1,847	..	..	2
3. Reefton Electric Light and Power Co., Ltd.	6,947	4,500	3,480	..	72	22	3,574	637	..	214	1,117	1,968	55·10	..	..	..	..	..	..	1,968	1,606	..	..	3
4. Rawene Motors, Ltd.[7] ..	1,156	400	578	..	73	33	684	443	..	..	73	516	75·45	41	..	94	..	135	11·68	651	33	..	..	4
5. Wilson's (N.Z.) Portland Cement, Ltd.	91,121	17,078	7,010	7,120	..	392	14,522	3,248	..	1,066	897	5,211	35·87	..	..	..	..	..	..	5,211	9,311	..	..	5
6. Westland Power, Ltd. ..	86,988	..	8,226	..	..	153	8,379	3,116	..	397	4,132	7,645	..	2,599	..	1,859	..	4,458	5·12	12,103	..	3,724	..	6
Total, Companies ..	273,215	68,506	32,594	7,120	175	814	40,703	10,059	..	2,735	9,550	22,344	54·95	5,695	..	3,451	..	9,146	3·35	31,490	12,937	3,724	..	
Totals, all Supply Authorities	34,253,508	29,487,186	3,826,779	1,197,222	20,872	79,347	5,124,220	186,442	1,155,889	620,195	424,461	2,386,987	46·60	1,328,604	217,743	315,225	305,530	2,167,102	6·33	4,554,089	689,753	119,622	15,036	

NOTES.—[1] Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. [2] New Electric-power District constituted 3rd March, 1937, but Board not yet functioning as a supply authority. [3] Not actively functioning. [4] Commenced supplying power on 19th December, 1936. [5] No returns received. [6] Taken over by Hawke's Bay Power Board on 1st April, 1937. [7] Formerly carried on under the name of P. Spender. [8] Includes cost of street lighting. [9] Principal repayment. [10] Made up of £38,120 (= half capital charges paid by Public Works Department on Auckland Power Board's steam station) plus £59,130 (= cost of raising loans, &c.). [11] Cost of raising loans, &c. [12] Exchange on overseas interest payments. [13] Loan-conversion expenses. [14] Preliminary expenses. [15] Arrears only, collected by Power Board before being taken over by Public Works Department. [16] Cost of maintaining stand-by plant only. [17] After deducting proportion of half the capital charges paid by Public Works Department on Auckland Power Board's steam station. [18] Includes £3,191 arrears due to Manawatu-Oroua Power Board. [19] Returns for period of operation, 19th December, 1936, to 31st March, 1937. [20] Availability rate. [21] General rate. [22] License delegated to Westland Power, Ltd. [23] Actual running costs (fuel, if any, wages, stores, supplies, etc), repairs and maintenance only.

	£	
Net profit for year—Public Works Department	136,034	
Power Boards	131,078	(Includes £521 loss on Southland.)
Cities	198,726	
Boroughs	94,579	
Town Boards	403	
Counties	98	
Companies	9,213	
Total	£570,131	

Table XII.—Appropriations and Reserves for Year ended 31st March, 1937.

(For Statistics of Capital, Revenue, and Expenditure see Table XI.)

Supply Authority.	Appropriations of Net Surplus for Year ended 31st March, 1937 (after paying Working-expenses and Statutory Capital Charges).									Accumulated Reserves and Funds.								Credit Balance, Revenue Account.	Debit Balance, Revenue Account.	No.
	Renewal Fund.	General Reserve Fund.	Accident Insurance Fund.	Relief of Rates (Local Authorities).	Payment of Dividends (Companies).	Capital Expenditure out of Revenue.	Miscellaneous Payments.	Unappropriated Surplus.	Total (Net Profit for Year).	Sinking Fund.		Depreciation.		Renewal.		General and Other Reserves.[11][12]				
										Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.			
Public Works Department.	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	
1. Arapuni-Mangahao-Waikaremoana	..	..	..	..	..	..	244,140[9]	..	244,140	55,930	..	949,888	..	..	..	..	..	..	155,175	1
2. Coleridge-Waitaki	..	..	..	..	..	..	..	..	..	270,592	12,908	438,461	..	..	..	67,703	..	..	..	2
3. Southland Electric-power Supply[1]	..	..	..	..	..	..	..	..	..	522	522	32,622	..	..	..	..	..	..	..	3
Totals, P.W.D. ..	..	..	..	..	..	..	244,140	..	244,140	327,044	13,430	1,420,971	..	..	..	67,703	..	..	155,175	
Electric-power Boards.																				
1. Ashburton	1,997	..	..	..	..	..	46	54	2,097	5,886	5,886	5,267	2,270	3,100	3,100	..	..	..	9,845	1
2. Auckland	..	..	..	..	..	..	2,541	17,661	20,202	1,207,160	1,182,438	707,576	..	25,652	..	287,564	..	54,375	..	2
3. Banks Peninsula	..	..	..	..	..	..	..	..	..	2,624	3,524	4,449	4,449	..	..	8,700	..	5,339	..	3
4. Bay of Islands[2]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5. Bay of Plenty	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
6. Buller[3]	..	..	..	..	..	3,004	1,119	4,926	9,049	8,800	8,800	9,966	1,921	..	..	26,111	..	..	4,960	6
7. Cambridge	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8. Central Hawke's Bay	..	..	..	..	..	..	..	707	707	6,283	6,283	1,030	1,030	..	..	15,388	..	4,240	..	8
9. Central Waikato	..	..	..	..	..	..	40	1,805	1,845	1,235	1,235	21,271	16,900	..	..	22,134	1,444	6,348	..	9
10. Dannevirke	..	..	..	..	..	..	..	3,733	3,733	23,596	23,596	32,464	30,754	6,619	6,573	18,572	..	11,045	..	10
11. Franklin	562	..	..	..	..	311	200	1,786	2,297	17,886	17,886	22,117	21,050	..	..	7,480	..	9,805	..	11
12. Golden Bay	..	..	..	..	..	..	..	108	670	31,894	31,894	25,000	25,000	..	..	16,587	9,369	4,700	..	12
13. Grey	..	..	..	..	..	225	600	209	1,034	1,500	1,496	2,237	1,027	..	..	1,700	..	1,880	..	13
14. Hawke's Bay	..	..	..	..	..	6,590	296	..	6,886	35,939	38,298	5,051	3,700	..	..	18,005	3,457	..	20,544	14
15. Horowhenua	..	..	..	..	..	7,864	..	..	7,864	27,250	27,250	16,897	16,897	..	..	27,802	..	9,805	..	15
16. Hutt Valley	..	..	200	..	..	360	..	3,633	4,193	1,295	1,295	31,284	31,284	..	..	39,937	13,900	12,582	..	16
17. Lake Wakatipu[3]	..	..	..	..	..	9,000	..	6,383	15,383	22,168	23,668	70,109	70,109	6,190	6,190	30,208	..	14,738	..	17
18. Malvern	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	18
19. Manawatu-Oroua	..	..	..	..	..	..	..	..	..	5,356	6,046	3,988	285	..	..	1,800	..	..	2,026	19
20. Marlborough	..	..	..	..	..	..	..	5,372	5,372	46,164	55,000	38,059	23,936	..	..	254	..	924	..	20
21. North Auckland[4]	..	..	..	..	..	..	..	2,539	2,539	29,256	36,256	25,595	10,824	..	..	10,284	..	..	5,062	21
22. North Canterbury	..	..	..	..	..	..	..	939	939	..	..	..	..	..	..	..	..	..	..	22
23. Opunake	..	..	..	..	..	72	53	998	1,123	11,029	8,343	6,846	1,898	..	..	15,268	..	4,800	..	23
24. Otago Central	..	..	..	..	..	2	..	264	266	2,552	2,552	2,462	2,242	..	..	18,373	..	6,658	..	24
25. Otago	..	..	..	..	..	..	..	..	..	4,716	4,716	3,621	1,710	..	..	13,008	..	..	7,802	25
26. Poverty Bay	..	1,341	..	..	..	1,601	3,851[10]	1,057	7,850	34,874	32,755	34,774	8,158	..	..	6,400	..	2,556	..	26
27. Reefton[3]	..	..	..	..	..	..	..	..	..	35,765	40,060	18,267	7,812	1,000	..	43,490	..	10,885	..	27
28. South Canterbury	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28
29. South Taranaki	300	..	..	..	..	..	..	1,978	1,978	13,205	16,190	12,581	4,885	..	..	43,523	..	4,198	..	29
30. Springs-Ellesmere	..	..	..	..	..	2,000	836	563	3,699	15,002	15,002	9,020	9,020	687	..	21,866	4,541	3,880	..	30
31. Taranaki	..	..	..	..	..	..	..	2,166	2,166	6,919	7,919	8,514	8,514	..	..	18,820	..	9,499	..	31
32. Tararua	..	..	..	..	..	3,665	475	1,948	6,088	2,802	2,802	15,886	10,281	..	..	34,186	..	5,943	..	32
33. Tauranga	..	..	..	..	..	20	..	2,685	2,705	16,323	13,983	5,390	13,128	584	..	12,331	..	3,876	..	33
34. Te Awamutu	..	1,000	494	..	..	..	..	..	1,494	1,231	1,231	12,426	11,167	..	..	20,759	8,893	240	..	34
35. Teviot	..	..	..	..	..	486	..	3,083	3,569	1,213	1,213	5,437	5,437	696	..	33,417	..	9,776	..	35
36. Thames Valley	..	..	..	..	..	97	..	..	97	7,580	7,580	3,636	2,284	..	..	200	..	4,361	..	36
37. Waimea	..	..	..	..	..	..	..	3,287	3,287	19,279	19,279	21,574	21,574	..	..	25,967	..	..	..	37
38. Wairarapa	..	..	..	..	..	2,031	..	..	2,031	..	..	3,430	..	..	..	3,280	..	1,058	..	38
39. Wairere	..	..	..	..	..	5,475	258	..	5,733	22,189	24,750	27,490	23,632	..	..	44,733	16,746	2,534	..	39
	..	..	..	..	..	..	..	172	172	3,568	3,358	1,921	1,921	..	..	1,400	..	764	..	

(For notes see page 127.)

Table XII.—Appropriations and Reserves for Year ended 31st March, 1937—*continued.*

(For Statistics of Capital, Revenue, and Expenditure see Table XI.)

Supply Authority.	Appropriations of Net Surplus for Year ended 31st March, 1937 (after paying Working-expenses and Statutory Capital Charges).									Accumulated Reserves and Funds.								Credit Balance, Revenue Account.	Debit Balance, Revenue Account.	No.
										Sinking Fund.		Depreciation.		Renewal.		General and Other Reserves.[12]				
	Renewal Fund.	General Reserve Fund.	Accident Insurance Fund.	Relief of Rates (Local Authorities).	Payment of Dividends (Companies).	Capital Expenditure out of Revenue.	Miscellaneous Payments.	Unappropriated Surplus.	Total (Net Profit for Year).	Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.			
Electric-power Boards—*continued.*	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	
40. Wairoa	..	..	..	..	..	..	..	..	..	2,354	2,260	3,625	2,446	..	..	2,738	..	..	5,358	40
41. Waitaki	..	..	..	..	..	..	2,817	728	3,545	33,211	22,250	22,146	22,146	..	..	14,001	5,559	8,969	..	41
42. Waitemata	..	..	..	..	..	..	..	3,604	3,604	15,744	15,944	27,402	25,524	..	..	80,128	10,005	11,552	..	42
43. Waitomo	..	..	..	..	..	1,887	..	460	2,347	11,288	11,288	3,100	2,948	..	..	554	..	851	..	43
44. Wanganui-Rangitikei	..	..	..	..	..	..	651	..	651	15,267	15,267	40,044	33,765	1,232	..	76,162	..	11,127	..	44
45. Westland[5]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45
Totals, Power Boards	2,859	2,341	694	..	..	44,690	13,783	72,848	137,215	1,750,403	1,739,613	1,311,952	1,593,039	45,760	15,863	1,063,130	73,914	239,308	55,597	
Other Local Authorities.																				
City Councils.																				
1. Christchurch	10,000	..	..	27,158	..	..	..	..	37,158	155,302	155,302	512,973	..	35,000	..	299,517	..	60,724	..	1
2. Dunedin	6,390	..	..	50,676	..	3,199	..	..	60,265	223,877	223,877	265,590	..	192,295	192,295	..	..	131,232	..	2
3. Invercargill	..	2,000	..	9,966	..	3,879	..	..	15,845	15,244	15,244	22,444	22,444	..	..	33,768	2,000	1,835	..	3
4. Nelson	..	..	..	2,000	..	1,025	..	1,733	4,758	6,148	6,148	14,338	21,251	23,816	..	14,600	..	41,497	..	4
5. Palmerston North	..	..	..	5,000	..	5,992	927	1,594	13,513	19,336	19,336	40,707	36,638	..	..	92,545	..	16,736	..	5
6. Wellington	21,894	..	..	15,075	..	..	790	29,428	67,187	89,081	89,081	83,375	..	161,639	168,922	514,052	150,861	493,050	..	6
Totals, City Councils	38,284	2,000	..	109,875	..	14,095	1,717	32,755	198,726	508,988	508,988	939,427	80,333	412,750	361,217	954,482	152,861	745,074	..	
Borough Councils.																				
1. Bluff	..	..	..	284	..	200	..	..	484	1,269	1,269	1,605	1,605	..	..	954	..	..	..	1
2. Hamilton	..	..	..	4,491	..	9,298	..	..	13,789	20,062	20,062	9,065	9,065	..	..	30,300	16,249	14,800	..	2
3. Inglewood	36	..	..	774	..	..	..	..	810	5,165	5,165	67	67	36	36	..	..	..	880	3
4. Kaiapoi	..	..	..	..	..	..	..	716	716	259	259	2,548	813	990	..	2,285	..	2,449	..	4
5. Lyttelton	..	..	..	..	..	699	..	1,019	1,718	..	..	1,000	1,000	..	..	3,699	..	8,820	..	5
6. Napier	..	..	..	9,402	..	..	470	..	9,872	16,528	16,925	27,303	25,120	..	..	5,392	..	5,446	..	6
7. New Plymouth	..	5,250	..	6,000	..	7,615	..	2,946	21,811	21,792	21,792	18,660	18,660	..	..	222,657	27,797	36,191	..	7
8. Ohakune	..	..	..	585	..	123	..	347	1,055	1,459	1,459	1,446	295	..	..	3,287	..	..	..	8
9. Patea	..	..	..	502	..	476	37	..	1,015	1,053	1,053	134	134	..	..	6,939	..	..	..	9
10. Picton	..	..	..	..	..	..	..	..	..	2,320	2,320	3,610	1,210	..	..	2,938	..	663	..	10
11. Queenstown	..	..	..	85	..	600	..	14	699	227	243	1,602	947	..	..	600	..	1,531	..	11
12. Raetihi	..	..	..	175	..	1,061	47	6	1,289	40	40	1,006	933	..	..	1,711	..	1,067	..	12
13. Rangiora	..	..	..	..	..	..	..	683	683	..	..	679	346	..	..	5,081	..	537	..	13
14. Riccarton	..	..	..	..	..	305	..	1,239	1,544	1,364	1,364	3,743	3,179	..	..	16,561	..	5,604	..	14
15. Ross[6]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16. Rotorua (Tourist Department)	..	3,311	..	..	..	..	..	..	3,311	22,469	22,469	21,106	21,106	..	..	11,652	8,341	..	..	16
17. Stratford	..	..	..	3,552	..	152	..	..	3,704	565	565	1,985	1,985	..	..	3,114	..	..	10,507	17
18. Sumner	..	..	..	618	..	..	..	..	618	1,167	1,167	2,335	1,990	..	..	311	..	9,082	..	18
19. Taihape	..	..	..	1,000	..	..	..	806	1,806	4,003	4,003	5,029	4,521	..	..	..	..	3,526	..	19
20. Taumarunui	..	..	..	1,450	..	1,073	..	2,395	4,918	2,559	2,559	5,047	5,047	..	..	14,998	..	3,799	..	20
21. Tauranga	..	..	75	36	..	4,561	..	..	4,672	10,709	10,709	8,696	6,970	..	..	44,650	10,862	15,675	..	21
22. Te Aroha	..	..	..	..	..	372	..	968	1,340	545	545	2,803	2,453	..	..	2,962	..	11,542	..	22
23. Te Puke	75	..	..	632	..	..	7	712	1,426	..	..	4,236	4,236	599	..	2,685	..	5,209	..	23
24. Thames	..	..	..	1,000	..	..	..	1,402	2,402	843	843	1,581	1,581	..	..	9,715	..	7,770	..	24
25. Timaru	2,000	..	..	1,000	..	1,594	..	..	4,594	11,453	11,453	..	..	4,070	4,070	52,814	..	10,645	..	25

(For notes see page 127.)

Table XII.—Appropriations and Reserves for Year ended 31st March, 1937—*continued.*

(For Statistics of Capital, Revenue, and Expenditure see Table XI.)

Supply Authority.	Appropriations of Net Surplus for Year ended 31st March, 1937 (after paying Working-expenses and Statutory Capital Charges).									Accumulated Reserves and Funds.								Credit Balance, Revenue Account.	Debit Balance, Revenue Account.	No.
	Renewal Fund.	General Reserve Fund.	Accident Insurance Fund.	Relief of Rates (Local Authorities).	Payment of Dividends (Companies).	Capital Expenditure out of Revenue.	Miscellaneous Payments.	Unappropriated Surplus.	Total (Net Profit for Year).	Sinking Fund.		Depreciation.		Renewal.		General and Other Reserves.[12]				
										Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.	Reserve.	Funds.			
Other Local Authorities—*continued.*																				
Borough Councils—continued.	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	
26. Wairoa	..	..	..	676	..	..	..	248	924	806	806	1,090	1,090	..	..	1,857	..	282	..	26
27. Waitara	..	..	..	735	..	..	..	..	735	3,770	3,770	1,645	1,645	..	..	559	..	735	..	27
28. Westport	..	..	..	1,000	..	399	..	243	1,642	7,130	7,130	3,499	3,499	..	..	2,060	..	7,464	..	28
29. Whakatane	..	..	..	1,400	..	..	634	721	2,755	972	1,284	149	149	..	..	846	..	272	..	29
30. Whangarei	..	..	..	1,740	..	3,112	..	196	5,048	7,526	7,648	6,976	6,976	..	..	591	..	55,172	..	30
Totals, Borough Councils ..	2,111	8,561	75	37,137	..	31,640	1,195	14,661	95,380	146,055	146,902	138,645	126,622	5,695	4,106	451,218	63,249	208,281	11,387	
Town Boards.																				
1. Havelock North[7]	..	..	..	29	..	..	..	..	29	758	758	..	..	..	..	9,983	..	5,165	..	1
2. Kamo	..	..	..	..	..	390	..	..	390	60	60	..	..	..	..	403	..	608	..	2
3. Kaponga	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	242	..	..	3
4. Mangaweka	..	..	..	..	..	..	..	173	173	898	898	..	..	..	..	..	..	5,751	..	4
5. Manunui	..	..	..	..	..	..	..	129	129	..	..	..	..	..	..	278	..	410	..	5
Totals, Town Boards ..	..	..	..	29	..	390	..	302	721	1,716	1,716	..	..	..	..	10,664	242	11,934	..	
County Councils.																				
1. Heathcote	..	..	..	..	..	..	..	374	374	..	..	8,889	8,889	..	..	..	..	3,769	..	1
2. Kaikoura	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1,598	2
3. Murchison	..	..	..	..	..	235	..	..	235	..	..	..	..	..	..	687	..	235	..	3
4. Uawa	..	..	..	..	..	..	..	25	25	..	..	..	..	..	..	1,026	..	..	138	4
5. Waimairi	..	..	..	..	..	..	..	..	..	6,624	6,639	16,306	..	..	..	36,022	..	..	131	5
Totals, County Councils ..	..	..	..	..	..	235	..	399	634	6,624	6,639	25,195	8,889	..	..	37,735	..	4,004	1,867	
Totals, other Local Authorities	40,395	10,561	75	147,041	..	46,360	2,912	48,117	295,461	663,383	664,245	1,103,267	215,844	418,445	365,323	1,454,099	216,352	969,293	13,254	
Companies.																				
1. Alderton Utility Co.	..	..	..	..	..	..	..	140	140	..	..	..	..	..	..	..	..	340	..	1
2. Kanieri Electric, Ltd.	..	..	..	..	..	1,402	445	..	1,847	..	..	..	..	..	..	7,402	..	5,007	..	2
3. Reefton Electric Light and Power Co., Ltd.	..	..	..	..	750	..	..	856	1,606[11]	..	..	..	..	..	..	2,055	..	..	..	3
4. Rawene Motors, Ltd.[8]	..	..	..	..	..	..	..	33	33	..	..	..	..	..	..	..	..	33	..	4
5. Wilson's (N.Z.) Portland Cement, Ltd.	..	..	..	..	..	..	..	9,311	9,311[11]	..	..	..	..	..	..	..	..	..	..	5
6. Westland Power, Ltd.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
Totals, companies	..	..	..	..	750	1,402	445	10,340	12,937	..	..	..	..	..	..	9,457	..	5,380	..	
Totals, all Supply Authorities	43,254	12,902	769	147,041	750	92,452	261,280	131,305	689,753	2,740,830	2,417,288	3,836,190	1,808,883	464,205	381,186	2,594,389	290,266	1,213,981	224,026	

Notes.—[1] Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. [2] New electric-power district constituted 3rd March, 1937, but Board not yet actively functioning as a supply authority. [3] Not yet functioning. [4] Commenced supplying power on 19th December, 1936. [5] License delegated to Westland Power, Ltd. [6] No returns received. [7] Taken over by Hawke's Bay Power Board on 1st April, 1937. [8] Formerly carried on under the name of P. Spender. [9] Applied towards reduction of accumulated loss. [10] Includes £1,000 for replacement of motor vehicles and £2,851 towards load development reserve. [11] Gross surplus. [12] Includes General Reserves, Accident Fund Reserves, Loan Repayment Reserves, Capital Expenditure out of Revenue, Load Development Reserves, Bad Debts Reserves, &c.

Table XIII.—Averages Derived from Tables IX, X, and XI, for Year ended 31st March, 1937.

(For Summary of Relevant Totals from above-named Tables see Table XIIIb on page 56.)

Supply Authority.	Number of Consumers.	Capital Outlay. Per Head of Population.	Capital Outlay. Per Consumer.	Capital Outlay. Per £1 of Revenue. (a)	Revenue from Sale of Electricity. Per Unit sold (Overall including Bulk Supply).	Per Unit sold (Excluding Bulk and Traction).	Per Unit sold (Domestic Supply).	Per Head of Population. (g)	Per Retail Consumer. (k)	Per Kw. of Maximum Demand. (m)	Per Route-mile of Line. (m) (8)	Working-costs. Per Unit sold.	Working-costs. Per Kw. of Maximum Demand.	Capital Charges. Per Unit sold.	Capital Charges. Per Kw. of Maximum Demand.	Total Costs. Per Unit sold.	Total Costs. Per Kw. of Maximum Demand.	No.
Public Works Department.		£	£	£	d.	d.	d.	£	£	£	£	d.	£	d.	£	d.	£	
1. Arapuni-Mangahao-Waikaremoana	308	..	..	10·22	0·337	..	..	..	..	7·06	695	0·055	1·16	0·192	4·01	0·247	5·17	1
2. Coleridge-Waitaki	138	..	..	17·52	0·370	..	..	..	..	5·77	390	0·094	1·47	0·409	6·36	0·503	7·83	2
3. Southland Electric-power Supply [1, 9]	10,638	33·75	155·0	11·40	1·497	1·833	2·701	2·68	11·35	19·54	60	0·473	6·17	1·340	17·47	1·813	23·64	3
Averages, Public Works Department	..	..	..	12·59	0·359(b)	..	..	..	..	..	277	..	..	..	..	..	..	
Electric-power Boards.																		
1. Ashburton	4,226	17·59	78·60	6·84	1·738	1·738	1·857	2·61	11·49	25·20	53	0·833	12·07	0·854	12·38	1·687	24·45	1
2. Auckland	56,089	15·05	60·40	5·26	0·934	0·968	0·814	2·89	10·50	15·40	555	0·524	8·62	0·392	6·46	0·916	15·08	2
3. Banks Peninsula	1,039	26·88	97·73	8·04	1·617	1·617	1·646	3·46	12·16	23·44	61	1·278	18·53	0·813	11·78	2·091	30·31	3
4. Bay of Islands [2]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5. Bay of Plenty	1,735	19·00	113·70	4·73	1·080	1·080	1·102	4·26	24·12	27·74	155	0·591	15·17	0·319	8·19	0·910	23·36	5
6. Buller [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7. Cambridge	1,494	18·75	75·30	5·40	0·966	0·966	0·642	3·56	13·93	20·80	109	0·655	14·11	0·303	6·52	0·958	20·63	7
8. Central Hawke's Bay	1,815	14·22	86·20	6·46	1·278	1·278	*	2·21	13·34	25·50	104	0·687	13·71	0·497	9·92	1·184	23·63	8
9. Central Waikato	5,719	20·20	68·53	5·83	1·018	1·019	1·214	3·53	11·76	22·33	89	0·590	12·93	0·392	8·59	0·982	21·52	9
10. Dannevirke	2,885	18·30	76·82	7·14	1·546	1·546	1·679	2·59	10·76	33·33	92	0·766	16·51	0·681	14·67	1·447	31·18	10
11. Franklin	4,267	16·08	72·10	5·78	0·878	0·878	*	3·05	12·47	19·19	84	0·536	11·72	0·415	9·08	0·951	20·80	11
12. Golden Bay	417	18·45	67·20	6·16	1·564	1·564	1·148	3·06	10·92	23·00	73	0·725	10·64	0·519	7·63	1·244	18·27	12
13. Grey	3,930	20·06	75·30	6·43	1·125	1·125	2·020	3·18	11·70	19·36	205	0·339	5·84	0·640	11·01	0·979	16·85	13
14. Hawke's Bay	7,186	12·55	51·95	4·28	0·802	1·045	1·035	2·36	9·68	17·43	231	0·523	11·37	0·211	4·58	0·734	15·95	14
15. Horowhenua	4,839	13·83	49·60	4·80	1·047	1·047	0·962	2·96	10·34	19·11	151	0·703	12·83	0·283	5·17	0·986	18·00	15
16. Hutt Valley	12,823	8·13	29·80	3·38	1·093	1·093	1·122	2·44	8·80	19·00	376	0·719	12·50	0·240	4·18	0·959	16·68	16
17. Lake Wakatipu [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17
18. Malvern	698	20·08	102·20	8·91	2·639	2·639	2·704	2·34	11·46	35·22	43	1·805	24·10	1·325	17·68	3·130	41·78	18
19. Manawatu-Oroua	5,245	23·37	93·00	5·30	0·738	1·170	*	3·54	13·98	17·83	147	0·456	11·01	0·244	5·89	0·700	16·90	19
20. Marlborough	2,996	23·07	111·87	10·71	1·902	1·902	1·507	2·19	10·44	32·58	110	0·538	9·22	1·244	21·31	1·782	30·53	20
21. North Auckland [4]	523	..	..	..	2·075	2·075	2·130	..	..	..	..	1·666	..	0·274	..	1·940	..	21
22. North Canterbury	2,458	15·54	74·20	6·18	1·307	1·483	2·000	2·32	10·68	21·30	54	0·871	14·20	0·431	7·03	1·302	21·23	22
23. Opunake	1,063	19·35	102·78	8·38	1·880	1·880	1·394	2·32	12·26	26·23	82	0·989	13·80	0·860	12·00	1·849	25·80	23
24. Otago Central	1,037	33·50	115·75	10·47	1·155	1·155	1·082	3·30	11·05	20·10	64	0·580	10·07	0·686	11·93	1·266	22·00	24
25. Otago	4,338	17·21	71·20	6·65	1·883	1·883	3·306	2·59	10·70	26·44	86	0·888	12·45	1·013	14·22	1·901	26·67	25
26. Poverty Bay	5,408	12·88	60·70	5·30	1·409	1·409	1·272	2·51	11·45	29·15	159	0·758	15·68	0·518	10·71	1·276	26·39	26
27. Reefton [3]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27
28. South Canterbury	4,512	17·46	77·40	5·71	0·893	1·287	1·185	2·20	9·40	15·38	76	0·564	9·72	0·322	5·54	0·886	15·26	28
29. South Taranaki	3,531	10·97	62·12	5·48	1·311	1·352	*	2·04	11·00	22·25	135	0·710	12·04	0·506	8·59	1·216	20·63	29
30. Springs-Ellesmere	2,671	13·04	60·19	5·24	1·351	1·351	1·962	2·51	11·48	23·97	93	0·872	15·47	0·395	7·01	1·267	22·48	30
31. Taranaki	2,715	34·60	178·20	9·78	1·067	1·448	1·678	2·91	14·84	19·64	117	0·348	6·41	0·596	10·96	0·944	17·37	31
32. Tararua	1,907	21·32	90·80	6·64	1·653	1·653	*	3·30	13·65	31·72	98	0·850	16·29	0·680	13·03	1·530	29·32	32
33. Tauranga	1,641	15·45	90·10	5·37	1·103	1·103	0·757	3·00	16·78	..	58	0·673	..	0·417	..	1·090	..	33
34. Te Awamutu	2,101	20·92	93·34	6·09	1·136	1·136	1·412	3·45	15·32	23·29	98	0·672	13·76	0·344	7·05	1·016	20·81	34
35. Teviot	432	31·25	135·99	11·06	0·810	0·810	0·772	2·90	12·29	12·07	74	0·338	5·03	0·479	7·12	0·817	12·15	35
36. Thames Valley	8,461	24·40	9·52	6·39	1·037	1·089	*	3·70	14·28	24·60	147	0·578	13·70	0·444	10·51	1·022	24·21	36
37. Waimea	2,023	9·65	44·15	5·62	3·915	3·915	4·160	1·79	7·86	51·25	121	1·943	25·43	1·652	21·62	3·595	47·05	37
38. Wairarapa	5,383	18·00	65·53	6·44	1·211	1·487	1·151	2·90	10·18	25·18	101	0·624	12·97	0·504	10·48	1·128	23·45	38
39. Wairere	350	20·06	143·20	9·63	0·954	0·954	0·905	2·19	14·87	15·87	44	0·446	7·43	0·524	8·71	0·970	16·14	39
40. Wairoa	439	9·36	148·60	4·66	0·878	1·266	1·485	1·25	19·14	15·75	141	0·626	11·23	0·276	4·95	0·902	16·18	40
41. Waitaki	4,230	10·79	44·62	5·20	1·045	1·045	0·934	2·17	8·59	17·41	77	0·651	10·85	0·337	5·62	0·988	16·47	41
42. Waitemata	12,231	10·70	40·10	5·36	1·095	1·095	1·016	2·04	7·48	21·72	116	0·724	14·37	0·352	6·99	1·076	21·36	42
43. Waitomo	1,496	16·06	71·60	5·20	1·173	1·173	0·790	3·14	13·77	20·23	149	0·684	11·80	0·374	6·44	1·058	18·24	43
44. Wanganui-Rangitikei	10,829	10·11	48·90	4·85	1·133	1·166	0·978	2·11	9·80	21·70	132	0·623	11·92	0·519	9·93	1·142	21·85	44
45. Westland [5]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45
Averages, Power Boards	..	15·16	65·70	5·67	1·050(b)	1·127(d)	..	2·63(h)	10·88(l)	..	143(n)	..	..	..	..	..	..	
Other Local Authorities. *City Councils.*																		
1. Christchurch	30,942	8·31	26·45	3·36	0·832	0·832	0·754	2·45	7·55	12·71	700	0·565	8·63	0·167	2·54	0·732	11·17	1
2. Dunedin	28,472	18·87	57·95	6·67	0·882	0·974	0·912	2·70	7·84	13·54	422	0·274	4·20	0·402	6·17	0·676	10·37	2
3. Invercargill	6,182	6·31	22·45	2·63	2·164	2·321	3·860	2·47	8·19	24·40	651	1·379	15·55	0·204	2·30	1·583	17·85	3
4. Nelson	3,219	10·53	36·70	4·01	3·574	3·630	*	2·63	8·82	32·02	614	2·105	18·86	1·027	9·20	3·132	28·06	4
5. Palmerston North	6,188	11·70	42·00	4·27	1·058	1·058	0·745	2·76	9·83	19·08	791	0·574	10·35	0·258	4·65	0·832	15·00	5
6. Wellington	36,764	10·31	35·10	3·91	1·080	1·134	1·178	2·68	8·08	14·24	906	0·712	9·39	0·167	2·21	0·879	11·60	6
Averages, City Councils	..	11·67	38·25	4·44	0·995(b)	1·062(d)	..	2·62(h)	8·00(l)	..	640(n)	..	..	..	..	..	..	

(For notes see page 130.)

TABLE XIII.—AVERAGES DERIVED FROM TABLES IX, X, AND XI, FOR YEAR ENDED 31ST MARCH, 1937—*continued.*

(For Summary of Rélevant Totals from above-named Tables see Table XIIIB on page 56.)

Supply Authority.	Number of Consumers.	Capital Outlay.			Revenue from Sale of Electricity.							Working-costs.		Capital Charges.		Total Costs.		No.
		Per Head of Population.	Per Consumer.	Per £1 of Revenue. (*a*)	Per Unit sold (Overall including Bulk Supply).	Per Unit sold (Excluding Bulk and Traction).	Per Unit sold (Domestic Supply).	Per Head of Population. (*g*)	Per Retail Consumer. (*k*)	Per Kw. of Maximum Demand. (*m*)	Per Route-mile of Line. (*m*)(8)	Per Unit sold.	Per Kw. of Maximum Demand.	Per Unit sold.	Per Kw. of Maximum Demand.	Per Unit sold.	Per Kw. of Maximum Demand.	
OTHER LOCAL AUTHORITIES—*continued.*																		
Borough Councils.		£	£	£	d.	d.	d.	£	£	£	£	d.	£	d.	£	d.	£	
1. Bluff	531	5·29	20·26	2·41	2·290	2·290	4·125	2·35	8·42	16·44	406	1·876	13·46	0·324	2·33	2·200	15·79	1
2. Hamilton	4,866	3·97	13·14	1·53	1·430	1·430	1·536	2·61	8·60	20·19	697	0·817	11·54	0·147	2·08	0·964	13·62	2
3. Inglewood	441	6·96	20·52	2·09	1·632	1·632	1·938	3·60	9·82	27·42	542	1·103	18·54	0·355	5·98	1·458	24·52	3
4. Kaiapoi	500	6·06	21·83	3·36	1·942	1·942	1·992	1·98	6·51	23·93	217	1·345	16·57	0·355	4·38	1·700	20·95	4
5. Lyttelton	940	3·95	13·85	1·91	1·552	1·552	1·617	2·07	7·24	24·66	680	1·025	16·28	0·137	2·18	1·162	18·46	5
6. Napier	4,868	8·46	26·57	2·99	1·113	1·113	0·846	2·92	8·88	25·09	1,006	0·649	14·63	0·246	5·54	0·895	20·17	6
7. New Plymouth	6,672	16·92	53·30	4·94	0·982	1·027	1·130	3·50	10·38	17·56	211	0·459	8·20	0·261	4·65	0·720	12·85	7
8. Ohakune	510	4·85	18·44	2·62	2·360	2·360	2·320	1·87	7·04	35·20	189	1·087	16·20	0·600	8·94	1·687	25·14	8
9. Patea	423	7·31	43·20	3·85	1·797	1·797	1·867	1·92	11·23	29·32	264	1·092	17·80	0·339	5·54	1·431	23·34	9
10. Picton	400	13·10	45·87	5·52	5·220	5·220	5·308	2·38	8·31	39·12	302	4·555	34·15	1·935	14·50	6·490	48·65	10
11. Queenstown	274	15·38	50·60	7·18	2·717	2·717	*	2·24	7·04	24·10	275	0·698	6·19	1·162	10·32	1·860	16·51	11
12. Raetihi	432	5·13	53·45	5·05	1·123	1·785	2·005	1·09	9·42	18·29	163	0·520	8·48	0·365	5·94	0·885	14·42	12
13. Rangiora	723	4·15	12·82	1·65	2·025	2·025	2·328	2·54	7·79	27·60	402	1·609	21·94	0·186	2·54	1·795	24·48	13
14. Riccarton	1,571	4·37	14·73	1·82	1·035	1·035	1·122	2·45	8·07	17·53	705	0·857	14·51	0·077	1·31	0·934	15·82	14
15. Ross[6]	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16. Rotorua (Tourist Department)	2,351	6·99	33·96	3·31	2·000	2·000	1·632	2·18	10·24	26·10	349	1·211	15·77	0·581	7·58	1·792	23·35	16
17. Stratford	1,122	7·53	25·18	2·01	1·497	1·497	1·266	3·75	12·53	22·70	828	0·767	11·62	0·310	4·70	1·077	16·32	17
18. Sumner	1,087	4·84	14·45	2·54	1·090	1·090	1·380	1·91	5·70	21·28	619	0·868	16·95	0·114	2·23	0·982	19·18	18
19. Taihape	577	4·85	18·32	1·95	2·180	2·180	1·790	2·48	9·40	23·96	542	0·920	10·12	0·533	5·86	1·453	15·98	19
20. Taumarunui	1,082	11·68	60·50	5·62	2·337	2·325	2·460	2·08	10·30	29·84	647	0·759	9·69	0·672	8·58	1·431	18·27	20
21. Tauranga	1,219	41·60	136·20	7·19	0·526	0·832	*	3·55	10·81	8·63	361	0·182	3·00	0·259	4·28	0·441	7·28	21
22. Te Aroha	754	7·22	22·70	2·16	1·610	1·610	1·226	3·35	10·52	27·44	418	1·176	20·05	0·166	2·83	1·342	22·88	22
23. Te Puke	328	12·30	38·28	3·12	1·365	1·365	1·230	4·17	12·28	25·50	336	0·667	12·46	0·234	4·38	0·901	16·84	23
24. Thames	1,198	6·48	25·42	2·83	1·682	1·682	1·445	2·31	9·00	38·36	490	1·221	27·85	0·098	2·23	1·319	31·08	24
25. Timaru	4,754	6·03	22·18	2·71	1·327	1·327	1·105	2·23	8·18	19·05	659	0·996	14·28	0·180	2·58	1·176	16·86	25
26. Wairoa	730	4·52	15·59	1·30	1·015	1·015	0·821	3·51	12·00	16·08	583	0·798	12·65	0·119	1·88	0·917	14·53	26
27. Waitara	564	3·80	13·32	1·72	1·990	1·990	1·820	2·32	7·76	26·87	365	1·188	16·03	0·565	7·63	1·753	23·66	27
28. Westport	1,091	7·72	31·90	4·25	2·557	2·557	2·731	1·84	7·50	25·71	409	1·303	13·10	0·768	7·72	2·071	20·82	28
29. Whakatane	547	20·05	64·15	5·01	1·313	1·313	1·110	4·15	12·80	21·20	97	0·398	6·43	0·449	7·25	0·847	13·68	29
30. Whangarei	2,290	9·71	33·50	4·06	1·672	1·719	*	2·73	7·87	22·32	484	1·233	16·45	0·307	4·09	1·540	20·54	30
Averages, Borough Councils	..	9·12	32·80	3·46	1·245(*b*)	1·337(*d*)	..	2·64(*h*)	9·13(*l*)	..	383(*n*)	..	..	..	..	..	..	
Town Boards.																		
1. Havelock North[7]	318	21·00	83·43	7·75	1·555	1·555	1·605	2·72	10·77	28·10	202	0·918	16·56	0·632	11·40	1·550	27·96	1
2. Kamo	127	4·21	19·88	1·49	2·109	2·109	*	2·84	13·35	13·24	283	1·308	8·22	0·326	2·04	1·634	10·26	2
3. Kaponga	395	14·10	42·85	3·15	1·860	1·860	2·667	4·95	13·60	24·40	105	1·737	22·80	0·432	5·67	2·169	28·47	3
4. Mangaweka	124	13·32	46·43	5·24	1·636	1·636	1·687	3·07	8·86	30·50	110	1·547	28·86	0·168	3·14	1·715	32·00	4
5. Manunui	166	4·09	19·07	3·33	7·170	7·170	7·560	1·23	5·72	38·00	190	4·360	23·13	1·833	9·72	6·193	32·85	5
Averages, Town Boards	..	12·85	48·60	4·38	1·873(*b*)	1·873(*d*)	..	3·13(*h*)	11·10(*l*)	..	141(*n*)	..	..	..	..	..	..	
County Councils.																		
1. Heathcote	1,317	4·20	19·11	2·23	1·185	1·185	1·169	1·89	8·56	14·94	322	0·950	11·98	0·202	2·56	1·152	14·54	1
2. Kaikoura	169	16·96	63·20	5·90	9·840	9·840	10·500	3·05	10·73	40·32	363	9·060	37·13	3·200	13·10	12·260	50·23	2
3. Murchison	188	28·27	81·20	6·58	3·400	3·400	3·840	4·41	12·35	34·65	145	1·936	19·75	1·204	12·29	3·140	32·04	3
4. Uawa	101	15·69	62·13	5·59	15·120	15·120	15·400	3·59	11·12	56·15	374	11·540	42·85	7·450	27·65	18·990	70·50	4
5. Waimairi	3,633	4·53	17·51	2·99	0·809	0·809	0·780	1·52	5·84	13·35	145	0·561	9·25	0·260	4·30	0·821	13·55	5
Averages, County Councils	..	5·60	22·38	3·20	1·028(*b*)	1·028(*d*)	..	1·78(*h*)	6·98(*l*)	..	183(*n*)	..	..	..	..	..	..	
Averages, other Local Authorities	..	10·72	36·33	4·35	..	1·133(*d*)	..	2·59(*h*)	8·28(*l*)	..	470(*n*)	..	..	..	..	..	..	

(For notes see page 130.)

TABLE XIII.—AVERAGES DERIVED FROM TABLES IX, X, AND XI, FOR YEAR ENDED 31ST MARCH, 1937—*continued.*

(For Summary of Relevant Totals from above-named Tables see Table XIIIB below.)

Supply Authority.	Number of Consumers.	Capital Outlay.			Revenue from Sale of Electricity.							Working-costs.		Capital Charges.		Total Costs.		No.
		Per Head of Population.	Per Consumer.	Per £1 of Revenue. (*a*)	Per Unit sold. (Overall including Bulk Supply).	Per Unit sold (Excluding Bulk and Traction).	Per Unit sold (Domestic Supply).	Per Head of Population. (*g*)	Per Retail Consumer. (*k*)	Per Kw. of Maximum Demand. (*m*)	Per Route-mile of Line. (*m*) [6]	Per Unit sold.	Per Kw. of Maximum Demand.	Per Unit sold.	Per Kw. of Maximum Demand.	Per Unit sold.	Per Kw. of Maximum Demand.	
COMPANIES.		£	£	£	d.	d.	d.	£	£	£	£	d.	£	d.	£	d.	£	
1. Alderton Utility Co.	71	8·68	76·40	5·06	1·115	1·115	0·994	1·71	15·10	11·91	89	0·532	5·68	0·438	4·68	0·970	10·36	1
2. Kanieri Electric, Ltd.	770	30·30	105·95	6·67	0·724	1·877(*e*)	1·807	4·63	9·53	10·73	422	0·385	5·70	0·243	3·63	0·628	9·33	2
3. Reefton Electric Light and Power Co., Ltd.	341	4·63	20·40	2·00	5·925	5·925	*	2·38	10·20	29·00	497	3·350	18·40	..	..	3·350	18·40	3
4. Rawene Motors, Ltd.	52	3·85	22·24	2·00	8·20	8·20	11·48	2·28	11·12	44·50	578	7·32	39·70	1·91	10·40	9·23	50·10	4
5. Wilson's (N.Z.) Portland Cement, Ltd.	182	10·12	35·05	6·45	0·349	2·210(*f*)	2·850	3·54	7·56	6·42	314	0·129	2·37	..	..	0·129	2·37	5
6. Westland Power, Ltd.	195	15·82	446·00	10·57	0·771	1·073(*e*)	1·000	1·52	21·32	9·91	123	0·716	9·21	0·418	5·37	1·134	14·58	6
Averages, Companies	..	25·15	173·50	7·04	0·570(*b*)	1·797(*d*)	..	3·02(*h*)	11·17(*l*)	..	247(*n*)	..	..	..	..	..	..	
Averages, all Supply Authorities, 1937		23·42	92·20	6·81	1·071(*c*)	1·107(*d*)	..	2·69(*h*)	9·93(*l*)	..	215(*n*)	..	..	..	..	..	..	
,, 1936		22·70	..	7·02	**1·127**	1·175	..	2·56	9·82	..	211	..	..	..	..	..	..	
,, 1935		22·60	..	7·32	**1·173**	1·22	..	2·48	9·80	..	206	..	..	..	..	..	..	
,, 1934		21·27	..	6·87	**1·208**	1·26	..	2·43	9·60	..	210	..	..	..	..	..	..	
,, 1933		22·10	..	6·94	**1·279**	1·34	..	2·54	10·50	..	218	..	..	..	..	..	..	

Average Revenue per Unit (Kw.-hr.) sold for all Purposes for Year ended 31st March, 1937 : 1·071d.

NOTES TO TABLE XIII.—(*a*) Capital outlay divided by revenue from retail plus bulk sales. (*b*) Derived from items 11 and 3, Table XIIIB. (*c*) Total revenue from retail sales (£3,826,779) divided by total units sold retail (857,830,375). (*d*) Derived from items 12 and 5, Table XIIIB. (*e*) Excludes mining supplies (see Table XIIIA). (*f*) Excludes supply for cement-manufacture (see Table XIIIA). (*g*) Gross revenue, excluding bulk sales and rates. (*h*) Derived from items 14 and 1, Table XIIIB. (*k*) Revenue from retail sales less revenue from traction supply, &c. (*l*) Derived from items 12 and 2, Table XIIIB. (*m*) Revenue from retail plus bulk sales. (*n*) Derived from items 10 and 6, Table XIIIB. [1] Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. [2] New electric-power district constituted on 3rd March, 1937, but Board not yet functioning as a supply authority. [3] Not actively functioning. [4] Commenced supplying power on 19th December, 1936. [5] License delegated to Westland Power, Ltd. [6] No returns received. [7] Taken over by Hawke's Bay Power Board on 1st April, 1937. [8] To nearest pound. [9] Figures for Southland are for full year's operation. * Figures for domestic units and revenue not given separately.

TABLE XIIIA.

Traction, Mining, &c.—Units sold and Revenue obtained for Year ended 31st March, 1937.

Supply Authority.	Type of Load.	Units sold.	Revenue.
PUBLIC WORKS DEPARTMENT.		Kw.-hrs.	£
Coleridge-Waitaki	Traction—N.Z.R., Christchurch	2,223,960	4,667
	Christchurch Tramways	8,097,070	15,182
Totals	..	10,321,030	19,849
POWER BOARDS.			
Auckland	Traction	19,391,450	54,563
Wanganui-Rangitikei	Traction	1,031,680	2,615
Totals	..	20,423,130	57,178
CITIES AND BOROUGHS.			
Dunedin	Traction	4,723,088	11,257
Invercargill	Traction	607,532	2,025
New Plymouth	Traction	801,255	1,800
Wellington	Traction	10,475,321	32,815
Totals	..	16,607,176	47,897
COMPANIES.			
Kanieri Electric, Ltd.	Gold-mining ..	3,119,800	4,886
Westland Power, Ltd.	Gold-mining ..	1,630,682	4,068
Wilson's (N.Z.) Portland Cement, Ltd.	Cement-manufacture	6,406,303	5,634
Totals	..	11,156,785	14,588
Totals for above Supply Authorities	..	58,508,121	139,512

TABLE XIIIB.

Summary of Totals from Tables IX, X, and XI.

Item.	——	Public Works Department. †	Power Boards.	Other Local Authorities. City Councils.	Other Local Authorities. Borough Councils.	Other Local Authorities. Town Boards.	Other Local Authorities. County Councils.	Other Local Authorities. Total.	Companies.	Totals, all Supply Authorities. ‡
1.	Population	No. 48,875	No. 855,369	No. 366,405	No. 153,985	No. 4,270	No. 21,630	No. 546,290	No. 11,117	No. 1,461,651
2.	Number of consumers ..	11,084	197,182	111,767	42,845	1,130	5,408	161,150	1,611	371,027
3.	Total units sold (bulk plus retail) excluding intersales within group	803,258,162	521,934,276	232,590,860	77,925,646	1,606,873	8,818,350	..	16,732,720	..
4.	Units sold retail	59,924,316	477,315,982	217,848,501	71,054,846	1,606,873	8,813,798	299,324,018	13,563,470	857,830,375
5.	Units sold retail, less units supplied for traction, &c. (see Table XIIIA)	49,603,286	456,892,852	202,042,560	70,253,611	1,606,873	8,813,798	282,716,842	2,406,685	799,322,254
6.	Route-miles of lines	4,338	15,961	1,506	1,061	89	206	2,862	161	23,322
7.	Capital outlay	£ 15,125,420	£ 12,999,177	£ 4,275,232	£ 1,404,541	£ 54,908	£ 121,015	£ 5,855,696	£ 279,561	£ 34,253,508
8.	Revenue (retail sales) ..	142,321	2,204,209	939,620	393,085	12,539	37,754	1,382,998	32,594	3,826,779
9.	Revenue (bulk sales)	1,058,815	80,183	24,717	12,627	..	33	37,377	7,120	1,197,222
10.	Revenue (retail plus bulk sales)	1,201,136	2,284,392	964,337	405,712	12,539	37,787	1,345,621	39,714	5,024,001
11.	Revenue from retail plus bulk sales, excluding intersales within group	1,201,136	2,284,336	964,337	403,945	12,539	37,787	..	39,714	..
12.	Revenue from retail sales, less revenue from traction, supply, &c. (see Table XIIIA)	122,472	2,147,031	893,523	391,285	12,539	37,754	1,335,101	18,006	3,687,267
13.	Gross revenue (excluding rates)	1,216,468	2,327,959	983,241	418,341	13,360	38,447	1,453,389	40,703	5,124,220
14.	Gross revenue, less revenue from bulk sales	157,653	2,247,776	958,524	405,714	13,360	38,414	1,416,012	33,583	3,926,998
15.	Working-costs	230,145	1,292,340	543,408	236,365	9,702	27,611	817,086	22,344	2,386,988
16.	Capital charges	850,290	904,020	241,107	87,147	3,255	10,738	342,247	9,146	2,167,102
17.	Total costs	1,080,435	2,196,360	784,515	323,512	12,957	38,349	1,159,333	31,490	4,554,090

† Does not include returns from Southland (1st. Apr. to 12th. Oct., 1936. See Tables X and XI.) ‡ Includes returns from Southland (1st. Apr. to 12th. Oct., 1936.)

TABLE XIV.—RETURN OF ELECTRIC RANGES, WATER-HEATERS, AND MILKING-MACHINES CONNECTED TO ELECTRIC-SUPPLY SYSTEMS AS AT 31ST MARCH, 1937.

Supply Authority.	Number of Consumers.			Ranges.					Water-heaters.			Milking-machines.		
	Domestic.	Commercial.	Total.	Under 5 Kilowatts.	5 Kilowatts and over.	Total Number.	Total Kw.	Percentage of Number of Domestic Consumers.	Number.	Total Kilowatts.	Percentage of Total Number of Consumers.	Number.	Horse-power.	Not yet electrified.
PUBLIC WORKS DEPARTMENT.	No.	No.	No.	No.	No.	No.		Per Cent.			Per Cent.			No.
1. Arapuni-Mangahao-Waikaremoana ..	298	10	308	17	179	196	1,288	65·80	206	237	66·90	..	..	..
2. Coleridge-Waitaki	106	32	138	28	68	96	515	90·60	111	144	80·40	2	6	..
3. Southland Electric-power Supply (1) ..	9,242	1,396	10,638	17	1,384	1,401	9,723	15·16	390	468	3·70	1,126	2,077	..
Totals, Public Works Department ..	9,646	1,438	11,084	62	1,631	1,693	11,526	17·55	707	849	6·38	1,128	2,083	..
ELECTRIC-POWER BOARDS.														
1. Ashburton	3,719	507	4,226	243	814	1,057	5,956	28·42	568	1,084	13·44	89	126	15
2. Auckland	45,528	10,561	56,089	..	8,472	8,472	59,304	18·60	13,811	7,596	24·62	408	816	..
3. Banks Peninsula	975	64	1,039	77	171	248	1,444	25·44	222	324	21·36	206	140	
4. Bay of Islands (2)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5. Bay of Plenty	1,484	251	1,735	64	514	578	3,451	38·93	1,103	828	63·60	614	873	..
6. Buller (3)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7. Cambridge	1,263	231	1,494	21	196	217	1,220	17·18	564	510	37·75	349	448	9
8. Central Hawke's Bay	1,460	355	1,815	8	264	272	1,803	18·63	336	337	18·50	108	191	..
9. Central Waikato	5,168	551	5,719	104	470	574	3,411	11·10	1,791	1,134	31·32	1,607	2,613	..
10. Dannevirke	2,384	501	2,885	8	249	257	1,688	10·78	605	428	20·97	432	555	..
11. Franklin	3,863	404	4,267	220	796	1,016	5,166	..	2,003	1,223	46·94	1,593	1,949	..
12. Golden Bay	343	74	417	24	27	51	209	14·87	71	53	17·03	93	90	7
13. Grey	3,368	562	3,930	32	356	388	2,572	11·52	268	293	6·82	28	35	..
14. Hawke's Bay	6,371	815	7,186	92	908	1,000	8,575	15·70	1,105	723	15·40	290	401	..
15. Horowhenua	3,653	1,186	4,839	..	889	889	5,554	24·35	1,290	815	26·66	1,068	1,038	..
16. Hutt Valley	12,071	752	12,823	130	2,242	2,372	12,721	19·66	2,012	2,121	15·70	82	119	..
17. Lake Wakatipu (3)	..	..	..	..	..	..	..	..	..	..	..	..		
18. Malvern	618	80	698	20	134	154	952	24·90	73	124	10·45	6	10	..
19. Manawatu-Oroua	5,072	173	5,245	..	970	970	5,575	19·13	1,609	1,100	30·70	1,289	2,035	..
20. Marlborough	2,552	444	2,996	162	396	558	3,245	21·86	309	227	10·31	106	175	..
21. North Auckland (4)	403	120	523	..	37	37	222	9·18	60	36	11·47	58	58	..
22. North Canterbury	2,235	223	2,458	120	292	412	2,396	18·43	276	457	11·23	92	122	..
23. Opunake	923	140	1,063	..	111	111	560	12·02	159	103	14·96	292	461	..
24. Otago Central	807	230	1,037	8	153	161	969	19·95	173	179	16·68	82	63	..
25. Otago	4,302	36	4,338	17	363	380	2,431	8·84	333	335	7·68	114	189	..
26. Poverty Bay	4,343	1,065	5,408	..	1,300	1,300	8,449	29·93	930	638	17·19	176	171	..
27. Reefton (3)	..	..	..		..	..	..	..	..	..	..	..	..	..
28. South Canterbury	3,919	593	4,512	99	653	752	5,651	19·20	517	771	11·46	181	244	15
29. South Taranaki	3,085	446	3,531	6	340	346	2,219	11·22	702	552	19·88	618	875	100
30. Springs-Ellesmere	2,426	245	2,671	92	245	337	1,909	13·89	174	188	6·51	144	217	..
31. Taranaki	1,258	1,457	2,715	10	370	380	2,690	30·20	986	618	36·33	1,060	1,887	..
32. Tararua	1,729	178	1,907	76	227	303	1,779	17·53	455	295	23·85	390	521	..
33. Tauranga	1,529	112	1,641	60	358	418	2,667	27·33	886	573	54·00	608	910	47
34. Te Awamutu	1,760	341	2,101	57	285	342	1,967	19·43	730	542	34·75	709	1,075	100
35. Teviot	354	78	432	16	158	174	1,028	49·15	135	113	31·26	..	..	..
36. Thames Valley	7,612	849	8,461	60	1,273	1,333	9,243	17·52	3,272	2,323	38·70	2,827	4,917	..
37. Waimea	1,758	265	2,023	45	25	70	285	3·98	48	27	2·37	40	21	30
38. Wairarapa	4,472	911	5,383	61	583	644	4,414	14·40	1,005	951	18·67	514	841	10
39. Wairere	294	56	350	4	116	120	747	40·83	190	105	54·30	..	..	..

(For notes, see page 133.)

Table XIV.—Return of Electric Ranges, Water-heaters, and Milking-machines connected to Electric-supply Systems as at 31st March, 1937—*continued.*

Supply Authority.	Number of Consumers.			Ranges.					Water-heaters.			Milking-machines.		
	Domestic.	Commercial.	Total.	Under 5 Kilowatts.	5 Kilowatts and over.	Total Number.	Total Kw.	Percentage of Number of Domestic Consumers.	Number.	Total Kilowatts.	Percentage of Total Number of Consumers.	Number.	Horse-power.	Not yet electrified.
Electric-power Boards—*continued.*	No.	No.	No.	No.	No.	No.		Per Cent.			Per Cent.			No.
40. Wairoa	367	72	439	31	79	110	583	30·00	139	90	31·65	154	124	..
41. Waitaki	3,510	720	4,230	118	765	883	5,809	25·16	859	1,088	20·30	41	55	..
42. Waitemata	11,169	1,062	12,231	58	2,605	2,663	13,812	23·84	2,414	1,484	19·74	695	577	..
43. Waitomo	1,143	353	1,496	45	303	348	2,211	30·45	467	301	31·20	234	348	..
44. Wanganui-Rangitikei	8,696	2,133	10,829	..	1,254	1,254	7,612	14·42	1,711	1,161	15·80	763	1,007	..
45. Westland [5]	..	..	..	..	..	..	..	..		..	..	..	..	..
Totals, Power Boards	167,940	29,242	197,182	2,188	29,763	31,951	202,499	19·02	44,361	31,850	22·50	18,160	26,297	..
Other Local Authorities.														
City Councils.														
1. Christchurch	26,360	4,582	30,942	613	7,381	7,994	52,275	30·32	6,613	6,663	21·38	18	33	..
2. Dunedin	21,686	6,786	28,472	232	1,579	1,811	10,590	8·35	2,839	3,027	9·97	70	220	..
3. Invercargill	5,206	976	6,182	10	93	103	604	1·98	1	1	..	..	..	..
4. Nelson	2,682[9]	537[9]	3,219	..	..	..	..	..	..	..	..	..	..	..
5. Palmerston North	5,028	1,160	6,188	96	712	808	4,238	16·07	1,535	971	24·80	3	6	..
6. Wellington	27,361	9,403	36,764	256	1,837	2,093	13,351	7·66	3,942	5,279	10·73	..	..	..
Totals, City Councils	88,323	23,444	111,767	1,207	11,602	12,809	81,058	14·51	14,930	15,941	13·36	91	259	..
Borough Councils.														
1. Bluff	433	98	531	5	3	8	25	1·85	2	2	0·38	..	..	..
2. Hamilton	3,570	1,296	4,866	19	144	163	995	4·57	366	297	7·52	..	..	..
3. Inglewood	369	72	441	3	30	33	210	8·94	27	25	6·12	3	4	..
4. Kaiapoi	431	69	500	49	28	77	348	17·86	7	7	1·40	..	..	..
5. Lyttelton	807	133	940	7	97	104	670	12·90	55	54	5·85	1	3	..
6. Napier	3,646	1,222	4,868	34	226	260	1,700	7·13	696	427	14·30	..	..	..
7. New Plymouth	5,654	1,018	6,672	208	1,260	1,468	6,423	26·00	1,378	860	20·65	472	833	..
8. Ohakune	397	113	510	5	13	18	95	4·53	21	17	4·12	7	7	2
9. Patea	348[9]	75[9]	423	29	30	59	254	..	40	26	9·45	20	19	2
10. Picton	330	70	400	1	1	2	11	0·61	..	..	..	..	..	..
11. Queenstown	207	67	274	3	12	15	70	7·25	1	1	0·37	..	..	..
12. Raetihi	342	90	432	1	14	15	94	4·39	41	30	9·49	41	43	..
13. Rangiora	628	95	723	4	61	65	418	10·35	58	73	8·02	..	..	..
14. Riccarton	1,435	136	1,571	43	393	436	2,734	30·30	446	404	28·40	..	..	..
15. Ross [6]	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16. Rotorua (Tourist Department)	1,744	607	2,351	115	167	282	1,395	16·17	336	296	14·30	92	123	..
17. Stratford	864	258	1,122	8	198	206	1,058	23·85	196	179	17·47	3	4	..
18. Sumner	1,087	..	1,087	51	133	184	1,096	16·93	115	107	10·57	1	3	..
19. Taihape	424	153	577	1	11	12	64	2·83	16	16	2·77	1	5	..
20. Taumarunui	716	366	1,082	8	33	41	210	5·76	43	30	3·97	30	26	..
21. Tauranga	970	249	1,219	102	408	510	3,060[9]	52·60	549	224	45·00	..	..	..
22. Te Aroha	525	229	754	4	60	64	448	12·19	82	54	10·88	7	15	..
23. Te Puke	213	115	328	13	54	67	262	31·45	56	32	17·07	6	9	..
24. Thames	920	278	1,198	6	22	28	159	3·09	44	29	3·67	..	..	..
25. Timaru	3,768	986	4,754	..	578	578	3,772	15·34	500	583	10·52	2	2	..

(For notes, see page 133.)

TABLE XIV.—RETURN OF ELECTRIC RANGES, WATER-HEATERS, AND MILKING-MACHINES CONNECTED TO ELECTRIC-SUPPLY SYSTEMS AS AT 31ST MARCH, 1937—*continued.*

Supply Authority.	Number of Consumers.			Ranges.					Water-heaters.			Milking-machines.		
	Domestic.	Commercial.	Total.	Under 5 Kilowatts.	5 Kilowatts and over.	Total Number.	Total Kw.	Percentage of Number of Domestic Consumers.	Number.	Total Kilowatts.	Percentage of Total Number of Consumers.	Number.	Horse-power.	Not yet electrified.
Borough Councils—continued.	No.	No.	No.	No.	No.	No.		Per Cent.			Per Cent.			No.
26. Wairoa	516	214	730	11	156	167	1,141	32·40	194	113	26·60	..	..	..
27. Waitara	448	116	564	6	44	50	302	11·16	40	30	7·09	1	2	..
28. Westport	830	261	1,091	1	14	15	102	1·81	28	23	2·57	1	2	..
29. Whakatane	396	151	547	16	99	115	726	29·05	123	75	22·50	8	8	..
30. Whangarei	1,752	538	2,290	35	191	226	1,385	12·90	155	91	6·77	13	24	..
Totals, Borough Councils	33,770	9,075	42,845	788	4,480	5,268	29,227	15·60	5,615	4,105	13·10	709	1,132	..
Town Boards.														
1. Havelock North (7)	290	28	318	66	8	74	296(9)	25·51	25	15	7·86	..	..	..
2. Kamo	119(9)	8(9)	127	..	..	..	..	..	..	..	..	1	2	..
3. Kaponga	329	66	395	..	24	24	160	7·30	60	39	15·18	60	39	30
4. Mangaweka	94	30	124	1	20	21	115	22·35	15	7	12·10	11	9	..
5. Manunui	146	20	166	..	..	..	..	..	..	..	..	2	1	..
Totals, Town Boards	978	152	1,130	67	52	119	571	12·17	100	61	8·85	74	51	..
County Councils.														
1. Heathcote	1,313	4	1,317	99	374	473	2,838(9)	36·00	346	320	26·27	6	6	..
2. Kaikoura	122	47	169	..	..	..	..	..	..	..	..	..	..	..
3. Murchison	167	21	188	6	5	11	41	6·59	13	9	6·92	22	25	3
4. Uawa	87	14	101	..	..	..	..	..	..	..	..	..	..	..
5. Waimairi	3,432	201	3,633	68	865	933	5,373	27·20	862	711	23·72	26	29	3
Totals, County Councils	5,121	287	5,408	173	1,244	1,417	8,252	27·66	1,221	1,040	22·58	54	60	..
Totals, other Local Authorities	128,192	32,958	161,150	2,235	17,378	19,613	119,108	15·30	21,866	21,147	13·57	928	1,502	..
COMPANIES.														
1. Alderton Utility Co.	63	8	71	10	23	33	175	52·40	30	174	42·25	8	4	..
2. Kanieri Electric, Ltd.	540	230	770	17	67	84	520	15·55	39	39	5·06	..	..	..
3. Reefton Electric Light and Power Co., Ltd.	251	90	341	..	..	..	..	..	2	3	0·59	1	2	..
4. Rawene Motors, Ltd.(8)	31	21	52	..	..	..	..	..	..	..	..	..	..	..
5. Wilson's (N.Z.) Portland Cement, Ltd.	143	39	182	3	2	5	21	3·50	6	4	3·30	24	42	..
6. Westland Power, Ltd.	155	40	195	5	18	23	117	14·84	38	56	19·50	26	52	..
Totals, Companies	1,183	428	1,611	35	110	145	833	12·26	115	276	7·14	59	100	..
Totals, all Supply Authorities, 1937	307,007	64,020	371,027	4,520	48,882	53,402	333,966	17·40	67,049	54,122	18·07	20,275	29,982	..
,, 1936	..	..	355,973	3,854	40,983	44,837	282,515	..	58,864	47,201	16·53	18,458	28,462	..
,, 1935	..	..	342,334	3,889	35,841	39,730	247,607	..	53,635	42,860	15·66	17,200	27,458	..
,, 1934	..	..	334,593	3,378	32,713	36,091	225,240	..	50,272	39,559	15·02	16,992	26,428	..
,, 1933	..	..	322,997	2,198	31,525	33,723	..	..	47,772	38,832	14·80	15,913	25,953	..

Ratio of Domestic Consumers to Total Consumers = 82·8 per cent.

(1) Formerly the Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936. (2) New electric-power district constituted 3rd March, 1937, but Board not yet actively functioning as a supply authority.
(3) Not actively functioning. (4) Commenced supplying power on 19th December, 1936. (5) License delegated to Westland Power, Ltd. (6) No returns received. (7) Taken over by Hawke's Bay Power Board on 1st April, 1937.
(8) Formerly carried on under the name of P. Spender. (9) Estimated figures.

Table XV.—Abridged Schedule of Tariffs for Electrical Energy, 1936-37.

(Note.—In the following table, on account of space limitations, only the more representative selling-rates are given in each case. For further information reference should be made to the Rate-book of the Electric-power Boards and Supply Authorities Association, or to the tariff schedules of individual supply authorities. Wherever possible a general domestic tariff covering electric cooking is quoted. Abbreviations: T.S. = Time switch; C.O.S. = Change-over switch used with range, motors, &c.)

Supply Authority.	Domestic.	Commercial.
Public Works Department.		
1. Arapuni-Mangahao-Waikaremoana 2. Coleridge-Waitaki ..	Bulk supply only: £2 10s. per kv.a. of maximum demand per quarter for first 200 kv.a.; £2 per kv.a. of maximum demand per quarter for next 4,800 kv.a.; £1 15s. per kv.a. of maximum demand per quarter for next 15,000 kv.a.; £1 6s. 3d. per kv.a. of maximum demand per quarter for all over 20,000 kv.a.	
3. Southland Electric-power Supply(*)	*Lighting, heating, and power*— Units per month: 21 @ 6½d. 21 @ 4d. 42 @ 2½d. Excess @ 1½d. *Cooking:* 1d. per unit. *Water-heating:* ⅝d. per unit up to 2,000 w. on C.O.S. Min. ch.: Lighting, £4 p.a. Range up to 5 kw.: £6 p.a. Range over 5 kw.: £8 p.a.	*Lighting, heating, cooking, and small power:* As for Domestic. *Power rate*:— £3 per kv.a. of M.D. per quarter for first 100 kv.a. £2 10s. per kv.a. of M.D. per quarter for next 100 kv.a. 10s. per kv.a. of M.D. per quarter for excess. Plus ½d. per unit or more, depending on conditions. Min. ch.: Milking-motors: £10 p.a. Occasional motors, ½ to 2 h.p.: £2 8s. p.a. Industrial motors: 5s. per h.p. per month.
Electric-power Boards.		
1. Ashburton	*Lighting, heating, and cooking*, with range over 3 kw. or heat-storage range:— Units per month: As per schedule @ 8d. Next 84 @ 2d. Excess @ 1¾d. Schedule:— Up to 150 w. .. .. .. 7 151 to 500 w. .. .. .. 10 Over 500 w. .. .. .. 13 (Lighting Connected Load. / Units @ 8d.) Min. ch. per month: Ashburton, 4s. Country districts, 6s. *Water-heating*:— Metered: ⅓d. per unit. Flat rates: 750 w., 7s. 6d. per month. 1,000 w., 12s. 6d. per month. 2,000 w., 25s. per month. On C.O.S. or T.S. (off up to 4 hrs. per day). Above rates are net.	*Lighting*:— Units per month: 150 @ 6d. 100 @ 5d. Excess at 4d. Min. ch.: As for Domestic. *Heating*:— Units per month: 60 @ 2d. 60 @ 1½d. Excess at 1d. Min. ch.: 5s. per month only if power used. *General tariff, including cooking and small power for Hotels, &c.*— Units per month: 100 @ 6d. 100 @ 2d. 100 @ 1½d. Excess at 1d. Min. ch.: £8 10s. per month. *Water-heating:* As for Domestic. *Power*:— Units per month: 80 @ 3d. 120 @ 2d. Excess at 1½d. Min. ch: 5s. per month per h.p. of connected load. Reduced rates for guarantees and for off-peak supply. Above rates are net.
2. Auckland	*General tariff*:— Units per month: 36 @ 3d. Excess @ ¾d. Min. ch.: 1s. per month. *Water-heating:* Flat rate: £12 12s. per 1,000 w. p.a., or *pro rata* according to size of element. Min. ch.: £4 p.a. Metered: ⅜d. per unit, with thermostat control; min. size, 10 gal.; min.-max. wattage, 400–3,000. Discount, 10 per cent. (14 days).	*Lighting*:— Units per month: M.D. × 14 @ 3d. Excess @ 1½d. *Radiators:* 3d. per unit (1st May to 31st October). *Cooking:* 1d. per unit (7 a.m. to 10 p.m.). ½d. per unit (10 p.m. to 7 a.m.). On 2-rate meter and T.S. *Power:* Unit rate:— Units per month: 100 @ 2½d. 3,500 @ 1d. Excess @ ¾d. *Power:* Demand rate: 8s. per kv.a. of M.D. per month, plus 9/16d. per unit. Min. ch.: 3s. per kv.a. of M.D. per month for over 10 kv.a. demand. Discount: 10 per cent. (14 days).

(*) Formerly Southland Electric-power Board. Taken over by the Public Works Department on 13th October, 1936.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
3. Banks Peninsula	*Lighting, heating, cooking, and small power :—* Units per quarter : As per schedule @ 9d. Excess @ 1½d. The above rate holds good provided an electric range is in use, otherwise an intermediate block of 450 units per quarter is charged for at 2d. per unit. Schedule :— Connected Lighting Load. — Units per Quarter @ 9d. Up to 200 w. .. .. .. 27 201 to 500 w. .. .. .. 33 501 to 600 w. .. .. .. 40 601 to 800 w. .. .. .. 50 Over 800 w. .. .. .. 60 Min. ch. per quarter per kw. of connected load :— Lighting : 15s. (Akaroa) ; 22s. 6d. (Counties). Heating : 10s. 6d. Cooking : 6s. Power : 12s. 6d. per h.p. per quarter (min. 6s. 3d.). *Water-heating :—* (*a*) 9.30 p.m. to 5.30 a.m. : $\frac{3}{10}$d. per unit on T.S. (*b*) Off peak (18 hrs. service) : ⅜d. per unit on T.S. and C.O.S. or thermostat. Min. ch. : (*a*) 7s. 6d. ; (*b*) 10s. 6d. per kw. per quarter. Discount : 7½ per cent. (14 days).	*Lighting :* 7d. per unit. Min. ch. : As for Domestic. *Heating :—* Units per quarter : 450 @ 2d. Excess @ 1½d. Min. ch. : 10s. 6d. per kw. per quarter (min. 15s. per quarter). *General purpose motors* (off from 5 p.m. to 6.30 p.m., May–September) :— Units per quarter : 240 @ 3d. 360 @ 2d. Excess @ 1½d. Min. ch. : £2 10s. per h.p. per annum. If on unrestricted service, £2 10s. per h.p. per annum in addition to unit rates above. *Milking-motors :—* Units per quarter : 360 @ 2d. Excess @ 1½d. Plus £5 per h.p. per season. *Dairy water-heaters :* ¼d. per unit, plus 12s. per kw. per quarter on C.O.S. or T.S. Discount : 7½ per cent. (14 days).
4. Bay of Plenty	*General tariff :—* Units per quarter : As per schedule @ 9d. Next 200 @ 2d. Excess @ 1¼d. Schedule :— Rooms. — Units per Quarter @ 9d. 5 or less .. .. 27 6 or 7 .. .. 30 8 or 9 .. .. 33 10 or more .. .. .. 36 Min. ch. :—Borough : 15s. per quarter. County : From £1 per quarter for two or three rooms to £3 per quarter for over nine rooms. *Water-heating :* 4s. per 100 w. per quarter on T.S. (18 hrs. per day approx.). Above rates are net.	*Lighting :—* 9d. per unit (shops and offices). 9d. for first unit per light } per quarter (hotels, 6d. for excess .. .. } &c.). *Heating :—* 4d. per unit (shops and offices). First 200 per quarter @ 2d. } Hotels, &c. Excess @ 1¼d. .. .. } *General-purpose motors :—* Units per quarter : 80 per h.p. @ 3d. 600 @ 2½d. Excess @ 2d. *Milking-motors :—* Units per quarter— Fractional h.p. : 120 @ 5d. Excess @ 1½d. 1 h.p. and over : 120 per h.p. @ 5d. Excess @ 1½d. *Dairy water-heaters :* 30s. per quarter for 750 w., 600 of which on C.O.S. Above rates are net.
Cambridge	*Lighting :* 6d. per unit. Discount : 5 per cent. *Heating and cooking :—* Units per month : 10 @ 3d. 90 @ 1½d. Excess @ ¾d. Combined min. ch. : 3s. 6d. per month. Discount : 5 per cent. *Water-heating :—* Restricted— 750 w., £4 10s. p.a. } on T.S. 1,000 w., £6 p.a. .. } Continuous : £12 per kw. p.a.	*Lighting :—* (*a*) Units per month : 100 @ 6½d. 100 @ 5½d. Excess @ 4½d. (*b*) First 60 hrs. of connected load @ 6½d. per unit. Excess @ 3½d. per unit. Discount : 5 per cent. *Power :—* (*a*) Unrestricted— Units per month : 100 @ 3d. 900 @ 1½d. Excess @ ¾d. (*b*) Restricted hours— Units per month : 100 @ 3d. 400 @ 1½d. 5,500 @ ¾d. Excess @ ½d. Discount : 5 per cent. *Milking-motors :—* Units per month : 60 per h.p. @ 4d. Excess @ 1d.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority	Domestic.	Commercial.
6. Central Hawke's Bay ..	*Lighting :—* Units per quarter : As per schedule @ 7d. Next 90 @ 3½d. Next 90 @ 2d. Excess @ 1½d. Schedule— Units per Quarter @ 7d. Rooms. Jan.–Mar. April–June. July–Sept. Oct.–Dec. 5 or less .. 24 30 30 24 6 or 7 .. 27 33 33 27 8 or 9 .. 30 36 36 30 10 or more 33 39 39 33 The above tariff also applies to heating, &c., where no range is installed; but with a range in use the heating and cooking rate is as follows :— *Heating and cooking :—* Units per quarter : 90 @ 2½d. 90 @ 2d. Excess @ 1½d. *Water-heating :—* £6 per 1,000 w. p.a., with range or milking-motor. £8 per 1,000 w. p.a. without. Booster elements and elements not equipped with a T.S. will be metered and current charged at heating rates. Above rates are net. Min. ch. :— Borough : 15s. per quarter. Country : 15s. per quarter up to six rooms. 25s. per quarter over six rooms.	*Lighting :* 7d. per unit. *Heating :—* Units per quarter : 120 @ 3d. 120 @ 2d. Excess @ 1½d. Off-peak heating (8.30 a.m. to 11 a.m. and 12.45 p.m. to 4.30 p.m.) as follows :— Units per quarter : 90 @ 2d. Excess @ 1d. *Industrial motors :—* 8 a.m. to 5 p.m. on T.S. if required— Units per quarter : 1,000 @ 3d. 1,000 @ 2½d. Excess @ 2d. From 9 p.m. to 6 a.m. : 1d. per unit on T.S. *Milking-motors :—* Units per quarter : 1,000 @ 2½d. Excess @ 2d. Above rates are net.
7. Central Waikato	*Lighting, heating, and cooking,* with range of not less than 2 kw. :— Units per month : 16 @ 5d. 80 @ 1½d. Excess @ 1d. Min. ch. per month : 4s. 6d. *Water-heating :—* With range of not less than 2 kw. : 12s. per 100 w. p.a. on T.S. Without range : 16s. per 100 w. p.a. on T.S. Unrestricted rate : 22s. per 100 w. p.a. Discount : 5 per cent. (14 days).	*Lighting :* 5d. per unit. Min. ch. : 2s. 3d. per month. *Heating :* 1½d. per unit. Min. ch. : 2s. 3d. per month. *Power :—* Ordinary rate : 2½d. per unit. Min. ch. : 5s. per h.p. per month up to 5 h.p. 2s. 6d. per h.p. per month for excess over 5 h.p. Milking-motors (2 h.p. or less) : 2½d. per unit. Off-peak supply (on T.S.) :— Units per month : 30 per h.p. @ 2½d. Excess @ 1½d. Min. ch. : 5s. per h.p. per month. Alternatively : 4½d. per unit; no min. ch. Discount : 5 per cent. (14 days).
8. Dannevirke	*Lighting :* 7d. per unit. Min. ch. : 2s. 6d. per month. *Heating :* 4d. per unit. *Cooking :—* Units per month : 20 @ 3d. Excess @ 1¼d. Min. ch. : 5s. per month. Where range installed all heating, ironing, &c., will be connected to range meter. Discount on above rates : 7½ per cent. *Water-heating :—* Metered : ½d. per unit (600 w., 16 hrs. per day on T.S.) plus 2s. 6d. per month T.S. rental. Flat rate : £1 per 100 w. p.a. on T.S. (off up to 8 hrs. per day). Min. ch. : £5 p.a.	*Lighting :* 6d. per unit. Min. ch. : 2s. 6d. per month. *Heating and power :—* Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1¼d. Min. ch. : Heating : 2s. 6d. per month. Motors : 2s. 6d. per h.p. per month. Discount on above rates : 7½ per cent. *Milking-motors :* £1 per h.p. p.a. plus the following unit charges per month :— 70 @ 4d. 100 @ 2½d. Excess @ 1d.
9. Franklin	*Lighting :* 5d. per unit. Min. ch. : 3s. per month. *Heating, power, and cooking,* where range installed :— Units per quarter : 120 @ 1¼d. Excess @ 1d. Min. ch. : 5s. per month. *Water-heating :—* On C.O.S. or T.S. : 15s. per 100 w. p.a. Min. ch. : £4 10s. p.a. Continuous rate : 20s. per 100 w. p.a. Min. ch. : £6 p.a. Discount : 10 per cent. (14 days).	*Lighting and heating :* As for Domestic. *Industrial and milking-motors :—* Units per quarter : 600 @ 2½d. Excess @ 2d. Min. ch. : 3s. per month for 1 h.p. and 2s. 6d. per month for each additional h.p. Discount : 10 per cent. (14 days).

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
10. Golden Bay	*Lighting :—* Units per month : 80 @ 9d. Excess @ 7d. Min. ch. : 5s. per month. *Heating* (including cookers up to 2½ kw. and small motors up to ½ h.p.) :— Units per month : 8 @ 4½d. 12 @ 3d. 120 @ 1½d. Excess @ 1d. Min. ch. : 2s. 6d. per month. *Electric ranges* (including all heating) :— Units per month : 140 @ 1½d. 460 @ 1d. Excess @ ¾d. Min. ch. : 2s. 6d. per month. Heat-storage range up to 750 w. : £6 p.a. *Water-heating :—* (*a*) £1 per 100 w. p.a. (*b*) £6 per kw. p.a., with electric range. Discount : 5 per cent.	*Lighting and heating :* As for Domestic. *Power :—* Units per month : 80 @ 4d. 240 @ 3d. Excess at 1d. Min. ch. : 2s. per h.p. per month. Discount : 5 per cent.
11. Grey	*Lighting :—* Units per month : 100 @ 6d. Excess @ 4d. Min. ch. : 2s. 6d. per month. *Heating and cooking :* 1d. per unit. Min. ch. per month : 7s. 6d. with range ; 2s. 6d. without. *Water-heating :* With range : ¼d. per unit. Without range : ½d. per unit. No min. ch.	*Lighting and heating :* As for Domestic. *Power :* 2d. per unit. Min. ch. : 2s. 6d. per month.
12. Hawke's Bay	*General tariff* (*lighting, heating, cooking, and motors* up to ½ h.p.) :— Units per 2 months : As per schedule @ 6d. Next 28 @ 2d. Excess @ 1¼d. Schedule— Units per 2 Months @ 6d. Rooms. / Within Hastings Borough. / Outside Hastings Borough. 5 or less .. .. 12 / 14 6 or 7 .. .. 14 / 18 8 or 9 .. .. 16 / 20 10 or more .. .. 18 / 22 *Alternative tariff* for private residences with range of not less than 5 kw. : Service charge 1s. per month per room (min. 5 rooms) plus 1d. per unit. *Water-heating :* £1 per 100 w. p.a. for not less than 500 w. on T.S. or control wire (21 hrs. service). Min. ch. :— Country : 4s. per month. Hastings : 2s. per month. Above charges are net.	*Lighting :—* Country— Units per 2 months : 200 @ 6d. Excess @ 4d. Hastings— Units per 2 months : M.D. × 30 units @ 5½d. Excess @ 1½d. *Heating :—* Country— Units per 2 months : 120 @ 2d. Excess @ 1½d. Hastings : 3d. per unit. *Cooking :—* Units per 2 months : 200 @ 2d. Excess @ 0·9d. *Power :—* Units per 2 months : 50 per h.p. @ 2½d. (max., 500). Excess @ 1¼d. Min. ch. :—Country : 4s. per month. Hastings : Up to 300 w., 2s. ; over 300 w., 5s. per month. Above charges are net.
13. Horowhenua ..	*General tariff :—* Units per month : 10 @ 6d. ; less 1d. discount. 200 @ 1¼d. ; less ¼d. discount. Excess @ ¾d. Min. ch. : 3s. per month. *Water-heating :* £12 per kw. p.a., continuous. £9 per kw. p.a. on C.O.S.	*Lighting :—* Units per month : 50 @ 6d. } Less 2d. Excess @ 4d. } discount. Min. ch. : 3s. 6d. per month. *Heating :—* Units per month : 100 @ 1⅛d. Excess @ 1d. Min. ch. : 2s. 6d. per month. *Power :—* (*a*) Units per month : 200 @ 2½d. Excess @ 2d. Min. ch. : 2s. 6d. per h.p. per month. (*b*) 6d. per unit up to 3 h.p. No min. ch. Milking-motors charged on rate (*a*) but with no minimum.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
14. Hutt Valley	*General tariff :—* Units per month : 14 @ 4½d. 64 @ 1½d. 464 @ 1d. Excess @ ¾d. Where an electric range of the fixed type is installed the second step will be 32 units @ 1½d. per unit instead of 64. Min. ch. : 2s. 6d. per month. *Water-heating :—* 19s. 6d. per 100 w. p.a. (22 hrs.) 16s. 9d. per 100 w. p.a. (on thermostat 12s. per 100 w. p.a. with range (on C.O.S. and thermostat) } Min : 500 w. 5s. per 100 w. p.a. (10 p.m. to 7 a.m. on T.S.). Min. 750 w. ; max. 3,000 w. Metered : ½d. per unit. Max. 3,000 w. Min. ch. : 2s. 6d. per 1,000 w. per month. Discount : 8⅓ per cent. (14 days).	*Lighting :—* Units per month : 32 @ 5d. 350 @ 3½d. Excess @ 3d. Min. ch. : 3s. per month. *Heating :—* Units per month : 12 @ 2½d. 12 @ 2d. 476 @ 1½d. Excess @ 1d. Min. ch. : 2s. 6d. per month. *Power :—* 7 a.m. to 10 p.m.— Units per month : 80 @ 3d. 120 @ 2d. 120 @ 1½d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. per month. 10 p.m. to 7 a.m.—0·65d. per unit. Min. ch. : 1s. per h.p. per month. 25 h.p. to 100 h.p.— Units per month : 228 @ 2d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. per month. Milking-motors— Units per month : 124 @ 2d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. per month. Discount : 8⅓ per cent. (14 days).
15. Malvern	*Lighting, heating, cooking, and small power :—* Rate (*a*)— Units per quarter : As per schedule @ 9d. Excess @ 3d. Min. ch. : £1 2s. 6d. per quarter. Schedule— Number of Points. / Units per Quarter @ 9d. Up to 7 .. .. 30 8 to 12 .. .. 33 Over 12 .. .. 36 Rate (*e*)— Units per quarter : 36 @ 9d. 300 @ 2d. 300 @ 1½d. Excess @ 1d. Min. ch. : £24 per annum. Three intermediate rates (*b*), (*c*), and (*d*), with minimum guarantees of £8, £12, and £18 p.a. respectively, not included for lack of space. *Water-heating :—* 9.30 p.m. to 7.30 a.m. on T.S. : ⅓d. per unit. 24 hr. service (up to 2 kw., where range installed) : ½d. per unit, reducible to ⅓d. where water-heater installation approved.	*Power :—* (*a*) Units per quarter : 240 @ 3d. 360 @ 2d. Excess @ 1½d. Min. ch. : 15s. per h.p. per quarter. (*b*) With a minimum charge of £15 per quarter, units over 600 per quarter are charged at 1d. instead of 1½d.
16. Manawatu-Oroua	*General tariff :—* Units per month : 15 @ 7d., less 1d. discount. 25 @ 3d., less 1d. discount. 60 @ 1½d., net. Excess @ 1d., net. Min. ch. per month : One meter, 4s. 6d. ; two or more meters, 7s. *Water-heating :—* Flat rates per annum : 500 w., £4 10s. 600 w., £5 8s. 750 w., £6 15s. 1,000 w., £9. Subject to control by T.S., C.O.S., or pilot wire during peak-load hours. Min. ch. : £4 10s. per annum.	*Lighting :—* Units per month : 100 @ 7d., less 1d. discount. 100 @ 5d., net. Excess @ 4d., net. *Heating :* 1½d. per unit net, if on separate meter. Min. ch. : As for Domestic. *Power :—* Units per month : 100 @ 4d., less ½d. discount. 100 @ 3d., net. Excess @ 1¾d., net. Subject to extra discount of 5 per cent. where static condensers are installed to maintain at least 0·95 P.F. Min. ch. p.a. : Up to ½ h.p., £2 ; ½ to 3 h.p. £2 10s. ; over 3 h.p., £5. Milking-motors— Units per month : 100 @ 3½d., less ½d. discount. 100 @ 2½d., net. Excess @ 1¾d., net. Subject to P.F. discount as above. Min. ch. : £2 10s. p.a. Large power consumers are charged on a kv.a. demand plus unit basis, for which see Board's tariff schedule. Min. ch. : £180 p.a.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
17. Marlborough	*Lighting, heating, cooking, and small power :—* Units per quarter : As per schedule @ 8d. Next 21 @ 2½d. Next 180 @ 2d. Excess @ 1½d. Schedule— Rooms. — Units per Quarter @ 8d. 5 or less .. .. 27 6 or 7 .. .. 30 8 or 9 .. .. 33 10 or more .. .. .. 36 *Water-heating :* 8 p.m. to 6.30 a.m., not less than 500 w. on T.S. : 9s. 6d. per 100 w. p.a. Above rates are net. Min. ch. per quarter— Borough and town districts : 7s. 6d. Country areas— 2- and 3-roomed houses, 10s. 4- and 5-roomed houses, 15s. 6- and 7-roomed houses, 20s. 8- and 9-roomed houses, 25s. Over 9-roomed houses, 30s.	*Lighting :* 6d. per unit. *Heating :—* Units per quarter : 120 @ 3d. } Shops and Excess @ 1½d. } offices. Units per quarter : 21 @ 2½d. } 180 @ 2d. } Hotels, &c. Excess @ 1½d. } *Motors :—* Units per quarter : 48 per h.p. @ 4d. 600 @ 2½d. Excess @ 2d. Min. ch. : 2s. 6d. per month. Large power consumers are charged on a kv.a demand plus unit basis, for which see Board's tariff schedule. Min. ch. : £45 per quarter. Above rates are net.
18. North Auckland	*Lighting :* 7¼d. per unit, less ¼d. discount (14 days). Min. ch. : 4s. per month. *Heating and cooking :—* Units per month : 10 @ 3d. 10 @ 2d. Excess @ 1½d. Less ¼d. discount (14 days). Min. ch. : 3s. per month. *Water-heating :—* Restricted— (*a*) With range or milking-motor, 17s. per 100 w. p.a. on T.S. or C.O.S. (off 4 hrs.). (*b*) Without range or milking-motor, 22s. per 100 w. p.a. on T.S. or C.O.S. Unrestricted— (*a*) 22s. } per 100 w. p.a. (*b*) 27s. 6d. }	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Industrial motors :—* Units per month : 500 @ 3¼d. 500 @ 2½d. Excess @ 2¼d. Min. ch. : 1 h.p. and over, 5s. per h.p. per month. Minimum, 4s. ; maximum, 20s. *Milking-motors :* 3¼d. per unit. Min. ch. : 6s. per month.
19. North Canterbury ..	*Rate "B" : General domestic service* (with range over 3 kw.) :— (*a*) Consumers guaranteeing 27s. 6d. per month— Units per month : As per schedule @ 6d. Next 50 @ 2d. Excess @ 1½d. (*b*) Consumers guaranteeing 35s. per month— Units per month : As per schedule @ 6d. Next 50 @ 2d. Next 100 @ 1½d. Excess @ 1d. Schedule— Number of Rooms. — Units per Month @ 6d. 6 and under .. .. .. 12 7 to 10 .. .. 20 Over 10 .. .. 30 *Water-heating* (on T.S. and thermostat) :— First 600 units per quarter @ ½d. per unit. Excess per quarter @ ¼d. per unit. Maximum wattage, 3,000. Min. ch. : Nil under Rate "B" above ; otherwise 5s. per month. Above charges are net.	*Lighting :—* Units per month : 80 @ 6d. Excess @ 4d. Min. ch. : 6s. per month. *Heating :—* Units per month : 60 @ 2d. 60 @ 1½d. Excess @ 1d. Min. ch. : 5s. per month ; nil if no power used. *Power :—* Ordinary rate— Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1½d. Min. ch. : 5s. per h.p. per month. *Milking-machines—* (1) Three-phase motors : £4 per h.p. per year plus unit rate as above. (2) Single-phase motors : 5s. per h.p. per month plus unit rate as above. Above charges are net.
20. Opunake	*General tariff :—* (*a*) Units per month : 12 per kw. of connected load @ 8d. Excess @ 3d. Min. ch. : 5s. per month. (*b*) Alternative rate— Units per month : 20 per kw. of connected load @ 8d. Excess @ 1½d. Min. ch. : 10s. per month. Discounts : 10 per cent. *Water-heating* (net) :— £1 per 100 w. p.a. (continuous). 15s. per 100 w. p.a. (on C.O.S.).	*Lighting and heating :* As for Domestic. *Industrial motors :—* Units per month : 200 @ 3d. Excess @ 2d. Min. ch. : 5s. per h.p. per month. *Milking-motors :—* Units per month : 60 per h.p. @ 4d. Excess @ 2d. Min. ch. : 5s. per month. Discounts : 10 per cent.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
21. Otago Central	*Lighting :—* Units per two months : 3–4 per 100 w. connected load, plus 30 @ 4d. 120 @ 2d. Excess @ 1d. *Heating and cooking :—* Units per two months : 3–4 per 1,000 w. connected load plus units as for lighting. *Water-heating :—* £12 per kw. p.a. (continuous). £6 per kw. p.a. on C.O.S. or T.S. Discounts from 5 to 10 per cent. allowed where consumption exceeds 1,000 units per two months.	*Lighting, heating, and cooking*—At Domestic rates, or, alternatively, at the following :— *Lighting :* 8d. per unit. Where heating installed— Units per month : 30 @ 8d. 120 @ 4d. Excess @ 2d. Min. ch. : 2s. per two months. *Industrial and Farm motors :* 6–8 units per h.p. plus units per two months as for domestic lighting.
22. Otago	*Lighting, heating, and cooking,* with range over 3 kw.:— (*a*) Units per quarter : 36 @ 9d. 300 @ 2d. Excess @ 1½d. Min. ch. : £4 10s. per quarter. (*b*) Units per quarter : 36 @ 9d. 300 @ 2d. 300 @ 1½d. Excess @ 1d. Min. ch. : £6 per quarter. *Water-heating :—* ⅓d. per unit on T.S. for 11 hours per day. 0·4d. per unit on T.S. for 16 hours per day. ¾d. per unit on T.S. for 22 hours per day. Flat rates on T.S. and thermostat— 750 w. : £5 5s. p.a. 1,000 w. : £6 p.a.	*Lighting :* 9d. per unit. *Heating :—* (*a*) 3d. per unit. (*b*) 1½d. per unit on T.S. off peak. *Power :—* Units per quarter : 300 @ 4d. 240 @ 2d. Excess @ 1d. Min. ch. : £5 per h.p. p.a.
23. Poverty Bay	*General tariff* (with range) :— Units per month : As per schedule @ 4¾d. Next 30 @ 2½d. Next 170 @ 1d. Excess @ ¾d. *Schedule :—* Rooms. / Apr. to Sept. Units. / Oct. to Mar. Units. 5 / 10 / 7 6 / 12 / 9 7 / 16 / 12 8 / 20 / 15 9 / 24 / 18 10 / 28 / 21 11 / 32 / 24 12 and over / 36 / 27 Min. ch : 2s. per month. *Water-heating* (all rates quoted are for off-peak supply) :— Flat rate : 19s. per 100 w. p.a. Metered : ¾d. per unit.	*Lighting :—* Units per month : 100 @ 4¾d. Excess @ 3½d. Min. ch. : 2s. per month. *Heating :—* Units per month : 60 @ 2½d. Excess @ 1½d. *Cooking :—* Units per month : 30 @ 2½d. Next 270 @ 1d. Excess @ ¾d. Min. ch. : 2s. per month per kw. connected load. *Water-heating :* Same as for Domestic, but metered rate 1d. per unit. *Power :—* Industrial— Units per month : 400 @ 2d. Excess @ 1½d. Min. ch. : 2s. per h.p. per month up to 20 h.p. 1s. per h.p. per month thereafter. Milking-motors : 3d. per unit. Min. ch. as above, but applies only from September to April inclusive.
24. South Canterbury	*General tariff* (per month) :— Rooms. / Units @ 7d. / Units @ 3d. 4 or less .. 6 / 12 5 or less .. 8 / 16 6 or less .. 10 / 20 7 or less .. 12 / 24 8 or less .. 14 / 28 9 or less .. 16 / 32 10 or less .. 18 / 36 11 or over .. 20 / 40 Excess units @ 1d. Min. ch. for lighting and cooking : 17s. 6d. per month. *Water-heating :—* With range— (*a*) 13s. 4d. per kw. per month plus 6s. 8d. per month for each kw. in excess (on T.S., 20 to 22 hrs. per day). (*b*) ½d. per unit. On C.O.S. Min. ch. : 5s. per month.	*Lighting :—* Units per month : 20 @ 7d. 40 @ 5d. Excess @ 4d. Min. ch. : 5s. per month. *Heating :* 3d. per unit. Min. ch. : 2s. 6d. per month. *Cooking :—* Units per month : 100 @ 2d. Excess @ 1d. Min. ch. : 12s. 6d. per month. *Power :—* Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. per month for farmers. 5s. per h.p. per month for commercial. Milking-motors : £3 per h.p. per year plus 2d. per unit.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
25. South Taranaki	*Lighting :—* Units per month : 100 @ 6d. Excess @ 4½d. Min. ch. : 2s. 6d. per month. *Heating and cooking :—* Units per month : 15 @ 2d. Excess @ 1½d. Min. ch. : 2s. 6d. per month. Discounts (14 days) : ½d. per unit ; also 5 per cent. off min. and flat rates. *Water-heating*, with range or milking-motor :— 15s. per 100 w. p.a. on T.S. or C.O.S. (20 hrs.). 20s. per 100 w. p.a. (continuous).	*Lighting, heating, and cooking :* As for Domestic. *Industrial motors :—* Units per month : 400 @ 3d. Excess @ 2d. Min. ch. per month : Under 1 h.p., 3s. ; 1 h.p. and over, 5s. per h.p. Max., 10s. *Milking-motors :* 3d. per unit. Min. ch. : 5s. per month. Discounts as for Domestic.
26. Springs-Ellesmere ..	*Light and heating :—* Units per month : As per schedule @ 5d. Excess @ 1½d. Schedule— Rooms. — Units per Month @ 5d. 5 or less .. .. 12 6 and over .. .. .. 16 Min. ch. : 5s. per month. *Cooking :* 1d. per unit. Min. ch. : 2s. per kw. of connected load per month. *Water-heating*, with range, 2 kw. or over :— (*a*) ½d. per unit. Min. ch. : 2s. 6d. per kw. per month } On thermostat or C.O.S. (*b*) £1 per 100 w. p.a. .. .. } (*c*) £4 per 1,000 w. p.a. 9 p.m. to 7.30 a.m. on T.S.	*Lighting :* 4d. per unit. Min. ch. : 5s. per month. *Heating :—* Units per month : 80 @ 3d. Excess @ 2d. Min. ch. : 5s. per kw. per month. *Power :—* Under 15 h.p.— Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1½d. Min. ch. : 2s. 6d. per h.p. per month. 15 h.p. and over— Units per quarter : 150 per b.h.p. or per kv.a. of M.D. @ 1½d. Excess @ ½d. 10 per cent. discount for P.F. maintenance at 90 per cent. or over. Min. ch. : 7s. 6d. per h.p., or per kv.a., per quarter. Milking-motors : 3d. per unit. Min. ch. : £3 per h.p. p.a.
27. Taranaki	*Lighting :* 6½d. per unit, net. *Heating :—* 3¼d., net, combination meter. 1½d., net, special meter, with separate min. 5s. per month. 1½d., net, on cooking-meter. *Cooking :* 1½d., net. Min. ch. : 3s. 6d., net, per month. *Water-heating :—* 600 w., £6 p.a. 10s. p.a. for each additional 50 w. On 24 hr. service or on T.S. or C.O.S., at Board's option.	*Lighting, heating, and cooking :* As for Domestic. *Power :—* ½ to 5 h.p. and all milking-motors, 3½d. per unit. 5 h.p. and over, 5s. per ampere of M.D. per month, plus— Units per month : 240 @ 3d. Excess @ 1d. For dairy-factory motors the unit charge is as above, but the M.D. charge is 4s. per amp. per month for first 10 amps. and 1s. per amp. in excess of 10 amps. Min. ch. : 2s. 6d. per h.p. per month.
28. Tararua	*Lighting :* 7d. per unit. *Heating and cooking :—* Units per month : 200 @ 1½d. Excess @ 1d. Min. ch. : 12s. 6d. per month. *Special rate for lighting and range :—* Lighting, 7d. Range and heating, 1d. Min. ch. : 10s. 6d. per month. *Water-heating*—On T.S. (20 hrs.) :— 750 w., 12s. per month. 1,000 w., 15s. 4d. per month. Continuous : £14 per kw. p.a., or *pro rata* for smaller size. Above rates are net.	*Lighting, heating, &c. :* As for Domestic. *Industrial motors :—* Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1½d. Min. ch. : 2s. 6d. per h.p. per month. *Milking-motors :* 3½d. per unit. Min. ch. p.a. : ¼ h.p., £4 ; ½ h.p., £5 ; 1 h.p. and 2 h.p., £6. Above rates are net.
29. Tauranga	*General tariff* (includes domestic motors up to ½ h.p.) :— Units per month : 20 @ 5d. 20 @ 3d. Excess @ 1d. Min. ch. : 6s. 8d. per month. *Alternative rate*, with range (2½ kw. or over) and water-heater (minimum 400 w., continuous or 500 w. on thermostat) :— £7 10s. p.a. plus ½d. per unit. *Water-heating :—* (*a*) 1s. 8d. per 100 w. per month, continuous. (*b*) ½d. per unit. Min. ch. : 1s. 6d. per month. Above rates are net.	*Lighting :* 8d. per unit. *Heating :* 1½d. per unit. Min. ch. per month : 4s. 2d. (shops, halls, &c.). *Motors* (under 5 h.p.) :— Units per month : 66 @ 3d. 66 @ 2½d. Excess @ 1½d. Above rates are net.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
30. Te Awamutu	*Lighting and small heating loads :—* Units per month : Active load in kw. × 60 hrs. @ 5d. Excess @ 3d. "Active load" = 80 per cent. of the first ½ kw. of connected load (excluding irons and small appliances) plus 60 per cent. of the load in excess of ½ kw. Min. 150 w. Min. ch. : 2s. 6d. per month. *Heating and cooking :—* (*a*) With range of 2½ kw. or more : 1d. per unit. Min. ch. : 5s. per month. (*b*) No range—Units per month : 30 @ 2d. Excess @ 1½d. Same minimum. *Water-heating :—* 750 w., £4 p.a. } On T.S. or C.O.S. 1,000 w., £5 p.a. } 750 w., £9 10s. p.a. } Continuous. 1,000 w., £11 10s. p.a. } The above rates are net.	*Lighting :* 5d. per unit. Min. ch. : 2s. 6d. per month. No minimum for churches and schools. *Power :—* (*a*) 5 a.m. to 5 p.m.— Units per month : 120 @ 2½d. 80 @ 2d. Excess @ 1½d. (*b*) 5 p.m. to 9 p.m. : 3d. per unit. (*c*) 9 p.m. to 5 a.m. : ¾d. per unit. Min. ch. : 5s. per h.p. per month up to 5 h.p.; 2s. 6d. per h.p. per month for excess. Alternative charge where three or more motors total over 15 h.p., 15s. per kv.a. of M.D. per quarter for first 5 kv.a. and 7s. 6d. per kv.a. for excess. (*d*) Milking-motors : Rate (*a*) above. Above rates are net.
31. Teviot	Tariffs consist of a capacity charge plus a unit charge, as follows :— *Capacity Charge.* *Lighting :* £10 per kw. p.a. Min. : £2 p.a. (200 w.). *Heating and cooking :* 10s. per kw. of installed capacity. *Water-heating :—* Continuous : £10 per kw. p.a. Intermittent : £6 per kw. p.a. on C.O.S. *General-purpose point :* 30s. p.a. Not charged for if range installed. *Unit Charge.* Units per 2 months : 20 @ 3d. 120 @ 1d. Excess @ ½d. Discounts : 5 per cent.	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Motors :—* 1 h.p. and over : 33s. per h.p. p.a. (min. £5), for which 99 units allowed. Excess units at 1d. per unit continuous and 3d. per unit intermittent. Under 1 h.p. (intermittent) : £8 p.a.
32. Thames Valley	*Lighting :* 4½d. per unit. *Heating and cooking :—* Units per month : 20 @ 3d. Excess @ 1d. Min. ch. : Combined supply, 3s. per month. *Water-heating :—* 13s. less 10 per cent. per 100 w. p.a. on T.S. 24s. per 100 w. p.a. continuous. 9.30 p.m. to 5.30 a.m. : 0·225d. per unit on T.S. Above charges are net.	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Industrial supply :—* Units per month : 100 @ 3d. 100 @ 2d. 4,800 @ 1½d. Next 5,000 @ 1¼d. Next 5,000 @ 1d. Next 5,000 @ 0·9d. Next 5,000 @ 0·8d. Next 5,000 @ 0·7d. Next 5,000 @ 0·6d. Over 35,000 @ 0·5d. Min. ch.—Unrestricted supply : 20 units per h.p. per month. *Milking and farm motors :* 3d. per unit. Above charges are net.
33. Waimea	*General tariff :—* Units per quarter : As per schedule @ 10d. Next 120 @ 3½d. Next 180 @ 3d. Excess @ 2½d. Schedule— Rooms. / Units @ 10d. / Min. ch. per Quarter. Up to 3 .. .. 27 — 15s. 4 to 5 .. .. 27 — 25s. 6 to 7 .. .. 30 — 30s. 8 to 9 .. .. 33 — 35s. Over 9 .. .. 36 — 40s. Min. ch. : 5s. per month. *Water-heating :* £10 per kw. p.a. on T.S. Discount : 1d. per unit (14 days).	*Lighting :* 10d. per unit. *Heating :* 4d. per unit. *Motors :—* Units per quarter : 50 per h.p. @ 4½d. 600 @ 3½d. Excess @ 3d. Or,— 8 p.m. to 6 a.m. : 2d. per unit. Discount 1d. per unit (14 days).

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
34. Wairarapa	*Lighting :* 5½d. per unit net. *Heating :* 2¾d. per unit net. When electric range installed :— *Lighting :* 4½d. per unit net. *Cooking and heating :*— Units per month : 100 @ 1¼d. Excess @ ¾d. *Water-heating :*— 9 hrs. : £3 10s. per 1,000 w. p.a. 14 hrs. : £5 5s. per 1,000 w. p.a. 16 hrs. : £6 per 1,000 w. p.a. 21 hrs. : £9 per 1,000 w. p.a.	*Lighting :*— Units per month : 100 @ 5½d. Excess @ 4½d. *Industrial motors :* From 2d. to ¾d. per unit, in accordance with M.D. *Milking-motors :* 2d. per unit net.
35. Wairere	*Lighting, heating, and cooking :*— Units per month : 14 @ 9d. 83 @ 2d. 236 @ ¾d. Excess @ 1d. *Water-heating :*— 750 w. : 13s. per month 1,000 w. : 15s. per month } On T.S. or C.O.S. Above rates are net.	*Lighting, heating, and cooking :*— Units per month : 14 @ 9d. 100 @ 2d. Excess @ 1d. *Power :*— General purposes : 4½d. per unit. Milking-motors— Units per quarter : 200 @ 3½d. 100 @ 2d. Excess @ ¾d. Above rates are net.
36. Wairoa	*General tariff :*— Units per month : 10 @ 9d. 60 @ 3d. 200 @ 2d. Excess @ 1d. *Water-heating*—750 w. : 25s. per quarter. 1,000 w. : 32s. 6d. per quarter. On T.S., otherwise 50 per cent. additional charge. Min. ch. (residences) : 13s. 6d. per quarter.	*Power :*— Units per month : 80 @ 3d. 120 @ 2d. Excess @ 1½d. Min. ch. : 5s. per h.p. per month. Milking-motors— 2 or 3 h.p., £16 10s. p.a. up to 600 units ; next 400 @ 3d. ; excess @ 1½d. ½ or 1 h.p., £8 5s. p.a. up to 300 units ; next 200 @ 3d. ; excess @ 1½d.
37. Waitaki	*Lighting, heating, and cooking*, with range of over 3 kw. :— Urban area— (*a*) Min. ch. : 10s. per month. Units per month : Units as per schedule @ 6d. Excess @ 1½d. (*b*) Min. ch. : £1 per month. Units per month : As per schedule (*a*) 6d. 100 @ 1½d. Excess @ 1d. Country areas— (*c*) Min. ch. : £2 10s. per quarter. Units charged as in (*a*). (*d*) Min. ch. : £5 per quarter. Units charged as in (*b*). Schedule— Lamp Load installed. — Units per Month @ 6d. Up to 200 w. .. .. .. 6 Each further 50 w. .. .. 1 Discounts : 33⅓ per cent. *Water-heating :*— 1s. per 100 w. per month on C.O.S. 2s. per 100 w. per month continuous, with range ; otherwise 2s. 6d. ⅓d. per unit (10 p.m. to 7 a.m.) on T.S. Min. ch. : £3 p.a. Discount : 33⅓ per cent.	*Lighting :* 6d. per unit up to 7 units per month per 100 w. Min. 500 w. Excess @ 3d. Discount : 33⅓ per cent. *Heating :* 2d. per unit. Min. ch. : £1 per kw. installed load for the two winter quarters. Discount : 33⅓ per cent. *Power :*— (*a*) Units per month— 12 per h.p. (or per kv.a. of M.D.) @ 3d. Next 18 per h.p. (or per kv.a. of M.D.) @ 2d. Next 24 per h.p. (or per kv.a. of M.D.) @ 1½d. Excess @ 1d. Min. ch. : 3s. per h.p. per month. Discount : 15 per cent. and 5 per cent. (*b*) 10 p.m. to 7 a.m. : ¾d. per unit on T.S. Min. ch. : 2s. per h.p. per month. Discount as above. Milking-motors (up to 2 h.p.) : £2 per h.p. p.a. plus 2d. per unit. Discount : 33⅓ per cent.
38. Waitemata	*Lighting :* 5d. per unit. *Heating, cooking, and domestic power* (not exceeding ½ h.p.) :— Units per month : 30 @ 3d. Excess @ 1¾d. Min. ch. : 4s. per month. *Alternative rate* (with range 5 kw. or over) : £5 p.a. (8s. 4d. per month) plus 1d. per unit. *Water-heating :*— 20 hrs. : 21s. per 100 w. p.a. Min. ch. : £5 5s. p.a. 8 hrs. (night) : 6s. 4d. per 100 w. p.a. Min. ch. : £3 16s. p.a. Discounts on above rates : 25 per cent. (14 days).	*Lighting :* 15s. per amp. of M.D. per quarter plus 2½d. per unit. *Industrial load :*— Units per month : 100 @ 3d. 100 @ 2¼d. Excess @ 1¾d. Min. ch. : Nil up to and including 3 h.p. ; over 3 h.p., 5s. per total h.p. per month. *Milking-motors :* 5s. per h.p. per month plus 2d. per unit. Flat rate remitted from May to October inclusive. Discounts on above rates : 25 per cent. (14 days).

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
39. Waitomo	*Lighting :* 5d. per unit net. *Heating :—* Units per month : 20 @ 3d. Excess @ 1½d. *Cooking* (range not less than 2½ kw.) : 1d. per unit net. Min. ch. : 5s. per month. Min. ch. for each separate lighting and heating installation : 4s. per month. *Water-heating* (600 w. on T.S.) :— With range : £4 16s. p.a. Min. ch. : 24s. per quarter. Without range : £6 p.a. Min. ch. : 30s. per quarter. Larger elements *pro rata.* Above rates are net.	*Lighting, heating, and cooking :* As for Domestic. *Industrial power :—* Up to 50 h.p.— Units per month : 30 per h.p. @ 2½d. Excess @ 1½d. Min. ch. : 2s. 6d. per h.p. per month. 50 h.p. and over—Special contracts : Min. ch., 15s. per h.p. per quarter. Above rates are net.
40. Wanganui-Rangitikei ..	*General tariff :—* Units per month : As per schedule @ 5d. Next 120 @ 1½d. Next 180 @ 1d. Excess @ ½d. Min. ch. : 2s. 6d. per meter per month. Schedule— Rooms. / Units per Month @ 5d. May–Oct. / Nov.–April. 5 or less .. .. 10 6 6 .. .. .. 12 8 7 .. .. .. 14 10 8 .. .. .. 16 12 9 .. .. .. 18 16 10 .. .. .. 20 20 11 .. .. .. 22 22 12 or more .. .. 24 24 *Water-heating :—* With range or milking-motor : 15s. per 100 w. p.a. Without : 20s. Subject to pilot wire or T.S. control. Metered : ½d. per unit. Above rates are net.	*Lighting :—* Units per month : 50 @ 5d. 250 @ 4d. Excess @ 3d. *Heating :—* Units per month : 300 @ 1d. } On pilot Excess @ ½d. } control. Without pilot control : Half lighting rates. *Industrial power :—* (*a*) Over 5 h.p.— Units per month : 80 @ 3d. 120 @ 2d. 400 @ 1½d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. (*b*) 1 to 5 h.p. : Either as in (*a*) above, or at lighting rates with 2s. 6d. min. *Milking-motors :—* With condenser : 1½d. per unit. Without condenser : 3d. per unit. Above rates are net.
CITY COUNCILS.		
1. Christchurch	*Lighting :—* Units per month : M.D. × 40 units @ 4d. Excess @ ¾d. (M.D. = ¾ of load of "active" lamps, excluding pantry, bathroom, &c.) *Lighting, cooking, and domestic appliances :—* Where "specified" cooker is installed— Units per month : M.D. × 40 units @ 4d. Excess @ ½d. *Water-heating :—* (*a*) 10 p.m. to 7 a.m. : ⅓d. per unit. (*b*) Unrestricted : ½d. per unit. (*c*) Unrestricted : ⅓d. per unit where "specified" cooker installed—*i.e.*, a cooker of 4 kw. or over and having its own fixed wiring. Min. ch. for domestic supply : Lighting, 2s. ; range, 2s. 6d. per month.	*Lighting :—* Units per month : M.D. × 40 units @ 4d. Excess @ 1d. Min. ch. : 2s. per kw. per month. *Radiators :* Offices and shops : 2d. per unit. Hotels : 1d. per unit. Min. ch. : 1s. per month, winter only. *Industrial supply :—* Units per month : 50 per kw. of M.D. @ 1d. Next 100 per kw. @ ½d. Excess @ ½d., less 10 per cent. *Milking-motors :* 30s. per ½ h.p. p.a. plus ¾d. per unit. Min. ch. : 2s. 6d. to 1s. 6d. per kw.
2. Dunedin	*Lighting, heating, and cooking :—* Primary rate : 4½d. per unit for 1½ units every two months per 100 sq. ft. floor-space, less 10 per cent. (Max., 2,400 sq. ft. ; min., 600 sq. ft.) Secondary rate— (*a*) City and boroughs : ¾d. per unit. (*b*) Country districts— (i) 1½d. per unit. (ii) With min. guarantee of £6 p.a. : 1d. per unit. (iii) With min. guarantee of £12 p.a. : ¾d. per unit. Min. ch. : City and boroughs : 20s. p.a. Country districts : 36s. p.a. *Water-heating :—* (*a*) 24 hr. service : £10 per kv.a. p.a. (*c*) 10 p.m. to 7.30 a.m. : £3 per kv.a. p.a. on T.S. (*e*) On C.O.S. : £6 per kv.a. p.a. (*f*) Meter rate : Eight summer months, ¼d. per unit ; four winter months, ¼d. per unit up to 650 units per kw. per two months ; excess @ ½d.	*Lighting :—* (*a*) 5d. per unit. (*b*) Units per month : Kv.a. of M.D. × 45 @ 5d. Excess @ 1d. *Heating :—* (*a*) 1½d. per unit. (*b*) Units per month : Kv.a. of M.D. × 50 @ 1½d. Excess @ ½d. *Power :—* Unrestricted— Units per month : 50 per h.p. or kv.a. of M.D. @ 1½d. Excess @ ½d. Milking-motors : £4 p.a. for first h.p., £2 p.a. for each additional h.p., plus 1d. or ¾d. per unit depending on annual guarantee.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
3. Invercargill	*Lighting :—* (*a*) 3½d. per 100 sq. ft. illuminated floor-space per month (min., 700 sq. ft.); plus secondary charge at power rates, rate C. 1 being as follows :— Units per month : 200 @ 2½d. 3,000 @ 1½d. Excess @ 1¼d. (*b*) Flat rate : 6d. per unit. Min. ch. : 2s. 3d. *Cooking, or cooking and heating combined :* 1½d. per unit. Min. ch. : 5s. Discounts : 5 per cent. (10 days).	*Power :—* Rate C. 1 : Units per month : 200 @ 2½d. 3,000 @ 1½d. Excess @ 1¼d. C. 2 : 2½d. per unit, 3.30 p.m. to 9.30 p.m. 1⅛d. per unit, 9.30 p.m. to 3.30 p.m. C. 3 : 2d. per unit, 9 a.m. to 9 p.m. 1d. per unit, 9 p.m. to 9 a.m. C. 4 : 2½d. per unit, 7 a.m. to 11 p.m. ¾d. per unit, 11 p.m. to 7 a.m. Discounts : 5 per cent. (10 days).
4. Nelson	*Lighting :* 6d. per unit. *Heating :—* Units per month : 30 @ 4d. 160 @ 3d. Excess @ 2d. *Water-heating :—* 11 p.m. to 7a.m.— (*a*) 1¼d. per unit ; or (*b*) 2s. per 100 w. per month. Min. ch. : 2s. 6d. per month. Discounts : 1d. per unit for lighting and ½d. per unit for power (14 days).	*Lighting :—* Units per month : 300 @ 6d. 300 @ 4d. Excess @ 3d. *Small power :—* Units per month : 160 @ 3d. Excess @ 2d. *Large power :—* Units per month : Over 1,500 to 6,000 @ 1¾d. Over 6,000 @ 1½d. Restricted between 4 p.m. and 10 p.m. May, June, and July, with 10 per cent. reduction on accounts during these months. Min. ch. and discounts : As for Domestic.
5. Palmerston North ..	*Lighting :* 5d. per unit, less 1d. discount. *Heating and cooking :* 1d. per unit, less ¼d. discount. *Water-heating :—* 21½ hrs. : 1s. 4d. net per 100 w. per month. 24 hrs. : 2s. net per 100 w. per month. Min. ch. on any service : 2s. 6d. per month.	*Lighting :—* 5d. per unit for first 5 units per month per 100 lamp-watts. 3d. excess. Discount : 12½ per cent. *Heating :—* 1½d. per unit. 1d. per unit in excess of first 500 units (with range). Discount : 12½ per cent. *Power :—* Units per month : 200 @ 3d. 100 @ 2½d. Excess @ 1¾d. Discount : 12½ per cent. *Large-power consumers :—* Units per month : 600 @ 2d. Excess @ 1d. Discount : 12½ per cent. Min. ch. on any service : 2s. 6d. per month.
6. Wellington	*General tariff :—* Units per month : Units as per schedule @ 4d. Excess @ ½d. Schedule— Number of Rooms. 5 6 7 8 9 10 11 12 13 14 15 Units per month @ 4d. 8 10 12 14 16 18 20 22 24 26 28 *Water-heating :—* (*a*) 10.30 p.m. to 7.30 a.m. : 6d. per 100 w. per month. (*b*) On thermostat control either at Domestic rates or as follows :— 500 w. : £5 p.a. 1,000 w. : £10 p.a.	*Lighting :—* (*a*) Units per month : 300 @ 4½. 200 @ 4d. 250 @ 3½d. 250 @ 3d. Excess @ 2½d. Less 15 per cent. discount. *Or,* (*b*) Units per month : Kv.a. demand × 45 @ 5d. Excess @ 1d. *Heating :* 2d. per unit, less 10 per cent. *Power :—* (*a*) Units per month : 300 @ 2d., net. 700 @ 1¼d., net. 1,000 @ 1d., net. Excess @ ¾d., net. *Or,* (*b*) 6s. per kv.a. of M.D. per month up to 50 kv.a., 5s. ,, ,, ,, for excess, plus ½d. per unit for all units. Discount : 20 per cent. on unit charge (14 days).
BOROUGH COUNCILS.		
1. Bluff	*Lighting :—* Units per month : 300 @ 6d. net. Excess @ 4d. net. Min. ch. : 2s. 6d. per month. *Heating :* 2d. per unit net.	*Lighting and heating :* As for Domestic. *Power :—* Units per month : 200 @ 3d., net. Excess @ 1⅞d., net. *Large-power consumers :* 1 1/16d. per unit, net. Min. ch., power : 12s. per h.p. p.a.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
2. Hamilton	*General tariff :—* Units per month : As per schedule @ 5d., net. Next 80 @ 1½d., net. Excess @ 1d., net. Discount : 10 per cent. (14 days). Min. ch. : 2s. per month. Schedule— Kw. Demand. — Units @ 5d. net. Up to 0·75 .. .. .. 8 Up to 1·5 .. .. .. 12 Up to 3 .. .. 18 Up to 5 .. .. 24 Up to 6 .. .. 30 Up to 7 .. .. 36 Up to 8 and over .. .. .. 42 *Water-heating :—* (1) 10 p.m. to 7 a.m. on T.S. : 6s. per 100 w. p.a. (2) Off peak on T.S. : 19s. per 100 w. p.a. (3) Continuous : 20s. per 100 w. p.a. Min. ch. in each case : £3 p.a.	*Lighting :—* Units per month : 100 @ 5d., net. 100 @ 4d., net. Excess @ 3d., net. Discount : 10 per cent. (14 days). Min. ch. : 2s. per month. *Power :—* Units per month : 300 @ 2d., net. 200 @ 1½d., net. Excess @ 1d., net. Discount : 10 per cent. (14 days). Min. ch. : 2s. per month.
3. Inglewood	*Lighting :* 6d. per unit, net. *Heating :* 2d. per unit, net. *Domestic rate :* 1¼d. per unit, net.	*Lighting and heating :* As for Domestic. *Power :* 2d. and 1¼d. per unit, net.
4. Kaiapoi	*Lighting, ironing, &c. :—* 4d. per unit, 1st April to 30th September. 5d. per unit, 1st October to 31st March. Min. ch. : 4s. per kw. connected load. *Cooking :—* 2s. 6d. for first kw. of connected load. 1s. for each extra kw. of connected load. 1½d. per unit up to connected load minimum. 1d. per unit excess.	*Lighting :* As for Domestic. *Power :* 2s. 6d. per h.p. per month, plus. Units per month : 2 × min. connected load @ 2d. Excess @ 1d. Max. @ 2d. per unit : £2 per month.
5. Lyttelton	*Lighting :—* 4½d. per unit, net. Min. ch. : 2s. per month. *Heating :—* 1d. per unit, net. Min. ch. : 1s. per month.	*Lighting and heating :* As for Domestic. *Power :—* Units per month : 80 @ 3d. 120 @ 2d. 160 @ 1½d. Excess @ 1d. Min. ch. : 2s. per h.p. per month.
6. Napier	*General tariff :—* Units per month : As per schedule @ 6d. Next 60 @ 1½d. Excess @ 1d. Discount 10 per cent. Schedule— Rooms. — Units per Month @ 6d. Up to 5 .. .. 6 6 .. .. 8 7 .. .. 10 8 .. .. 12 9 .. .. 14 10 .. .. 16 Over 10 .. .. 18 *Water-heating :—* (*a*) 1s. 10d. per 100 w. per month (*b*) 1s. 8d. per 100 w. per month (with range). (*c*) ⅕d. per unit, net. (*d*) ⅓d. per unit, less 10 per cent. (with range).	*Lighting :—* Units per month : M.D. × 30 @ 6d. Excess @ 2d. Less 10 per cent. discount. (M.D. : 1 kw. min. ; 10 kw. max.). *Radiators and small power :—* Units per month : 100 @ 3¼d. 100 @ 2d. Excess @ 1½d. Less 10 per cent. discount. *Heating :—* 9 p.m. to 4 p.m. (19 hrs.) : 1d. per unit. Less 10 per cent. *Power :—* (*a*) Units per month : 20 per h.p. @ 3¼d. 150 @ 2d. Excess @ 1¼d. Less 10 per cent. discount, or 12½ per cent. for over 2,000 units. (*b*) Units per month : 500 per kv.a. @ 2½d. Excess @ 1¼d. Less 10 per cent. discount.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
7. New Plymouth	*General tariff :—* Units per month : As per schedule @ 5½d. Excess @ 1½d. Schedule— Average Units used per Month. — Units @ 5½d. Not over 6 .. .. .. 6 „ 10 .. .. .. 8 „ 14 .. .. .. 12 „ 18 .. .. .. 16 „ 22 .. .. .. 20 „ 26 .. .. .. 24 „ 30 .. .. .. 28 „ 34 .. .. .. 32 „ 38 .. .. .. 36 „ 42 .. .. .. 40 Over 42 .. .. .. 44 Min. ch. : 2s. per month. Discount : ½d. per unit. *Water-heating :—* (*a*) 24 hrs. service : £1 per 100 w. p.a. up to 1,000 w. (*b*) Metered : One-third heating rates. (*c*) With booster element : Heating rates. (*d*) With range : 25 per cent. reduction.	*Lighting :—* Units per month : 50 @ 6½d. 450 @ 5½d. Excess @ 4½d. Discount : ½d. per unit. *Heating and cooking :—* Units per month : 50 @ 2½d. Excess @ 1½d. Min. ch. : 1s. 6d. per month. Discount : ½d. per unit. *Power :—* (*a*) Units per month : 50 per h.p. @ 2½d. Excess @ 1½d. (*b*) Units per month : M.D. in kv.a. × 50 @ 2½d. Excess @ 1½d. Min. ch. : 1s. per h.p. Discount : ½d. per unit.
8. Ohakune	*General tariff :—* Units per Month. 20 or under As per schedule @ 10d. ; excess @ 3½d. 20 to 35 .. As per schedule @ 10d. ; next 20 @ 3¼d. ; excess @ 2½d. 35 to 50 .. As per schedule @ 10d. ; next 20 @ 3¼d. ; excess @ 2d. 50 to 75 .. As per schedule @ 9d. ; next 20 @ 3¼d. ; excess at 2d. 75 to 100 .. First 10 @ 8d. ; next 20 @ 3d. ; excess @ 1½d. M.C., 14s. 6d. 100 to 175 First 12 @ 8d. ; next 40 @ 1½d. ; excess @ 1d. M.C., 15s. 6d. Over 175 .. First 15 @ 7d. ; next 30 @ 1½d. ; excess @ 1d. M.C., £1. Discount : 20 per cent. Schedule— A .. 1 to 3 lighting points : First 4 as lighting. B .. 4 to 7 lighting points : First 6 as lighting. C .. 8 to 11 lighting points : First 10 as lighting. D .. 12 or more lighting points : First 12 as lighting. *Water-heating :—* Up to 600 w. : £4 p.a. (20 hr. service). 12s. per 100 w. p.a. in excess. Metered : ½d. per unit. Min. ch. : 2s. 6d.	*General tariff* (including motors up to ½ h.p.) :— Units per Month. Up to 30 .. As per schedule @ 10d. ; excess @ 3¾d. 31 to 50 .. As per schedule @ 10d. ; next 10 @ 3¾d. ; excess @ 2½d. 51 to 100 .. As per schedule @ 9d. ; next 10 @ 3¾d. ; excess @ 1½d. 101 to 200 .. As per schedule @ 8d. ; next 50 @ 2d. ; excess @ 1½d. 201 or more As per schedule @ 8d. ; next 20 @ 2d. ; excess @ 1d. Discount : 20 per cent. Schedule : Same as for Domestic. *Power :—* Motors up to 10 h.p. : Rates on application. Motors over 10 h.p.— Units per month : 200 @ 4d., less 25 per cent. 50 @ 3d., less 33⅓ per cent. Excess @ 1½d., less 33⅓ per cent. Min. ch. : 2s. 6d. per h.p. per month.
9. Patea	*Lighting :—* Units per month : First 50 @ 7d., net. Over 50 all units @ 6d. net. Min. ch. : 3s. per month. *Heating and cooking :—* Units per month : 9 @ 4d., net. 24 @ 1½d., net. Excess @ 1d., net. Over 200 @ 1d. for all units. *Water-heating :* 15s. per 100 w. p.a. Min. ch. : 7s. 6d. per month with range or motor. 10s. per month without range or motor.	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Power :—* Units per month : 500 @ 3d., net. 500 @ 2½d., net. 500 @ 2d., net. Excess @ 1d., net. Min. ch. : 2s. 6d. per month.
10. Picton	*Lighting, heating, and cooking :—* Rate C, with range :— Units per month : 12 @ 8d. Excess @ 2d. Min. ch. : 5s. per month.	*Lighting :—* Shops and offices— Units per month : 12 @ 8d. (10 during Nov.-Feb.). 12 @ 4d. 12 @ 3d. Excess @ 2d. *Power :* 4d. per unit. Min. ch. : 5s. per month.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
11. Queenstown	*Lighting :—* Up to 10 points— Units per month : First 2 per light @ 7d. Next 2 per light @ 4d. Excess @ 2d. Over 10 points— Units per month : First 2 per light (up to 10 lights) @ 7d. Next 1 per light (over 10 lights) @ 7d. Plus { 2 per light (up to 10 lights) @ 4d. Plus { 1 per light (over 10 lights) @ 4d. Excess @ 2d. Min. ch. : 5s. per month. Discount : 1d. per unit.	*Lighting :* As for Domestic. *Power :—* Units per month : 20 @ 4d. 50 @ 3d. Excess @ 2d. Min. ch. and discount : As for Domestic.
12. Raetihi	*Lighting :—* Units per month : 150 @ 8d. 50 @ 5d. Excess @ 3d. Min. ch. : 3s. per month. *Heating :* 1d. per unit. Min. ch. : 1s. per month. *Water-heating :—* 750 w. : 6s. 3d. per month. 1,000 w. : 8s. 4d. per month.	*Lighting, heating, and water-heating :* As for Domestic. *Power :—* Rate (*a*)— Units per month : 300 @ 3d. 700 @ 2½d. 1,000 @ 2d. Excess @ 1½d.
13. Rangiora	*General tariff :—* Units per month : 12 @ 5d. 12 @ 2½d. 50 @ 1½d. 100 @ ¾d. Excess @ ½d. Discount : 7½ per cent. Min. ch. per month : Lighting 3s., plus range 2s. per kw. for first 4 kw. ; 1s. per kw. excess. *Water-heating* (on pilot-wire control) :— Units per month : Kw. of M.D. × 60 @ ½d. Excess @ ¼d. Discount : 7½ per cent.	*Lighting, &c. :—* Units per month : Sq. ft. floor space divided by 100 @ 5½d. Next 50 @ 5d. Next 250 @ 4d. Excess @ 3d. Minimum floor space : 1,200 sq. ft. Discount : 7½ per cent. Min. ch. : 3s. per month. *Radiators* (on pilot-wire control) : 1d. per unit. Discount : 7½ per cent. Min. ch. : 2s. 6d. per month. *Power :—* Units per month : 200 @ 3d. Excess @ 1d. Min. ch. : 2s. 6d. per h.p. per month. Discount : 7½ per cent.
14. Riccarton	*Lighting :—* (*a*) 4d. per unit, net. (*b*) Units per month : M.D. in kw. × 40 @ 6d. Excess @ ⅞d. *Heating and cooking :* ⅞d. per unit, net. Min. ch. in each case : 2s. 6d. per month. *Water-heating* (on T.S.) :— 12 hrs. : 7s. 11d. per 100 w. p.a. 17 hrs. : 12s. 9d. per 100 w. p.a. 22 hrs. : 17s. 8d. per 100 w. p.a. Discounts : 15 per cent. (15 days).	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Power :* 1½d. per unit. Min. ch. : 2s. 6d. per h.p. per month. Discounts : 15 per cent. (15 days).
15. Rotorua (Tourist Dept.) ..	*Lighting, heating, and cooking :—* Units per month : As per schedule at 6½d. Next 20 @ 3d. Next 80 @ 1½d. Excess @ 1d. Schedule— Rooms. Units @ 6½d. Rooms. Units @ 6½d. 1 .. 5 9 .. 16 2 .. 6 10 .. 18 3 .. 7 11 .. 20 4 .. 8 12 .. 22 5 .. 10 13 .. 24 6 .. 12 14 .. 26 7 .. 13 15 .. 28 8 .. 14 *Water-heating :—* (*a*) ½d. per unit " off peak " (on T.S.). (*b*) £5 per kw. p.a. on C.O.S.	*Lighting :—* Units per month : 50 @ 6½d. 200 @ 6d. 250 @ 5½d. Excess @ 5d. *Heating and power :—* (*a*) Restricted to daylight hours— Units per month : 20 @ 3d. 980 @ 2d. Excess @ 1d. (*b*) Unrestricted : 3d. per unit. (*c*) 10.30 p.m. to 7 a.m. : ½d. per unit.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
16. Stratford	*Lighting :* 8d. per unit for first 2 units per room per month. *Heating and cooking :—* Next 60 units over lighting @ 2d. Excess @ 1d. No min. ch. *Water-heating :—* (*a*) 1s. per 100 w. per month (on T.S., 20 hrs.). (*b*) 2s. per 100 w. per month (24 hrs.). (*c*) 6d. per 100 w. per month (night) Min. ch. : 5s. per month.	*Lighting :—* Units per month : First 3 per 100 w. @ 8d. Excess @ 3d. Min. high rate : 20. No min. ch. *Heating :—* Units per month : 40 @ 3d. 60 @ 2d. Excess @ 1d. Min. ch. : 12s. p.a. *Power :—* Units per month : First 20 per h.p. (to 10 h.p.) @ 4d. Excess @ 1d. Min. ch. : 4s. per h.p. per month up to 3 h.p.
17. Sumner	*Lighting :* 4d. per unit, net *Heating :* 1d. per unit, net } Less 2½ per cent. special discount. *Water-heating :—* 10s. per 100 w. p.a., 10.30 p.m. to 6.30 a.m. £1 per 100 w. p.a., 11.30 p.m. to 3.30 p.m. 30s. per 100 w. p.a., continuous.	*Lighting, heating, and water-heating :* As for Domestic. *Power :* 1d. per unit, net. Less 2½ per cent. special discount.
18. Taihape	*Lighting :* 6d. per unit, net. *Heating and cooking :* 1½d. per unit, net. *Water-heating :—* 10.30 p.m. to 4.30 p.m. : £4 10s. per kw. p.a. 10.30 p.m. to 8 a.m. : £2 per kw. p.a.	*Lighting, &c. :* As for Domestic. *Power :—* Units per month : 750 @ 2d., net. 500 @ 1d., net. Excess @ ½d., net.
19. Taumarunui	*Lighting :* 8d. per unit for units per month = 2 × number of living-rooms (max. 6 ; min. 3 rooms). *Heating :—* First 10 over lighting units per month @ 4d. Excess @ 2d. Min. ch. : 2s. 6d. per month. Discount : 1d. per unit. *Water-heating :—* On T.S. with 3 kw. range (off ½ hr. before sunset to 9 p.m.)— 500 w. : £6 p.a. Each extra 100 w. : £1 p.a.	*Lighting :* 8d. per unit, net. *Heating :—* Units per month : 20 @ 3d. Excess @ 2d. Min. ch. : 2s. 6d. per month Discount : 1d. per unit. *Power :—* Units per month : 600 @ 3½d. 900 @ 2½d. 1,500 @ 2d. 2,500 @ 1¾d. Next 5,500 @ 1½d. Min. ch. : 5s. for first 2½ h.p. ; 1s. per h.p. over. Discount : ½d. per unit.
20. Tauranga	*Lighting :* 5d. per unit, net. *Heating :* 1d. per unit, net. *Water-heating :* 2s. per 100 w. per month.	*Lighting :* As for Domestic. *Heating :—* (*a*) 1d. per unit. (*b*) 1s. 6d. per kw. installed, plus ¾d. per unit. *Power :—* Units per month : 200 @ 2d. 800 @ 1d. 10,000 @ 0·8d. Over 11,000 @ 0·6d.
21. Te Aroha	*Lighting :* 4½d. per unit net. Min. ch. : 6d. per month. *Heating and cooking :—* Units per month : 16 @ 2½d., net. 25 @ 2d., net. Excess @ 1d., net. Min. ch. : 3d. per month. *Water-heating :—* (*a*) With range : 1s. 1d. per 100 w. per month (on T.S.). (*b*) Without range : 1s. 3d. per 100 w. per month (on T.S.). Discount : 10 per cent. in each case.	*Lighting, heating, and cooking :* As for Domestic. *Power* (not including domestic motors) :— Units per month : 10 per h.p. @ 3d., net. 333 @ 2d., net. 667 @ 1½d., net. Excess @ 1d., net. Min. ch. : 3d. per month. Discount : 10 per cent.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
22. Te Puke	*Lighting :* 7d. per unit. Min. ch. : 3s. 6d. per month. *Heating :—* Units per month : 40 @ 2d. Excess @ 1d. Min. ch. : 3s. 6d. per month. *Water-heating :—* 9s. 4d. per month for 500 w. (on T.S.). 13s. 8d. per month for 500 w. (24 hrs.). Other sizes *pro rata*.	*Lighting :* As for Domestic. *Heating :—* Units per month : 40 @ 2½d. Excess @ 1¼d. Min. ch. : 3s. 6d. per month. *Power :—* Units per month : 200 @ 2½d. Excess @ 1¼d. Min. ch. : 4s. per h.p. per month.
23. Thames	*General tariff :—* Units per month : 10 @ 6d. 25 @ 3d. 65 @ 2d. Excess @ 1½d. Min. ch. : 2s. 6d. per month. *Water-heating :—* (*a*) 9.30 p.m. to 6.30 a.m. : 10s. per 100 w. p.a. (on T.S.). Min. ch. : £3 p.a. (*b*) 20 hrs. : £1 per 100 w. p.a. Min. ch. : £4 p.a. (*c*) Continuous : £1 8s. 10d. per 100 w. p.a. Min. ch. : £5 15s. 4d. p.a.	*Lighting :* 7d. per unit. *Heating :—* Units per month : 25 @ 3d. 75 @ 2d. Excess @ 1½d. Min. ch. : 2s. 6d. per month. *Power :—* A. Outside of peak hours— Units per month : 80 @ 3d. 120 @ 2d. 4,800 @ 1d. 5,000 @ 0·9d. 5,000 @ 0·8d. 5,000 @ 0·7d. 5,000 @ 0·6d. Excess @ ½d. B. During peak hours : 6d. per unit. Min. ch. per month : Up to 10 h.p., 5s. per h.p. : over 10 h.p., 5s. per h.p. of M.D.
24. Timaru	*General tariff :—* Units per month : As per schedule @ 5d. Excess @ 1d. Schedule— Number of Rooms. — Units @ 5d. 4 or less .. .. .. 6 5 .. .. 8 6 .. .. 10 7 .. .. 12 8 .. .. 14 9 .. .. 16 10 or more .. .. .. 18 Min. ch. : 2s. 6d. per month. *Water-heating :* 0·3d. per unit, 16 hrs., controlled.	*Lighting and heating :—* (*a*) 4d. per unit. (*b*) Units per month : k.w. of M.D., × 50 @ 4d. Next (k.w. of M.D., × 50) @ 2d. Excess @ ½d. Min. ch. : 2s. 6d. per month. *Power :—* Units per month : 50 × h.p. @ 2d. Excess @ ½d. Min. ch. : 2s. 6d. per month.
25. Wairoa	*Lighting :* 5d. per unit, plus 10 per cent. *Heating and cooking :—* Units per month : 20 @ 2½d., plus 10 per cent. 200 @ 1d., plus 10 per cent. Excess @ ½d., plus 10 per cent. *Water-heating :—* 700 w. : 13s. 2d. per month, plus 10 per cent. 1,000 w. : 18s. 2d. per month, plus 10 per cent.	*Lighting :* 5d. per unit, plus 10 per cent. *Motors :—* (*a*) Units per month : 25 per h.p. @ 3d., plus 10 per cent. Excess @ 1½d., plus 10 per cent. (*b*) Units per month : 500 @ 3d., plus 10 per cent. 1,500 @ 1½d., plus 10 per cent. Excess @ 1d., plus 10 per cent. Min. ch. : 5s. per h.p. per month, plus 10 per cent.
26. Waitara	*Lighting :* 7d. per unit. *Heating :* 3d., 2d., and 1d. per unit.	*Lighting and heating :* As for Domestic. *Power :* 3d. and 1d. per unit.
27. Westport	*General tariff :—* Units per month : As per schedule @ 6d., net. Next 40 @ 3d., net. Excess @ 1d., net. Schedule— Rooms. — Units per Month @ 6d. net. 4 or less .. .. .. 8 5 and 6 .. .. .. 9 7 and 8 .. .. .. 10 9 and 10 .. .. .. 11 11 or more .. .. .. 12 Min. ch. : Borough, 3s. ; county, 5s. per month. *Water-heating :* 1s. per 100 w. per month (24 hrs.).	*Lighting :—* Units per month : 20 @ 6d., net. Excess @ 5d., net. *Heating :—* Units per month : 40 @ 3d., net. Excess @ 1d., net. *Power :—* Units per month : 27 per h.p. @ 3d., net. 200 @ 2½d., net. Excess @ 2d., net. Min. ch. : Borough, 2s. per h.p. per month ; county, 2s. 6d. per h.p. per month.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
28. Whakatane	*Lighting and heating :—* Units per month : 12 @ 8d. Excess @ 2d. Min. ch. : 5s. per month. *Cooking :* 1½d. per unit. Min. ch. : 2s. 6d. per month. *Water-heating :* £1 per 100 w. p.a. (24 hrs.).	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Power :—* Units per month : 100 @ 3½d. 200 @ 2½d. Excess @ 1½d.
29. Whangarei	*Lighting :—* Units per month : 100 @ 4½d., net. Excess @ 4d., net. *Domestic power :* 1d. per unit. *Water-heating :* £1 per 100 w. p.a.	*Lighting and water-heating :* As for Domestic. *Power :—* Units per month : 100 @ 2¼d., net. 100 @ 1¾d., net. Excess @ ¾d., net.
TOWN BOARDS.		
1. Havelock North	Taken over by Hawke's Bay Power Board on 1st April, 1937.	
2. Kamo	*Lighting :* 9d. per unit. Discount : 1½d.	*Power :* 4d. per unit. Discount : 20 per cent. *Power :* (Kamo Potteries and Collieries) :— Units per month : 100 @ 3d., net. 100 @ 2½d., net. Excess @ 2d., net.
3. Kaponga	*Lighting and heating :—* Units per month : 10 @ 8d., net. 10 @ 4d., net. Excess @ 2d., net. *Cooking :* 1½d. per unit, net. *Water-heating :* £1 per 100 w. p.a.	*Lighting, heating, and cooking :* As for Domestic. *Industrial motors :* 4d. per unit, net. *Milking-motors :—* Units per season : 1,100 @ 3½d., net. Excess @ 2d., net.
4. Mangaweka	*Lighting :* 7d. per unit. Min. ch. : 3s. 6d. per month. *Heating :—* Units per month : 50 @ 2½d. Excess @ 1½d. *Cooking :—* Units per month : 300 @ 1½d. Excess @ 1d. *Water-heating :—* (*a*) 10s. per 50 w. p.a. (T.S., 20 hrs.). (*b*) 7s. 6d. per 50 w. p.a. (range).	*Lighting, heating, cooking, and water-heating :* As for Domestic. *Power :* 4d. per unit.
5. Manunui..	*General tariff :—* Units per month : As per schedule @ 9d. Excess @ 4½d. Schedule— Rooms. Units @ 9d. Rooms. Units @ 9d. 3 .. 6 7 .. 14 4 .. 8 8 .. 16 5 .. 10 9 .. 18 6 .. 12 10 .. 20	*Lighting :* 9d. per unit. *Heating and cooking :* 4½d. per unit.
COUNTY COUNCILS.		
1. Heathcote	*Lighting :* 5d. per unit. (Cashmere area, 4d.). *Heating :* 1d. per unit. (Cashmere area, ⅞d.). *Water-heating :—* 18 hrs. : £8 per kw. p.a., or ½d. per unit. 11 hrs. : ⅓d. per unit.	*Lighting, heating, and water-heating :* As for Domestic. *Power :—* Avon, Bromley, Cashmere, and Mount Pleasant— (*a*) Up to 3 h.p.— Units per 2 months : 400 @ 2d. Excess @ 1d. (*b*) Over 3 h.p.— Units per 2 months : 160 @ 3d. 240 @ 2d. Excess @ 1d. Valley— Units per 2 months : 200 @ 2d. Excess @ 1d. Min. ch. : 2 h.p. or under, 2s. 6d. per month. Over 2 h.p., 5s. per month.
2. Kaikoura	*Lighting :* 10½d. per unit Min. ch. : 5s. per month.	*Power :* 4d. per unit. Min. ch. : 5s. per month.

TABLE XV.—ABRIDGED SCHEDULE OF TARIFFS FOR ELECTRICAL ENERGY, 1936–37—*continued.*

Supply Authority.	Domestic.	Commercial.
3. Murchison	*Lighting :* 7s. per month for 12 lighting and 2 heating points, plus 4d. per unit. *Heating :* 3d. per unit, net. *Cooking :* 2d. per unit, net. Water-heating :— 15s. per 100 w. p.a. on T.S. or C.O.S. 20s. per 100 w. p.a. continuous.	*Lighting, heating, and cooking :* As for Domestic. *Power :—* £3 per h.p. p.a., plus 3d. per unit for first 40 units per month and 2d. per unit for excess. *Milking-motors :* £6 per h.p. p.a., plus unit charges as above.
4. Uawa	*Lighting :* 17d. per unit. *Heating :* 11d. per unit.	*Power :* 11d. per unit.
5. Waimairi	*General tariff :—* Assessed units : According to connected load @ 4d. per unit ; excess @ 1d. per unit. No min. ch. Discount : 1d. per 1s. (14 days). *Water-heating :—* (*a*) Metered, unrestricted : ½d. per unit. Min. : 16s. 8d. per kw. per month. (*b*) On T.S. (18 hrs.) : 10s. per kw. per month. (*c*) On T.S. (12 hrs.) : 5s. per kw. per month. (*d*) On T.S. (10 hrs.) : 3s. 6d. per kw. per month.	*Power :—* Units per month : 100 @ 2d. Excess @ 1d. Off from sunset to 10.30 p.m. Min. ch. : 2s. 6d. per h.p. per month.
COMPANIES.		
1. Alderton Utility Co. ..	*General tariff :—* Units per month : 20 @ 6d. 10 @ 4d. 10 @ 2d. Excess @ 1d. Min. ch. : 10s. per month. *Water-heating :* 20s. per 100 w. p.a., with *pro rata* reduction in charge where T.S. in use.	*Power :* £5 per h.p. a.
2. Kanieri Electric, Ltd. ..	*Lighting :—* Units per month : 200 @ 6d., net. Excess @ 4d., net. Min. ch. : 4s. per month. *Heating, cooking, and domestic power :* 1d. per unit, net. Min. ch. : 4s. per month. *Water-heating :—* Continuous, with thermostat, and approved system : ½d. per unit, net. Unapproved systems : ¾d. per unit, net. On T.S. or C.O.S. : ⅜d., net.	*Power :—* Rate PA— Units per month : 80 @ 3d., net. 120 @ 2·67d., net. 800 @ 2d., net. 2,000 @ 1¼d., net. 1,000 @ 1d., net. 4,000–6,000 @ 0·4d., net. Rate PB— Where consumption exceeds 6,000 units per month : £15 per month, plus 0·4d. per unit.
3. Reefton Electric Light and Power Co., Ltd.	*Lighting :* 9d. per unit.	*Power :—* Units per month : 80 @ 4d. Excess @ 1½d.
4. Rawene Motors, Ltd. ..	*Lighting :* 15d. per unit.	*Power :* 9d. per unit.
5. Wilson's (N.Z.) Portland Cement, Ltd.	*Lighting :—* Units per quarter : 150 @ 5½d., net. Excess @ 5d., net. *Domestic power :* 1½d. per unit, net. *Water-heating :* ½d. per unit on C.O.S. Additional discounts : 3 per cent. on lighting and domestic power. Min. ch. : 5s. per quarter.	*Lighting :* As for Domestic. *Power :—* (*a*) Units per quarter : 300 @ 3d., net. Excess @ 2½d., net. (*b*) 1¾d. and 1½d. per unit. (*c*) £1 10s. per kv.a. of M.D. per quarter, plus ¼d. per unit. Discount : 10 per cent. (*d*) Units per month : 100 @ 3d. 100 @ 2½d. 1,000 @ 2d. Excess @ 1½d. Additional discounts : 3 per cent. on power rates (*a*) and (*b*). Min. ch. : 5s. per quarter.
6. Westland Power, Ltd. ..	*Lighting :* 9d. per unit where water-heater, range, or motor of 2 h.p. or over in use ; otherwise, 1s. per unit. Min. ch. : 8s. per month. *Heating :* 3d. per unit ; with range, 2½d. per unit. Min. ch. : 2s. 8d. per month. *Cooking :* 2½d. per unit. Min. ch. : 4s. 3d. per kw. connected load. *Water-heating :—* Metered : 1½d. per unit. Min. ch. : 4s. 3d. per kw. Flat rate : £1 6s. 8d. per 100 w. p.a. for approved systems with thermostat and C.O.S. Discounts on above rates : 25 per cent. (14 days).	*Lighting, &c. :* As for Domestic. *Power :—* Up to 15 h.p. day load— Units per month : 100 @ 4d. Excess @ 2d. Min. ch. : 6s. per h.p. per month. *Milking-plants :* £10 per h.p. p.a. if water-heater installed and on C.O.S. Discounts on above rates : 25 per cent. (14 days).

TABLE XVI.—SAMOAN ADMINISTRATION (APIA).—STATISTICS FOR YEAR ENDING 31ST MARCH, 1937.

Installed in December, 1928.

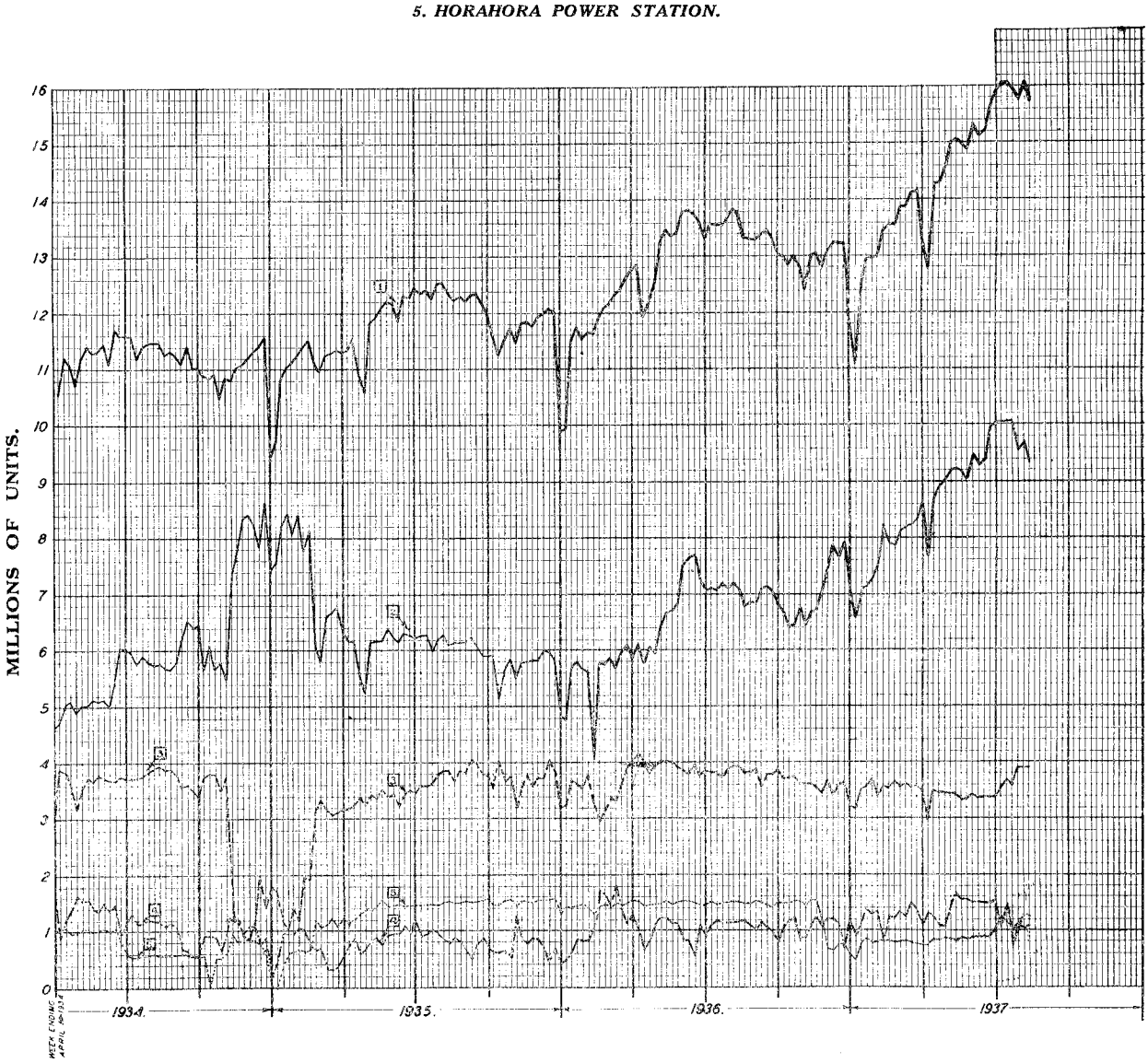
Statistical.	1935.	1936.	1937.	Financial.	1935.	1936.	1937.
					£	£	£
Installed capacity (hydro) ..	80 kw.	80 kw.	80 kw.	Capital outlay	21,563	23,325	23,832
Installed capacity (Diesel) ..	..	45 kw.	45 kw.	Revenue from sale of electricity ..	3,548	3,755	3,982
Static head	192 ft.	192 ft.	192 ft.	Revenue, miscellaneous ..	330	317	815
Generating voltage	2,200 volts	2,200 volts	2,200 volts	Working-expenses	1,053	1,075	1,221
Supply voltage	220/110 volts	220/110 volts	220/110 volts	Capital charges	1,228	1,233	1,755
Number of consumers (domestic)	214	256	294	Total annual costs	2,281	2,308	2,976
Number of consumers (commercial)	74	82	85	Profit	1,597	1,764	1,821
Units generated (hydro) ..	200,911	208,429	223,162	Accumulated Depreciation Reserve	7,895	9,128	10,366
Units generated (Diesel) ..	..	..	..		d.	d.	d.
Units sold	164,912	165,031	186,310	Average revenue per unit sold ..	5·20	5·45	5·13
Units non-productive	17·9 per cent.	20·8 per cent.	16·51 per cent	Average working-cost per unit sold	1·53	1·57	1·57
Maximum load	70 kw.	65 kw.	74 kw.	Average total cost per unit sold ..	3·30	3·36	3·83
Connected load	234 kw.	238 kw.	321 kw.		£	£	£
Average load factor	32·9 per cent.	36·4 per cent.	34·45 per cent	Capital outlay per £1 of revenue	6·35	5·73	4·97
Demand factor	29·8 per cent.	27·3 per cent.	23·05 per cent		Per Cent.	Per Cent.	Per Cent.
Route-miles of reticulation—				Ratio working-expenses to gross revenue	29·75	26·40	25·45
Overhead	$10\frac{1}{4}$	$10\frac{1}{2}$	$10\frac{1}{2}$				
Underground	$6\frac{3}{4}$	$6\frac{3}{4}$	$6\frac{3}{4}$	Ratio capital charges to capital outlay	5·68	5·29	7·36
				Ratio net profit to capital outlay	7·38	7·57	7·64

NORTH ISLAND POWER SYSTEM.

UNITS GENERATED PER WEEK.

CURVES :

1. *NORTH ISLAND SYSTEM.*
2. *ARAPUNI POWER STATION.*
3. *WAIKAREMOANA POWER STATION.*
4. *MANGAHAO POWER STATION.*
5. *HORAHORA POWER STATION.*



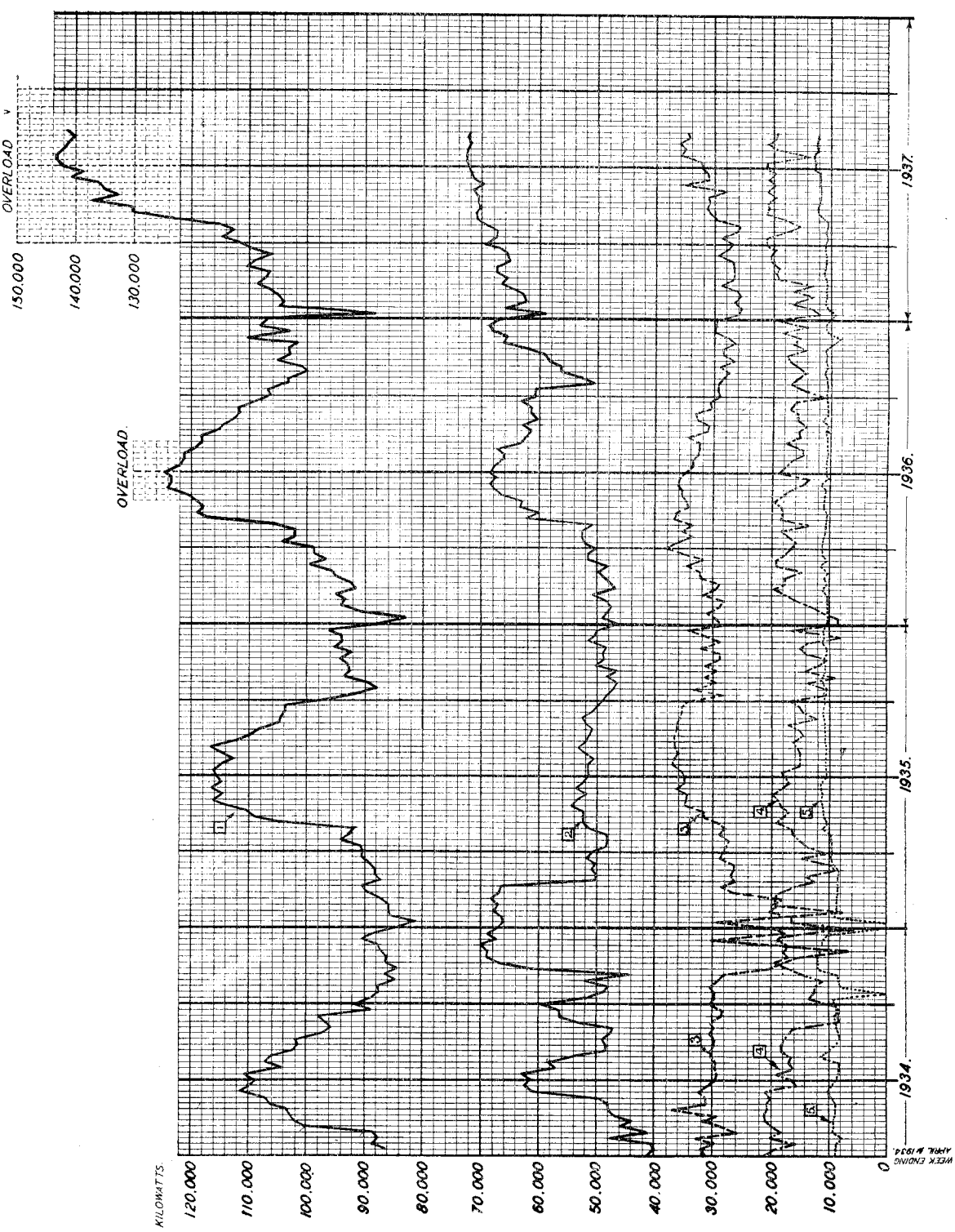
NORTH ISLAND POWER SYSTEM.

MAXIMUM WEEKLY LOADS.

CURVES:

1. *NORTH ISLAND SYSTEM.*
2. *ARAPUNI POWER STATION.*
3. *WAIKAREMOANA POWER STATION.*
4. *MANGAHAO POWER STATION.*
5. *HORAHORA POWER STATION.*

PLANT CAPACITY INSTALLED: MAIN PLANT, 122,600 kw.; STANDBY PLANT, 5,250 kw.

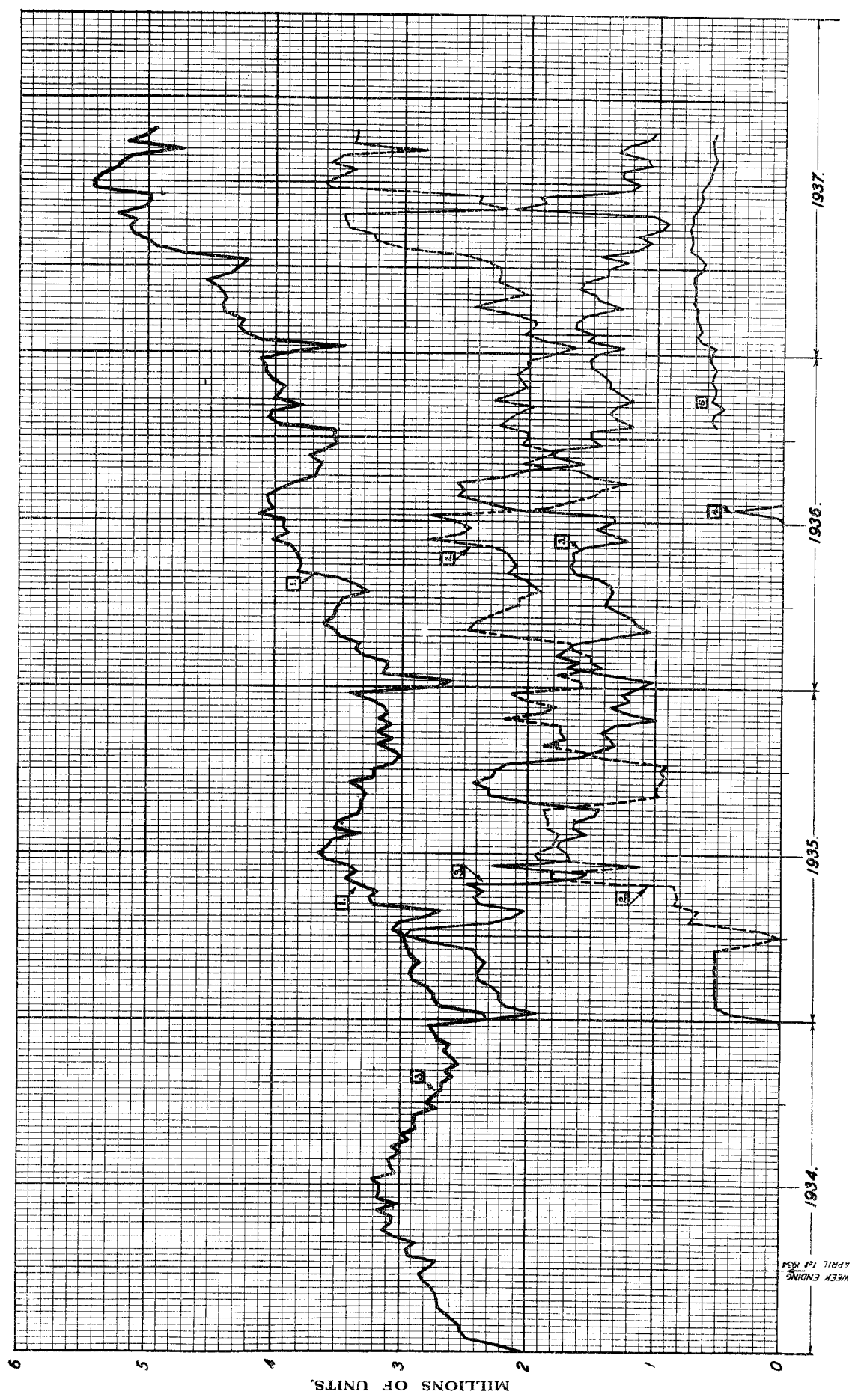


SOUTH ISLAND POWER SYSTEM.

UNITS GENERATED PER WEEK.

CURVES:

1. SOUTH ISLAND SYSTEM.
2. WAITAKI POWER STATION.
3. LAKE COLERIDGE POWER STATION.
4. SOUTH ISLAND DIESEL STATION.
5. MONOWAI POWER STATION.



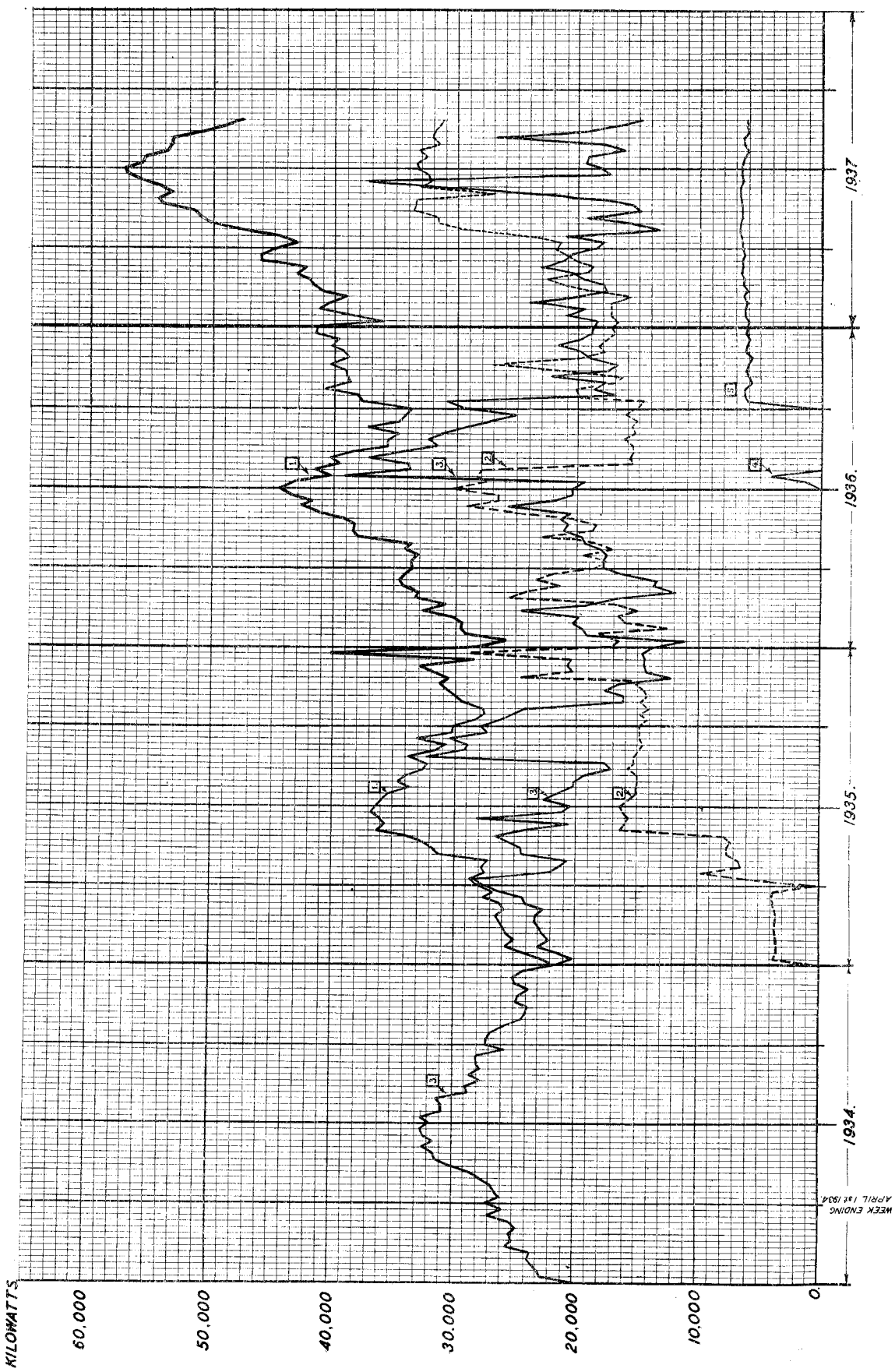
SOUTH ISLAND POWER SYSTEM.

MAXIMUM WEEKLY LOADS.

CURVES:

1. SOUTH ISLAND SYSTEM.
2. WAITAKI POWER STATION.
3. LAKE COLERIDGE POWER STATION.
4. SOUTH ISLAND DIESEL STATION.
5. MONOWAI POWER STATION.

PLANT CAPACITY INSTALLED: MAIN PLANT, 70,500 kw.; STANDBY PLANT, 5,760 kw.



APPENDIX E.

THIRTEENTH ANNUAL REPORT OF THE MAIN HIGHWAYS BOARD.

The Hon. Minister of Public Works.

Sir,—

In accordance with the requirements of section 24 of the Main Highways Act, 1922, the Main Highways Board has the honour to submit its thirteenth annual report for presentation to Parliament.

The report covers the period from the 1st April, 1936, to the 31st March, 1937, though a number of matters referred to are subsequent to the latter date and are included for convenience and completeness of record.

General.

The present length of main highways maintained or subsidized by the Board is 12,114 miles, and particulars of expenditure for the year ended 31st March, 1937, as well as a detailed statement on the position of various works are shown later in this report. Of the total length of main highways, 3,921 miles have been classified as State highways, and the State system is further referred to in another part of the report.

As mentioned in the last annual report, the Main Highways Revenue Fund and the Main Highways Construction Fund were abolished as from the 1st April, 1936, from which date all disbursements have been made from a single Main Highways Account, comprising both revenue and loan moneys.

The total expenditure from the Main Highways Account for the financial year ended on the 31st March, 1937, amounted to £3,114,196, compared with £2,337,558 for the year immediately preceding.

These figures include a number of charges against the Main Highways Account under special legislative authority and which are not directly related to matters covered by the Main Highways Act, 1922.

The total amount of £3,114,196 expended during the year 1936–37 constitutes a record in the Board's history. To some extent the increase is due to higher wages and the greater cost of materials, but apart from these factors a very extensive programme of substantial improvements has been in progress, particulars of which are described elsewhere.

Further increases in the registrations of motor-vehicles and the importation of motor-spirits indicate that the amount of road traffic, particularly on main highways, continues to grow.

Personnel.

During the year under review there were no changes in the personnel of the Board, but pursuant to section 7 of the Main Highways Amendment Act, 1936, Mr. A. J. Baker was appointed as the Deputy Chairman.

Legislation.

New legislation directly affecting the Board and passed since last report was the **Main Highways Amendment Act, 1936,** and the full text of the principal provisions reads as follows:—

"2. (1) For the purposes of the principal Act, unless the context otherwise requires,—

"'Construction' includes reconstruction, and also includes such improvement as, in the opinion of the Board, is not merely maintenance; and 'to construct' has a corresponding meaning:

"'Maintenance' includes repair.

"(2) If any question arises as to whether any work in relation to a main highway is a work of construction or a work of maintenance, it shall be decided by the Board, and the decision of the Board shall be final.

"(3) The enactments specified in the Schedule to this Act are hereby consequentially amended in the manner indicated in that Schedule.

"3. (1) Notwithstanding anything to the contrary in the principal Act or in this Act, no work of construction in relation to a main highway shall be commenced, whether by or on behalf of the Board or by or on behalf of any local authority acting pursuant to a delegation from the Board or to an agreement with the Board, except with the precedent consent of the Minister.

"(2) The Minister, in his discretion, may refuse his consent under this section to the commencement of any work or works, or may grant his consent either unconditionally or upon or subject to such conditions as he thinks fit to impose. Any consent under this section may relate to any specified work or works or to a general programme of works.

"4. (1) The Board may from time to time, with the approval of the Minister, classify any main highway or portion of a main highway as a State highway.

"(2) The Board may from time to time determine a standard with respect to the construction and maintenance of any main highway or portion of a main highway.

"(3) Any classification or determination made under the foregoing provisions of this section may in like manner from time to time be varied, or may be at any time in like manner revoked.

"(4) This section is in substitution for section ten of the principal Act, and that section and section eleven of the Main Highways Amendment Act, 1925, are hereby accordingly repealed.

"5. (1) Subject to the provisions of this section, where a main highway or portion of a main highway has been classified under the last preceding section as a State highway the whole of the cost of the construction and maintenance of the State highway in accordance with the standard prescribed by the Board shall, as from the date of the classification, be provided by the Board out of the Main Highways Account.

"(2) In respect of any State highway the Board may undertake, at the request of a local authority, or may authorize any local authority to undertake, any work of construction or maintenance that is of a higher standard than the standard prescribed by the Board or is in addition to the works required to be undertaken in order to comply with that standard. In any such case the Board may, in its discretion, and subject to such terms and conditions as it thinks fit, provide out of the Main Highways Account the whole or such part (if any) as the Board thinks fit of the cost of the work in so far as, in the opinion of the Board, it exceeds or is in addition to the cost that would have been incurred in carrying out works of the standard prescribed by the Board. Except as provided in this subsection, the additional cost, or so much thereof as is not provided by the Board as aforesaid, shall be payable by the local authority concerned.

"(3) Nothing in the foregoing provisions of this section shall be construed to relieve any local authority from any liability or obligation to which it may be subject in respect of any main highway at the time of the classification of the highway as a State highway. In any case where, pursuant to an arrangement made between the Board and a local authority before the classification of a highway as a State highway, the local authority is liable for a contribution towards the cost of the construction or maintenance of the highway, the Board may, if it thinks fit, remit the contribution in whole or in part in so far as it relates to a period after the classification of the highway as a State highway. If any amount so remitted has been paid it shall, without further appropriation than this section, be refunded out of the Main Highways Account.

"6. (1) If any local authority is dissatisfied with any final decision of the Board fixing the proportions of the cost of any work to be provided by the several local authorities in a highway district under section eighteen or section nineteen of the principal Act, or refusing in whole or in part an application for a remission under subsection three of the last preceding section, it may appeal to the Minister against the decision.

"(2) Every appeal under this section shall be made in writing within one month after the local authority has received notice of the decision of the Board and of the fact that it is final.

"(3) Upon an appeal under this section the Minister may either confirm the decision appealed against or vary it as he thinks fit.

"(4) For the purposes of this section a decision of the Board shall be deemed to be final when the Board expressly states that it is final. It shall be the duty of the Board whenever required so to do by a local authority that is affected by any decision of the Board to state forthwith whether or not the decision is final.

"7. Section five of the principal Act is hereby amended as follows:—

"(*a*) By adding to paragraph (*a*) of subsection three the words 'and the other shall be appointed as the Deputy Chairman of the Board.'

"(*b*) By inserting in subsection seven, before the words 'the members present shall appoint', the words 'the Deputy Chairman, if present, shall preside, and in the absence of both the Chairman and the Deputy Chairman'."

The classification of main highways as State highways pursuant to this legislation is dealt with in a subsequent paragraph.

Section 3 of the Finance Act (No. 2), 1936, empowered the Minister of Finance to borrow £2,000,000 for the purposes of construction or reconstruction of main highways, making the total loan authority £6,000,000.

Finance.

The actual income of the Main Highways Account from revenue sources for the year 1936–37 amounted to £2,385,889. The table below shows how this amount is made up, and also the corresponding figures over the previous nine years. In addition to this amount, £853,500 was borrowed for main highways. The annual loan charges against the Main Highways Account increased from £291,651 for the year 1935–36 to £307,516 for the year 1936–37:—

——	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34.	1934–35.	1935–36.	1936–37.
	£	£	£	£	£	£	£	£	£	£
Transfer from Consolidated Fund	35,000	35,000	35,000	†	†	†	†	†	†	†
Proceeds of tax on tyres and tubes collected through the Customs Department	219,658	196,747	155,722	129,188	84,649	63,253	62,979	91,693	93,308	138,894
Registration and license fees of motor-vehicles, &c.	303,861	341,017	378,135	397,139	372,224	354,216	354,444	355,990	397,606	545,763
Motor-spirits tax ..	130,461	730,414	873,369	1,219,209	1,231,202	644,126	669,868	970,506	1,449,125	1,697,942
Mileage-tax ..	..	..	..	..	..	..	1,133	1,284	1,616	3,290
Totals ..	688,980	1,303,178	1,442,226	1,745,536	1,688,075	1,061,595	1,088,424	1,419,473	1,941,655	2,385,889

† Further transfers abolished by amending legislation.

It will be noted that income from revenue sources for the year 1936–37 was almost £450,000 greater than the previous highest figure for the year immediately preceding.

The receipts from the Customs tax on tyres and tubes show a substantial increase on the amounts obtained from this source during the previous five years, and was £50,000 more than for the year 1935–36.

Registration, license fees, &c., constituted a record to date, being £148,000 in excess of the previous highest total for the year 1935–36.

The proceeds from the motor-spirits tax were also very much higher for the year 1936–37, being nearly £250,000 greater than the previous year's total, and representing the largest sum which has been credited to the Main Highways Account in any one year up to the present.

The revenue for the year 1936–37 which was derived from the mileage-tax levied on motor-vehicles using other than motor-spirits, and trackless trolly-omnibuses, and credited to the Main Highways Account, amounted to twice the sum received from this source during the previous year.

The gross importations of motor-spirits since 1927 have been as follows, these figures providing a good index of the volume of motor traffic to which maintenance requirements especially are closely related :—

	Gallons.		Gallons.
1927 (January to December) ..	48,000,000	1932 (January to December) ..	58,400,000
1928 ,, ..	54,500,000	1933 ,, ..	55,400,000
1929 ,, ..	62,400,000	1934 ,, ..	64,600,000
1930 ,, ..	68,300,000	1935 ,, ..	65,300,000
1931 ,, ..	61,800,000	1936 ,, ..	86,800,000

It will be noted that the gross importations reached a peak figure in 1936. This heavy consumption of petrol, even after making allowance for the amount on which road-tax is not payable, indicates an immense increase in mileage travelled by motor traffic, and, in conjunction with the fact that the number of registered vehicles has also increased considerably, affords some idea of the extent of recent developments in the use of highways generally. The large increase referred to is not reflected to the same extent in the Board's revenue for the financial year 1936–37 owing to the fact that substantial importations took place during the latter months of the previous financial year, while such importations are, of course, included in the calendar year total.

The following is a summary of expenditure from the Main Highways Account for the year ended 31st March, 1937 :—

	Expenditure.
	£
Maintenance—	
North Island	601,882
South Island	298,849
Renewals—	
North Island	75,116
South Island	31,288
Construction and improvements—	
North Island	761,717
South Island	633,140
Administration and general charges	109,365
Loan charges (including commutation of toll-gate charges and of Hutt Road fees)	407,516
Subsidy on rates	195,323
	£3,114,196

An analysis of the expenditure for 1936–37 by the Board and by local authorities on maintenance only, as distinct from renewals, construction, interest on loans, and other overhead charges, is shown in the tabulation below :—

——	Board's Contribution.	Local Authorities' Contribution.	Total.	Percentage Board's Contribution to Total.	Percentage Local Authorities' Contribution to Total.
	£	£	£		
North Island	601,882	131,023	732,905	82·12	17·88
South Island	298,849	65,000	363,849	82·14	17·86
Total	900,731	196,023	1,096,754	82·13	17·87

An analysis of the actual expenditure by the Board on maintenance in each Island, as compared with the number of motor-vehicles in each Island at the 31st March, shows the following comparisons for the last ten years :—

——	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34.	1934–35.	1935–36.	1936–37.
North Island—										
Maintenance expenditure	67·51	66·13	62·30	59·23	62·31	62·84	63·80	65·44	64·80	66·82
Motor-vehicles ..	62·19	63·08	63·63	63·84	63·77	63·78	63·94	64·31	64·84	65·30
South Island—										
Maintenance expenditure	32·49	33·87	37·70	40·77	37·69	37·16	36·20	34·56	35·20	33·18
Motor-vehicles ..	37·81	36·92	36·37	36·16	36·23	36·22	36·06	35·69	35·16	34·70

NOTE.—Prior to 1936–37 these percentages relate rather to expenditure from the Revenue Fund, but as from 1st April, 1936, true maintenance figures have been recorded.

The following table shows an analysis of expenditure for the year 1936–37 by the Board and by local authorities on renewals :—

——	Board's Contribution.	Local Authorities' Contribution.	Total.	Percentage of Board's Contribution to Total.	Percentage of Local Authorities' Contribution to Total.
	£	£	£		
North Island	75,116	18,014	93,130	80·66	19·34
South Island	31,288	2,753	34,041	91·91	8·09
Totals	106,404	20,767	127,171	83·67	16·33

An analysis of the Board's expenditure and the expenditure by local authorities for the year 1936–37 on improvements and construction shows the following position :—

——	Board's Contribution.	Local Authorities' Contribution.	Total.	Percentage of Board's Contribution to Total.	Percentage of Local Authorities' Contribution to Total.
	£	£	£		
North Island	761,717	63,995	825,712	92·25	7·75
South Island	633,140	18,498	651,638	97·16	2·84
Totals	1,394,857	82,493	1,477,350	94·42	5·58

The following tabulation shows the amounts which have been provided by the Board and the local authorities on maintenance, renewals, and construction during the last ten years :—

——	1927–28.	1928–29.	1929–30.	1930–31.	1931–32.	1932–33.	1933–34	1934–35.	1935–36.	1936–37.
	£	£	£	£	£	£	£	£	£	£
Maintenance by Board ..	523,581	756,399	1,049,249	872,577	849,734	600,324	674,026	932,675	1,190,179	900,731*
Maintenance by local authorities	269,065	284,526	375,849	317,839	21[illegible],568	168,466	187,735	226,554	284,423	196,023*
Construction by Board ..	449,904	936,148	1,007,957	667,902	361,969	159,323	198,295	325,483	428,084	1,501,261†
Construction by local authorities	262,538	214,155	203,148	150,984	94,973	43,181	55,997	57,975	78,263	103,260†
Totals	1,505,088	2,191,228	2,636,203	2,009,302	1,522,244	971,294	1,116,053	1,542,687	1,980,949	2,701,275
Percentages.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Maintenance by Board ..	66·0	72·7	73·6	73·3	79·8	78·1	78·2	80·5	80·7	82·1
Maintenance by local authorities	34·0	27·3	26·4	26·7	20·2	21·9	21·8	19·5	19·3	17·9
Construction by Board ..	63·1	81·4	83·3	81·6	79·2	77·6	77·0	84·9	84·5	93·6†
Construction by local authorities	36·9	18·6	16·7	18·4	20·8	22·4	23·0	15·1	15·5	6·4†

*These figures represent true maintenance expenditure, whereas in preceding years expenditure under the Revenue Account was shown. †These figures and percentages relate to renewals and construction; previously renewals have been absorbed in both maintenance and construction.

The maintenance figures in the above tabulation exclude indirect charges such as supervision, interest, &c., but include the cost of earthquake and flood-damage restoration.

It will be noticed that expenditure on constructional work was over £1,000,000 greater than in the previous year, and further that the proportion found by local authorities continued to diminish, particularly in respect of construction work, where the local authorities contributed only 6·4 per cent.

The following statement shows the total expenditure by the Board in each Island on both maintenance and construction for the financial year ended 31st March, 1937, the latter including renewals. The figures take into account administration charges, but exclude interest on highways loans :—

——	Expenditure on Maintenance.	Expenditure on Renewals and Construction.	Total Expenditure in each Island.	Percentage of Expenditure in each Island.
	£	£	£	
North Island	629,287	874,933	1,504,220	59·90
South Island	312,456	694,681	1,007,137	40·10
Totals	941,743	1,569,614	2,511,357	100·00

Promotion of Employment.

Reference was made in last year's report to improvement works which were in progress, and which had been commenced principally to relieve unemployment. These activities have been continued and improvements to further sections taken in hand without financial aid from the Employment Promotion Fund. The retention of the large number of men on highways has meant a substantial commitment against current funds, but extensive and beneficial results have been obtained earlier than would otherwise have been the case. One of the problems associated with the promotion of employment is the selection of justifiable works in appropriate localities. On completion of planned reconstruction there is a tendency to expect further improvements, in order to continue employment, in places where traffic requirements are not so urgent as elsewhere. There is, of course, much scope for reconstruction on many sections of main highways, and as far as possible this type of work is being undertaken where the needs are greatest.

Maintenance.

Due to the fact that in previous years the Main Highways Account was divided into two funds, it has been the practice to include under the heading of "maintenance" expenditure from the Revenue Fund, which also covered a large number of minor improvements. The aggregate cost of these improvements in the past has been included in the average maintenance costs of the main highways system, but commencing from 1st April, 1936, the beginning of the year under review, the Board's expenditure has been recorded so as to indicate how much expenditure is represented by the term "maintenance." The total maintenance expenditure by the Board and by local authorities during the financial year 1936–37 amounted to £1,096,754, which is equivalent to an average of £90·5 per mile over the total main highways system of 12,114 miles.

As the State arterial highways system was not inaugurated until late in the financial year, it is not practicable to show separately the maintenance costs of State highways and ordinary main highways respectively, as these would relate only to portions of the year covered by this report. In future, however, separate costs will be available for complete years, and it is proposed to include details in later reports.

Maintenance operations were affected, to some extent, during the past year by prevailing wet conditions throughout most districts. Also, as mentioned in the last report, some local bodies took little more than a perfunctory interest in the State highways which were under their control during the period that necessarily had to elapse before the Board could complete its organization and assume control.

The up-to-date plant purchased by the Board and local authorities during the year has assisted considerably in the direction of bringing the mechanical equipment up to a higher standard of efficiency. The majority of the graders now employed are of modern design, with ample power and speed, enabling more frequent and regular gradings to be carried out.

In taking over the State highway system the Board expected that quite a number of local bodies would have plant that they would desire to sell, but, with one or two exceptions, all that was offered were a few unsuitable machines. The release of local-body plant from the arterial highways, which had in most cases first call, together with the financial relief to local bodies through the inauguration of the State system, should be reflected in improved maintenance on ordinary main highways and county roads.

In order to provide for the proper maintenance of the State system, twenty-five modern power graders were ordered under indent, and fifty-two machines, as designed for the Board by the Public Works Department, have been ordered for local manufacture. Of these latter, thirty-eight have now been delivered and are in service. On account of the economy in operation, nine of these machines have been equipped with Diesel power units, and the remaining fourteen, still to be delivered, will be similarly equipped. It is proposed to change over the petrol units to Diesel power as each machine becomes due for engine reconditioning.

On the basis of eighty graders for the State system, the average length which each will require to service is fifty miles. The annual cost of running each machine, including depreciation, is approximately £700, or £14 per mile, representing about 10 per cent. of the total State highways maintenance cost.

The purchase by the Board of grading plant and other maintenance equipment has been carried out on a conservative basis, having in view the progressive advancement of paving on State highways, and the consequent reduction in the length of metalled surfaces. Also, no special provision has been made for standby plant, and in the event of the paving programme being delayed through adverse seasonal or other conditions, it is possible that supplementary orders will require to be placed in order to meet special circumstances.

Renewals and Improvements.

The expenditure on renewals and improvements for the year 1936–37 was £1,501,261, a very substantial increase on the corresponding expenditure for the preceding year.

The season just passed was not a good one for bituminous surfacing, owing to the continual wet weather in early summer and mid-summer. Even the late summer was not as good as might have been expected, consequently much of the sealing-work that would normally have been carried out prior to the 31st March was delayed till the fall of the year, and in many cases had to be entirely postponed.

During the year 272 miles of highway were reconstructed, formed, or widened, and 254 miles of dustless surfacing were completed, of which 184 miles were sealing and 67 miles plant-mix pavement.

The Board has continued the policy of assisting towards the provision of dustless surfaces on main highways in small townships, even though the adjacent lengths may not be paved for some time to come.

The table below shows the extent and types of work carried out on the main highway system by the Board and local authorities since the Board commenced active operations in 1924 :—

Year.	Formation and Widening.	Gravelling and Metalling.	Tar and Bituminous Sealing.	Road-and-Plant-mix Bituminous Surfacing.	Bituminous Macadam (Penetration).	Bituminous Concrete.	Portland-cement Concrete.	Bridges.
	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.	Ft.
1924–25.. ..	19	63	6	..	6	..	..	2,434
1925–26.. ..	45	88	16	..	45	4	6	5,168
1926–27.. ..	174	151	35	..	38	12	16	6,408
1927–28.. ..	173	133	83	..	34	..	6	7,760
1928–29.. ..	224	185	122	..	51	14	11	9,482
1929–30.. ..	173	179	133	..	39	31	12	7,547
1930–31.. ..	130	128	95	..	41	14	9	11,175
1931–32.. ..	139	69	129	..	32	9	3	4,062
1932–33.. ..	56	45	72	..	8	..	..	3,178
1933–34.. ..	44	28	75	..	7	..	1	4,988
1934–35.. ..	113	69	172	27	3	..	2	6,641
1935–36.. ..	152	98	245	91	2	..	..	8,718
1936–37.. ..	272	131	184	67	3	..	..	9,575
Totals ..	1,714	1,367	1,367	185	309	84	66	87,136

A description of some of the major works is as follows :—

Whangarei District.

The northern peninsula is subjected to sub-tropical rains which promote considerable flooding, and this materially affects the trunk routes running north, thereby causing interruption and serious delay to traffic.

As funds permitted, the Board has undertaken the raising of the highway above flood-level at several of the worst places. Those in hand during the current year were at Kawakawa, Milne's Flat, Waiomio, and Hukerenui.

Construction has been continued on the main route between Auckland and Whangarei, the sealing to Topuni being well advanced towards completion. During the year consideration was given to the portion of main highway north of Kaiwaka. Much of the formation on the present route is in slippy-limestone country, which would be a never-ending source of trouble, as the ground is liable to move both above and below the formation. It was finally decided to adopt a deviation farther to the eastward in dacitic formation, which is much more stable.

The connection from the deviation to Maungaturoto is via the Brynderwyn Road which, although about one mile longer, will not, when improved, increase the time factor to that point. A great improvement has been effected to the alignment on the Waiwera Hill, where practically all the sharp bends and zig-zags are being eliminated.

Auckland District.

Between Auckland and Helensville reconstruction has been in progress preparatory to extending the dustless surfacing of this State highway northwards in the direction of Helensville. In the course of reconstruction a number of deviations have been made for the purpose of obtaining better alignment and improved visibility.

The reconstruction of the Great South Road, south of Hamilton, has been continued, and except for one or two small sections the first-coat sealing has been practically completed to the southern boundary of the Waipa County. It is interesting to note that when the work was originally proposed the standard curvature was a minimum of 6 chains radius, but in view of the development of speed in the motor-vehicle it was considered advisable to adopt 10-chain-radius curves as a minimum. As the work has progressed it was found that the higher standard had not increased the cost.

The adjoining section of the Great South Road in the Otorohanga County has also been under reconstruction, and improvements to the formation and alignment have been carried out in readiness for paving.

Improvements to the arterial traffic route from Pokeno Junction across the Waikato Plains towards Paeroa have been continued, and earthwork has steadily been advanced.

Arrangements have been made for reconditioning the main highway between Putaruru and Oruanui in order to cater for the growing needs of timber traffic in the Atiamuri and surrounding districts. Most of this length is of light construction, and the steps proposed are designed to strengthen the foundations, if possible, before major damage occurs. In order to obviate claims against transport operators for extraordinary damage to the highway, the payment of a levy on all timber taken out over the road has been decided upon. The Board was of opinion that this course was in the best interests of all concerned, rather than to allow the surface to suffer destruction before remedial measures could be taken.

Throughout the Auckland District general improvements and a certain amount of paving have been carried out, and particulars of these are given later in the detailed progress report.

Tauranga District.

The principal works in progress in the Tauranga District were improvements to the main highway over the Kaimai Hills, and the construction to a moderate standard of an all-weather highway along the coastal route between Opotiki and Cape Runaway.

On the Kaimai Hills the original alignment was very tortuous and the highway generally in bad shape, but the reconstruction work in hand will provide a much improved outlet for Tauranga and the surrounding district.

On the Opotiki – Cape Runaway section, traffic has suffered inconvenience and delays on account of the many unbridged rivers which, in times of flood, completely isolated the area. It is proposed to bridge all waterways on this route as soon as possible, and work is already in progress with the construction of the Raukokore River bridge and approaches. Plans for the other structures required are in hand, and further construction work on certain sections of the main highway is progressing.

Gisborne District.

The principal works in this district were on the Gisborne – Te Araroa and the Gisborne–Wairoa via Hangaroa Highways. In addition to some 5 miles of reconstruction and sealing on the former, it was found urgently necessary to replace the old bridge over the Uawa River at Tolaga Bay Township, and construction is well forward. Also on this highway the Karakatuwhero Bridge near Te Araroa has been almost completed.

On the Gisborne–Wairoa via Hangaroa Highway realignment and surfacing throughout a length of some 16 miles have been undertaken.

Napier District.

Heavy formation work has been in hand on the Taupo–Napier and the Napier–Wairoa Highways. Both of these highways traverse difficult country, and in order to obtain reasonable alignment very heavy formation has been necessary, particularly in the gorge sections of the road.

On the former a considerable amount of widening and improvements to curvature have been carried out on the Napier side of Te Pohue, whilst beyond Tarawera work has been commenced on the Runanga Deviation. This deviation, which will be approximately 8 miles in length, leaves the present main road at the Nunneries Bridge and will follow an easy grade up the Waipunga River. When completed it will eliminate a very hilly and tortuous portion of the existing route.

On the flats from Napier southwards, where the traffic is generally heavier, sealing-work has been carried out by several local bodies. The Manawatu Hill deviation has been completed, including the erection of a new bridge over the Manawatu River, this being the last of the bad hill sections between Napier and Palmerston North. Previously this section of highway was of restricted width and of sharp curvature, but a major deviation has provided ample room for traffic with improved visibility and better alignment.

Taumarunui District.

This area, which occupies the central portion of the North Island, contains portions of connecting trunk routes which traverse the Island in several directions, and, though traffic densities generally are smaller than in the areas to the north and south, it is essential that these connecting links receive the consideration which their importance warrants. Generally the area has not yet become the focal point, but, as reconstruction of the highways from the north and south is nearing completion, consideration will have to be given during the next few years to extending improvements throughout this area.

In the meantime some of the heavy construction between Te Kuiti and Pio Pio and between Te Kuiti and Taumarunui has been put in hand and steady progress made. It is advisable that the formation, which passes through unstable country, should have some time to consolidate before receiving its final surfacing.

Taranaki District.

The re-formation of the main arterial highway in the Mimi Valley has been continued, and marked improvements have been made in the direction of straightening the alignment where the original road followed a winding and irregular course. Other works in this district were on the National Park – Wanganui and on the Horopito–Bulls Highways where heavy re-formation work has been in progress. The sections in hand traverse particularly difficult country, and the improvements which are being made are of a very comprehensive nature. The completion of the sealing on the Turakina–Cliff Road via Marton Highway has been a welcome improvement in the direction of providing a dustless surface on a route much used by fast-moving traffic.

Wellington District.

Three major works have been in progress—viz., the completion of the paving between Himatangi and Sanson, the realignment and raising of the highway above flood-level at Whirokino, and the linking-up of dustless surfacing throughout the arterial highway in the Wairarapa.

On the Himatangi–Sanson section great difficulty has been experienced in maintaining at all times a reasonable gravel surface, and the condition of this length has been a continual source of complaint by motorists. The second-coat sealing-work has not been completed, but re-formation and tar-priming have been finished, and in the meantime road-users have the advantage of a dustless surface.

At the Whirokino Deviation a contract has been in progress in connection with the erection of 3,000 lineal feet of reinforced-concrete trestling over the flood channel. The erection of the main bridge over the Manawatu River will be put in hand at a later stage, but in the meantime the approach banks have been formed to allow the fillings to consolidate.

The paving during the year of the remaining sections of the trunk highway through the Wairarapa has provided a continuous stretch of dustless surfacing between Wellington and Napier, a distance of some 230 miles.

Nelson District.

On the Waimea Plains, several surfacing jobs are in hand, those of particular interest being the section from Nelson to the Lud Bridge and the section between Richmond and Motueka.

Very heavy formation work has been carried out in connection with the widening and realignment of the main highway over the Takaka Hill, where the road climbs to a height of some 2,600 ft. This is the longest individual hill section in New Zealand, and, although the curvature could not be improved to a particularly high standard, the improvements have considerably eased the curves, increased the width, and generally placed the highway in much safer condition than it was previously.

Improvements of a similar nature have been carried out over the hilly sections between Nelson and Blenheim and between Nelson and Westport, the standards on these lengths having been raised very considerably.

Greymouth District.

From the West Coast district of the South Island the outlets to other districts traverse very rugged country, and to make these outlets reasonably safe a large expenditure is involved. During the last few years widening of the narrowest sections and general reconstruction have been in hand, and during the financial year covered by this report further progress has been made on the Nelson–Westport, the Inangahua–Greymouth, and also the Christchurch–Kumara sections. The district contains more lineal feet of bridging per mile of highway than any other district in New Zealand. Many of the bridges have reached the stage where their renewal can no longer be deferred, and some twenty-five replacements have been in hand and are in various stages of completion.

Christchurch North District.

During the year a contract has been let for the construction of the Conway River Bridge on the inland main highway between Culverden and Kaikoura. Settlers have been required to use a rather dangerous ford on this river, but the erection of the bridge is nearing completion and will shortly be available to traffic.

Sealing has been completed between Hurunui and Red Post, a distance of some 10 miles.

Christchurch Central District.

One of the principal works in this area has been the metalling and preparation for sealing of the Summit Highway between Evans Pass and Dyers Pass along the summit of the Port Hills. The highway will be almost entirely of scenic and recreational value, affording motorists from all parts of the Canterbury Plains an excellent view of Christchurch and the surrounding seascape from an elevated position. The length of the highway is some 9 miles, and it should be ready for sealing during the coming season.

Widening has been in progress on the main highway between Sumner and Lyttelton, where, on account of the narrow roadway along a steep rock sideling, concrete and rock retaining-walls have had to be constructed in order to secure a reasonable width of roadway.

Throughout this district a number of sealing-works have also been undertaken, but these are more particularly described later in the detailed progress report.

Christchurch South District.

In South Christchurch district a bold step has been taken by the Board in letting contracts for modern highway traffic bridges over the Rakaia and Rangitata Rivers.

The Rakaia Bridge is nearly 6,000 ft. in length, and will be the longest road bridge in the Dominion. Heretofore it has been necessary for road traffic to make use of a combined road and railway bridge of similar length, and this has occasioned a considerable amount of delay and inconvenience.

The combined bridge, which is a timber structure, was built in 1873, and it was found that the end of its useful life was rapidly approaching. The Railways Department has commenced a new bridge, and consideration was given to the taking-over of the railway bridge for highway purposes, but such a large sum of money was required to recondition it for road traffic that it was found to be more economical to proceed immediately with the construction of a reinforced-concrete road bridge 24 ft. wide.

A contract has also been arranged for the construction of the Rangitata bridges, which will cross the north and south arms of the river respectively, and work has been commenced. The total length of these two bridges is 3,000 ft., and they form part of the Rangitata Deviation, which will reduce the length of the highway between Christchurch and Timaru by some 10 miles. On the deviation, which is 21 miles long, good progress has been maintained with construction.

Dunedin District.

At the beginning of the year there were unsealed gaps between Dunedin and Oamaru totalling some 26 miles. Contracts for re-formation and sealing of the whole of this length have been put in hand, and good progress is being maintained. At the end of the coming sealing season it is expected that the only unsealed section between Christchurch and Dunedin will be a short length of the Rangitata Deviation.

The work of pushing forward the reconstruction and sealing south of Dunedin has made considerable progress, where more than 11 miles of formation has been completed beyond Milton Borough. Considerable improvement by widening has also been effected between Clyde and Cromwell and on the section near the Lindis Pass. The former section passes through the Cromwell Gorge, paralleling and crossing the Otago Central Railway in a number of places, and in the course of improvement it has been possible to eliminate a number of level-crossings by exchanging positions between the road and the railway.

Invercargill District.

While the trunk routes in this district were under the control of the local authorities comparatively little progress was made in providing dustless surfacing, so that at the present time there is considerable leeway to make up. The Board has already taken in hand the sections from Invercargill to the Bluff, and north of Invercargill from Kennington to Brydone. Contracts have been let, and during the coming year much of the work at present in hand should be ready for sealing.

Major improvements are in hand between Pukerau and McNab, where a deviation is being constructed to provide an all-weather route which will replace a length of the existing highway subject to serious flooding.

The most extensive work, however, in the Southland District has been the construction of the road connection to Milford Sound, which involves the piercing of the Homer Saddle by a tunnel some 60 chains in length. Weather conditions during the past year have been very trying and have considerably delayed progress. Many setbacks were suffered, and these culminated in a catastrophe when an avalanche fell over the mouth of the Homer Tunnel, resulting in the death of the Engineer in Charge and one of the Overseers. The season was considered to be so untoward that it was deemed advisable to suspend temporarily the work on the tunnel.

In the meantime the road approach to the tunnel from the Milford Sound side is being pushed forward, and a length of 5 miles, or practically one-half of the formation, has been completed.

BRIDGES.

During the year ninety-eight bridges have been completed, the total length being 9,575 ft. In addition to those completed there is over 15,000 ft. of bridging in hand.

Nearly all of the bridges that have been completed are two-way structures, and where single-lane traffic bridges have been adopted it has been on account of the relatively low traffic on the highway. On important trunk routes the standard width is 24 ft. between kerbs. It is found, in any case, that the difference in cost between 20 ft. or 22 ft. and 24 ft. is so small that the long view has been taken having regard to the life of reinforced concrete and the phenomenal increase in the number of motor-vehicles using the highways.

Among the most important structures at various stages of completion, the following are particularly mentioned :—

Uawa River Bridge, on the Gisborne - Te Araroa State Highway at Tolaga Bay Township, has been designed to replace an old structure comprising a steel latticed truss on timber foundations. The new bridge is to be of reinforced concrete on piles, having ten 50 ft. spans, with a roadway 22 ft. wide, and one footway 4 ft. wide. A contract for its erection is in progress, and the cost will be approximately £16,000.

Kaiteritahi Bridge, on the Gisborne–Whakatane via Waioeka State Highway, crosses the Waipaoa River. The old timber bridge is being replaced by a new structure consisting of six 90 ft. steel-plate girder spans, with concrete deck, having a road-width of 20 ft. supported on reinforced-concrete pile piers. The total cost will be in the vicinity of £15,000. A contract has been let for this bridge, but owing to difficulty in obtaining steel, it has not been possible to make very much progress with construction.

Te Reinga Falls Bridge, situated on the Ruakituri Valley Main Highway, was completed during the year. This structure replaces an old timber truss bridge built in 1915 across the Wairoa River some twenty miles north of Wairoa, and has a main suspension span of 198 ft. with short joist spans at either end. The deck of the suspended span is of timber and that of the approach spans of concrete, the width throughout being 10 ft. The steel and iron work for the new bridge were fabricated by the Railways Department, and the erection was carried out by contract at a total cost of approximately £6,000.

Whirokino Trestle, for which a contract has been let, is on the Wanganui–Levin State Highway a few miles south of Foxton, and forms part of a deviation where the road-level is being raised above the flood-level of the Manawatu River. The trestle, which is required to provide an opening for flood waters, will be 3,600 ft. long, made up of ninety 40 ft. reinforced-concrete spans, having a roadway 24 ft. in width supported on concrete pile piers. The cost will be approximately £50,000.

Hokitika River Bridge, at Kanieri, is situated on the Greymouth–Weheka State Highway a few miles from Hokitika, and is being constructed to replace a timber truss bridge erected in 1878 which was severely damaged by flood in 1932. The new structure will be 806 ft. long, consisting of thirteen 62 ft. reinforced-concrete spans on concrete pile foundations, the roadway being 22 ft. in width. The erection of the new bridge is being carried out by contract, and the total cost will be in the vicinity of £20,000.

Ashley River Bridge, on the Picton–Christchurch State Highway, has recently been completed at a cost of some £20,000. This bridge is 1,190 ft. in length and has fifteen 52 ft. and ten 41 ft. continuous spans, supported on piles, the whole structure being of reinforced concrete, and having roadway 22 ft. wide. The bridge was built by contract, and was completed eleven months ahead of contract time. Built several chains downstream from the old timber structure which it has replaced, the new bridge is on a better alignment and conforms to a major scheme of river-control which is being carried out by the Ashley River Trust.

Rakaia River Bridge is on the Christchurch–Timaru State Highway about 34 miles south of Christchurch. A contract has been let for this new structure, which will be the longest road bridge in New Zealand. It replaces a combined road and railway bridge and will comprise one hundred and forty-four 40 ft. spans, giving a total length of 5,760 ft. Construction will be of reinforced concrete, and the deck of 24 ft. width will be supported on pile foundations. The cost will be approximately £65,000.

Rangitata River Bridges, on the Christchurch–Timaru State Highway, will cross the north and south branches of the river. Erection of both bridges is being carried out under a single contract. The structures will be of reinforced concrete on pile piers, and will have a 24 ft. roadway, the one across the north branch consisting of fifty-three 40 ft. spans and the other across the south branch of twenty-six 40 ft. spans. The cost of the two bridges will total approximately £44,000.

Elimination of Level-crossings.

During the past year only some £100,000 was spent on the elimination of level-crossings, though a great amount of work was put into the preparation of proposals and completion of designs.

The programme as originally set out included the elimination of 250 of the 530 crossings on main highways, and of these 250, 200 proposals were given consideration. At present the work on the level-crossing programme may be summarized as follows:—

Work completed	15 crossings.
Contracts let and/or work in hand	67 crossings.
Proposals completed	7 crossings.
Proposals in hand	57 crossings.
Surveys, &c., in hand	36 crossings.
Investigated and deferred	18 crossings.
	200

In investigating many of the proposals it was found that those in or adjacent to many of the towns and boroughs presented considerable difficulty. As a general rule these towns and boroughs had grown up round the railway-station with the business premises as close as possible to the station. In many cases the most valuable sites are found to be close to the level-crossing where property interference reaches a maximum. Consequently many of the proposals were too costly for immediate consideration.

On the other hand, road speeds in the towns are slower, and generally the trains are either pulling up or getting under way, so that the danger here is often not as great as at those crossings in the open country where train speeds are high and the crossings occur in unsuspected places.

However, those crossings which have been deferred will be given further consideration when elimination has been effected on the trunk-route crossings in rural areas, but in the meantime arrangements have been made with the Railways Department for the installation of automatic warning signals.

Many interesting problems have been met, and it has been found that each crossing requires special consideration. Each elimination where a subway or overbridge is the solution does, to a certain extent, place an obstruction to visibility, so that the greatest care has been taken to give the maximum possible sight distance on the horizontal and vertical consistent with economy. The following is a description of some of the level-crossings that have been eliminated, and these are typical of most of the others:—

Kamo.—Length, 90 ft., comprising three 30 ft. spans and having a roadway 24 ft. wide. The bridge, which has pile foundations, has been designed on the straight and is nearly square to the

centre-line of the railway. It eliminates a bad crossing on the Lake Omapere – Maungaturoto State Highway about 3 miles north of Whangarei. Construction work is being carried out by the Public Works Department, and the cost of the bridge-work will be approximately £2,100.

Huapai.—Length, 80 ft., consisting of three continuous spans of 24 ft., 32 ft., and 24 ft. on pile foundations. The roadway is 22 ft. wide, and there is also a footway 4 ft. wide. The bridge is on the straight, but crosses the railway at an angle of 32°, with the piers parallel to the railway. Construction has been completed at a cost of £2,530 for the bridge itself, which is on the Auckland–Helensville State Highway.

Waipukurau.—Length, 200 ft., consisting of four 50 ft. spans, with a roadway 24 ft. wide. The bridge will be on the straight, crossing the railway at an angle of 29°, and one step-over pier is included in the layout. All piers will be on footing foundations. This structure is situated on the Napier – Palmerston North State Highway. A contract has been let, and the cost is estimated at £3,170.

Bonny Glen.—Length, 255 ft., made up of three 40 ft. and three 45 ft. spans, with a roadway 24 ft. wide. This bridge will be on the straight, but crossing the railway at an angle of 18°, with piers square to the centre-line of the structure itself. All piers are on footing foundations, two being of the cantilever type and one of the step-over type. The bridge is on the Turakina–Cliff Road via Marton Main Highway, and a contract for its construction has been let at an approximate cost of £3,840.

Porirua.—Length, 310 ft., comprising six 40 ft. and two 35 ft. spans, with a 24 ft. roadway and a 4 ft. footway, with provision for a duplicate railway-track. A fairly extensive deviation of the main highway is involved in this elimination scheme, including a bridge over the Porirua Stream consisting of four 40 ft. spans. The alignment of the whole deviation is straight, but crosses the railway at a skew of about 18°. The railway-tracks are being separated to allow columns to be placed between them. The overbridge involves two cantilever piers, two single step-over piers, and one double step-over pier. Both bridges are on pile foundations, and a single contract has been let for both, including the deviation and approaches. The total estimate is approximately £20,200, of which the two bridges account for approximately £12,500. The deviation is situated on the Levin–Porirua State Highway. This elimination project is one of the most difficult yet undertaken from an engineering viewpoint, as may be judged from the fact that no fewer than five routes were surveyed and investigated in detail before the final proposals were adopted.

Elevation.—Length, 105 ft., consisting of two 30 ft. and one 45 ft. spans, with a roadway 24 ft. in width. The bridge itself is on the straight, but crosses the railway at an angle of 60°, while the pile piers are skewed 30° to normal. A contract has been let for the erection of the bridge at a cost of £3,200, the location being between Picton and Blenheim on the Picton–Christchurch State Highway.

Camp Crossing.—Length, 260 ft., made up of four 50 ft. and two 30 ft. spans on pile foundations, and having a roadway 24 ft. wide. The bridge is on the straight, but crosses the railway at a skew of 22°. All piers are square to the centre-line of the bridge, but one step-over pier has had to be introduced. A contract has been let for the construction of this bridge, which is on the Westport–Greymouth Main Highway, and the cost will be in the vicinity of £6,020.

Kartigi.—Length, 156 ft., comprising three continuous spans of 48 ft., 60 ft., and 48 ft. respectively, on pile foundations, and having a roadway 24 ft wide. The bridge is on a curve of 30 chains radius, and crosses the railway at an angle of 39°. The bridge has been completed by contract at a cost of £3,500, excluding approaches, and has been opened to traffic. It is situated on the Timaru–Dunedin State Highway.

Combined Road and Railway Bridges.

Throughout the main-highways system there are a number of combined road and railway bridges in respect of which the Main Highways Board and local authorities contribute annually a fixed amount representing the maintenance of these structures for road traffic as distinct from rail traffic.

The deck-widths of these bridges available to road traffic vary, and in some cases cause inconvenience to vehicles through difficulty in straddling the rails which are superimposed upon the deck-planking.

At present proposals are in hand for erecting separate structures for road traffic in some localities where circumstances so require, and eventually it may become necessary to pursue this course further.

In the meantime, where serious disabilities exist arrangements have been completed with the Railways Department for longitudinal planking to be placed flush with the rails, the full cost being met from highways funds.

This method of dealing with the position will mean safer conditions for all traffic using combined road and railway bridges.

State Highways System.

The Main Highways Amendment Act, 1936, made provision whereby the Board could from time to time, with the approval of the Minister of Public Works, classify any main highway as a State highway.

The Government's reasons for this legislation were reviewed briefly in the last annual report.

The effect of classification is that the costs of maintenance and construction, within standards laid down by the Board, are payable wholly from the Main Highways Account, whereas formerly such works were paid for partly by local authorities, with a major subsidy from the Board.

Any works which may be required, mainly for local amenities and services, outside of the prescribed standards may be undertaken with the Board's approval by the local authority concerned at its own expense, or with financial assistance from the Main Highways Account if authorized by the Board.

As from the 1st November, 1936, the following portions of main highways were classified as State highways :—

State Highways.

NORTH ISLAND.	Approximate Length in Miles.
Whangarei–Awanui via Kawakawa	104
Whangarei–Dargaville	38
Dargaville–Maungaturoto	40
Whangarei–Maungaturoto via Waipu	38
Birkenhead–Maungaturoto	76
Auckland–Helensville	31
Auckland–Hamilton	70
Hamilton – Te Kuiti	49
Pokeno–Paeroa via Ngatea	46
Thames–Paeroa	22
Paeroa–Whakatane	116
Hamilton–Paeroa	43
Hamilton–Rotorua	65
Rotorua–Whakatane	55
Whakatane–Gisborne via Waioeka	129
Rotorua–Taupo	51
Taupo–Napier	88
National Park – Taupo	65
Gisborne – Te Araroa	109
Gisborne–Napier via Hangaroa	142
Napier – Palmerston North	113
Woodville–Masterton	49
Te Kuiti – National Park	74
National Park – Wanganui	79
Te Kuiti – New Plymouth	105
New Plymouth – Hawera	45
New Plymouth – Hawera via Opunake	66
Hawera–Wanganui	53
Wanganui–Levin	63
Horopito–Bulls via Taihape	100
Masterton – Upper Hutt	39
Sanson – Palmerston North	13
Levin–Porirua	50
Total	2,226

SOUTH ISLAND.	
Picton–Christchurch	220
Blenheim–Nelson	75
Richmond–Collingwood	81
Nelson–Westport	144
Inangahua–Greymouth	72
Greymouth–Weheka	134
Christchurch – Kumara Junction	146
Christchurch–Timaru (excluding Hinds–Winchester section)	75
Timaru–Dunedin	118
Timaru–Cromwell via Lindis	191
Milton–Queenstown	155
Queenstown–Invercargill	85
Dunedin–Gore	99
Gore–Invercargill	41
Invercargill–Bluff	18
Gore–Lumsden	41
Total	1,695
Dominion total	3,921

In accordance with the policy of the Government the Board has resumed control of State highways throughout rural districts so as to facilitate a uniform standard of maintenance and construction. In a few cases the transfer of control has been deferred pending the delivery of plant, but as soon as equipment is to hand these cases also will revert to the direct jurisdiction of the Board. In the majority of cases Borough Councils and independent Town Boards are remaining in local control under powers delegated to them by the Board.

This will enable such local authorities to cater for local amenities and administer services essentially municipal in character. At the same time major maintenance or reconstruction may, by arrangement, be undertaken by the Board in conjunction with similar work on adjoining sections.

Unfortunately some deterioration occurred between the announcement that State highways would be introduced and the actual passing of the legislation, and it has become necessary for the Board to restore or improve some sections which were allowed to suffer.

It was unavoidable during the transition period, while the Board was short of plant, that some temporary retrogression took place, and this gave rise to a certain amount of criticism which was entirely unjustified. As soon as plant was delivered the position was rectified, and district staffs have been suitably instructed regarding adequate maintenance on all routes which have been taken over.

One of the Government's reasons for the State highways system arose from the reluctance of local authorities to finance their one-fourth share—in some cases less—of the reconstruction and paving of their lengths of arterial highway, and consequently it became necessary for the State to give attention to linking up gaps. Now that such works are being completed by the Board without further expense to the local authorities, it is regrettable to hear of complaints that highways funds are being absorbed in constructing high-standard arterial roads to the exclusion of other county highways carrying much less traffic.

As a matter of fact, improvements to the secondary highways are not being starved through lack of finance, notwithstanding that expenditure on State highways is heavier than previously. The extra finance being made available this year has enabled reasonable provision to be made for the secondary highways, and there is no intention of these roads being allowed to suffer through the needs of State highways having to be met.

However, a considerable amount of improvement work yet remains to be done on the arterial routes, and it is proposed to expedite as far as possible the reconstruction of State highways and to lay down paving where conditions justify.

Steady progress has been made, especially during the past year, and the completion of the heavier sections in due course will enable the lighter portions to be dealt with more readily.

In a number of localities there are possibilities for the shortening of arterial routes by constructing major deviations, and detailed investigations by means of survey are being made to ascertain exactly what proposals are practicable.

The rapid development of road transport in recent years has demonstrated that, in justifiable circumstances, a bold scheme of initial improvements is more desirable than a series of modified improvements which in the aggregate would prove much more expensive and delay the full benefits to traffic.

Traffic Census.

The comprehensive traffic census throughout the main highways system was taken in 1934–35, and as mentioned in the report last year the information then obtained was of very great value in disclosing traffic features of a reliable nature. Arrangements have been made for another census to be taken during 1937–38, and it is anticipated that the results will show substantial increases in many localities. However, definite information which will be secured relative to actual traffic conditions will enable the Board to study the trend of developments, which will be most useful in formulating future programmes.

Payment for Engineering Services.

For many years local authorities and professional consultants have sought to have engineering services recognized in claims for payment of main highways subsidies.

As a result of representations which were made to the Minister of Public Works it was agreed that for subsidy purposes in respect of construction works under the jurisdiction of the Public Works Department engineering services would, as from the 1st November, 1936, be regarded as part of the cost of the work. Charges for such services were fixed according to scale, relative to the value of the project, differential rates being applied to services rendered by the stipendiary staff of local bodies and by private consultants respectively.

Moreover, this arrangement applies only in cases where a work is carried out under the supervision and direction of engineers registered under the Engineers' Registration Act, 1924. Where the Department undertakes engineering work of any kind for a local authority, the local authority is charged the appropriate amount for departmental engineering services.

During the past few years the Main Highways Board has subsidized engineering costs in connection with highways bridge construction, and, in accordance with departmental policy outlined above, the Board adopted the same procedure for all highway works of a constructional nature. In neither case are engineering costs relative to maintenance operations subject to subsidized assistance.

New Zealand Road Safety Council.

In connection with the campaign initiated by the Minister of Transport for promoting safer conditions on public highways, the New Zealand Road Safety Council was appointed in September, 1936, and is representative of various interests including the Main Highways Board. The Chairman of the Board is a member of this advisory Council. The object of the Council is to investigate proposals and to consider suggestions for dealing with accident-producing factors so that it may submit recommendations to the Government.

From the commencement of the Council's deliberations the Board resolved to co-operate in every way possible, and to assist in carrying out any recommendations affecting main highways which might be approved by the Minister.

The Board itself suggested that road-controlling authorities would be able to undertake valuable work in furtherance of the safety campaign, and submitted the following matters as being appropriate or attention by roading authorities :—

The erection of protective fencing or kerbing at dangerous curves ;
The extension of centre-line marking on pavements in order to divide traffic ;
The stencilling of warning notices on pavements at level-crossings until complete grade separation could be effected ;
The proper super-elevation of curves ;
The longitudinal planking on bridges to full width, or, alternatively, the complete removal of this type of planking ;
The white painting of handrails, approach fences, and parapets to bridges, and the white painting of fencing at bends, &c. ;
The erection of safety barriers at school exits to prevent children from running into traffic ;
The provision of non-skid surfaces on roads ; and
The minimizing of risks to road-users by reducing the amount of loose-gravel surfaces.

In addition to these points, which primarily affect roading authorities, it was suggested that investigation be made as to the extent to which the following matters were contributing causes of accidents, and the possibility of adopting educative means for emphasizing the dangers arising therefrom :—

The inadequate lighting of vehicles of all descriptions during hours of darkness and the dangers of partly lit vehicles ;
The operation of vehicles with smooth tyres in relation to accidents ;
The operation of vehicles on gravel surfaces, and the necessity for greater care on the part of persons who, being more used to paved surfaces, require to travel on gravel roads.

In December, 1936, the Minister referred to the Board certain recommendations by the sub-committee dealing with faulty road conditions which had been adopted by the full Council. The Board agreed to proceed immediately to give effect to these recommendations as far as practicable.

It was decided to set apart the sum of £25,000 annually for the next few years for the purpose of erecting protective fencing and providing other safety measures in localities where dangerous conditions exist.

In addition to this amount, which will be reserved specially for safety items, a good deal of beneficial work from the safety viewpoint can be accomplished in the course of ordinary maintenance activities, and appropriate instructions have been issued in this respect.

The elimination of dangerous level railway-crossings on main highways, on which a large amount is being expended, is also being carried out for the purpose of providing safer conditions for traffic.

The New Zealand Road Safety Council suggested the desirability of ascertaining the volume of pedestrian traffic, especially in localities adjacent to urban centres and seaside or other holiday resorts in order that the need for providing footpaths could be determined. The Council also stressed the importance of maintaining footpaths to a good standard in order that the greatest benefits might be secured from their construction.

Principally for financial reasons it has not been possible hitherto for grants or subsidies to be given from highways funds for footpath construction or maintenance other than on bridges in populous areas. However, in view of the Council's considered opinion, the Board thought it expedient that the matter be further investigated. Arrangements were therefore made for a comprehensive survey of the footpath requirements throughout the highways system, excluding boroughs and town districts. This has necessitated the collection of much detailed information, together with approximate estimates of construction and maintenance. Up to the present the investigation has not been completed, but as soon as full particulars are available the Board will examine the possiblities as to whether some degree of assistance can be granted under certain circumstances.

A highways subsidy of £1 for £1 is now granted in respect of the cost of erecting safety barriers at school-exits on both State highways and main highways.

It is hoped that in co-operation with local bodies, as well as in its own activities, the Board will be able to achieve much success in furtherance of the campaign for reducing accidents and personal injury throughout the entire main highways system.

Visit of Inspection to the South Island and Contact with Local Bodies.

During November, 1936, and March, 1937, the Board visited the South Island for the purpose of inspecting main highways and conferring with local authorities relative to matters of policy and of local interest.

As three years had elapsed since the previous visit, the numerous improvements carried out during that period were the more noticeable. The completion of bridges, deviations, realignment, and surfacing indicated the extent to which traffic requirements had been provided for. Several new proposals in contemplation were also examined on the ground and tentative arrangements were adopted for certain undertakings so that they could be commenced at an early date.

It was gratifying to learn of the way in which main highways improvements were contributing towards the development and well-being of the different districts. The demand for extending dustless surfacing appears to be increasing, and as the more heavily trafficked sections of arterial highways reach completion it should be possible to consider the paving of many secondary routes where economies could thereby be effected.

In conference with the respective local bodies, the Board discussed items of business and outlined its views on many aspects concerning main highways. In some cases it was possible to dispose of matters of urgency following upon local inspection. The suggestions of local bodies relative to further works were also outlined and discussed to advantage.

Bush Preservation and Amenity Planting.

As a matter of policy the Board encourages the preservation of existing native growth on main highways reserves, and is also in favour of the beautification of road reserves wherever possible by amenity planting.

In the preservation of natural bush, departmental instructions provide for the least destruction commensurate with traffic requirements, and there are many miles of highways which derive a special attractiveness from the beauty of standing trees and native shrubs.

Public opinion does not always recognize, however, that under some conditions trees and other growth are detrimental to road surfaces. The shading of a road often causes deterioration, rendering maintenance operations difficult and expensive, and roots from the larger trees may disturb the road-bed or lift a pavement, thereby necessitating costly remedial measures or producing traffic risks. The possibility of large timber falling across the traffickable roadway and causing complete obstruction, with risk to human life, must also be taken into account. The preservation of small growth can often be arranged without any detriment to the road or those who travel upon it.

In the interests of the road-user it is necessary to point out that the requirements of traffic must receive first consideration, but subject to this condition the Board is prepared to view sympathetically any scheme which might be devised for the beautification of main highways either by retaining existing growth or by planting.

Any scheme of beautification should, of course, be subject to the approval of the appropriate roading authority. This is necessary firstly because the roading authority is called upon to carry a responsibility to road-users and the public generally, and secondly to obviate subsequent interference with or destruction of plantations in the course of later improvements to the road itself. It is essential that any planting be subject to proper control, with adequate safeguards for the protection of road-surfaces and for the safety of traffic. For example, it may be appropriate to plant on the outside of a curve where visibility is not affected, but it would be totally wrong to establish growth on the inside of a curve, reducing visibility and creating dangerous traffic conditions. The question of power or telegraph lines, either present or future, also requires particular attention. Instructions have been issued that surfacemen may give care to the protection of any trees which may have been planted on main highways under the Board's control for purposes of improving the appearance of these roads.

In certain districts the preservation of growth may be secondary to other features of natural beauty. Where, for example, a road skirts a lake or traverses elevated country, the provision of open spaces may be desirable to allow travellers to enjoy the beauty of views which otherwise would be obscured. The clearing of undergrowth would sometimes achieve the desired result, or the removal of larger obstructions might become necessary, but, even so, valuable trees or shrubs need not be wantonly destroyed.

Public interest in highway beautification is being awakened, and the co-operation of roading authorities can be of valuable assistance in furthering the aims of those who are keenly interested in this avenue of community service.

Advances to Local Authorities.

In pursuance of the powers conferred upon it by special legislation, the Board has, during the last financial year, continued its usual policy of advancing to those local authorities which were unable to raise loans from other sources their shares of the cost of urgent works on main highways. The number of agreements entered into last year was twenty, and the amount advanced totalled £29,401 7s. 9d., as compared with twenty-one agreements, totalling £24,523 12s. 9d., for the previous year.

The total principal outstanding at 31st March, 1937, in respect of past advances was £100,904 10s. 7d.

Signposting, Centre-line Marking, etc.

The cost of signposting carried out on main highways during the year ended 31st March, 1937, was subsidized at the rate of £3 for £1, the cost to the Board being £2,854 15s. 2d. The total amount contributed by the Board towards this work up to the date mentioned has been £14,404 4s. 5d.

The marking of centre-lines on paved surfaces and the lettering of standard warning-notices on pavements adjacent to railway-crossings and other dangerous locations have been continued.

Plant.

Although local authorities have continued to make use of the facilities provided by the Board to enable them to acquire plant under the hire-purchase system, a decrease in these transactions has to be recorded. The purchases for 1936–37 amounted to £15,694, as compared with £18,090 for 1935–36, £9,166 for 1934–35, and £3,368 for 1933–34.

Since the inception of this scheme plant to the value of £208,588 has been purchased, of which sum £27,760 remained outstanding at 31st March, 1937.

The items purchased during the year under this system were—Trucks, 10; graders, 7; planers, 3; tractors, 2; grader and tractor, 1; crusher, 1.

In addition to the above the Board purchased a large quantity of plant for its own use. A considerable number of these purchases was occasioned by the introduction of the State highways system and by the appointment of several additional Traffic Inspectors. The following items were purchased: Motor-cars, 34; graders, 27; motor-lorries, 12; tractors, 7; pump and oil engines, 4; excavators, 3; crushers, 2; compressors, 2; concrete-mixers, 2; bucket, 1; crusher, screen, and bins, 1; crusher and elevator, 1; oil-engine, 1; air-hoist, 1; lathe machine, 1; drilling-machine, 1; planer, 1; sand-blaster, 1; tractor, 1; bulldozer, 1; trailer, 1; welding plant, 1.

Traffic-control.

Reference was made in the last report to the unsatisfactory conditions then obtaining relative to traffic-control and the measures proposed to be adopted for the Board to take over Traffic Inspectors employed under local body groups. Subsequently the Minister of Transport launched a safety campaign for the purpose of reducing the large number of fatal and non-fatal accidents throughout the Dominion. In furtherance of this campaign the appointment of additional Inspectors became necessary, and the early termination of group schemes essential. Towards the end of 1936 fourteen new Inspectors were appointed, and these, together with group officials taken over and Inspectors already operating under departmental jurisdiction, made up an enforcement organization of forty-two Traffic Officers, including a Chief Traffic Inspector for each of the four transport districts. An augmented staff was therefore available for patrolling main highways in rural areas during the last holiday season, and the results were noticeably beneficial in the conduct of traffic generally. In collaboration with the Transport Department, the Board arranged for traffic officers to devote special attention to educative methods in the regulation of traffic.

In view of the Government's proposals for more intensive enforcement not only of the general traffic regulations, but also of the conditions governing licensed transport services, the question of future administration was discussed with the Transport Department. It was decided to recommend that steps be taken to place all traffic control outside of municipalities having a population in excess of 6,000 under the jurisdiction of the Commissioner of Transport as from the 1st April, 1937. This suggestion was adopted, and pending the introduction of special legislation relative to financing the cost of control the expenses of enforcement are being met from the Main Highways Account for part of the year 1937–38.

The Board is much concerned regarding damage to highway surfaces due to the loading of vehicles in excess of classification limits. Satisfactory arrangements have been made with the Transport Department so that Traffic Officers will, in the course of their duties, give attention to the regulating of gross loading on heavy motor-vehicles.

The testing of loadometers for local authorities and of such instruments used by departmental Inspectors has been continued as a safeguard against discrepancies in ascertaining vehicle loads.

In the matter of heavy traffic it is disappointing to have to record the prevalence of excessive loading in many parts of the country.

For many years roads have been classified for permissible gross loads. In every case, before any restriction has become operative, public notice has been given, and after the classification has been approved by the Minister of Transport special signs, as prescribed by regulations, have been erected on the roads for the information and guidance of the general public.

Even in localities where Traffic Inspectors have regularly patrolled main highways, overloading has not been uncommon, and where no system of control has existed the weights of loads have generally been much in excess of legal limits.

Now that the Government has introduced a comprehensive system of traffic patrols, it is confidently expected that the loading and also the speeds of heavy motor-vehicles will be better regulated, so as to conform to permissible limits.

In this way unnecessary damage to road surfaces will be prevented, and maintenance costs will bear a closer relationship to reasonable traffic requirements.

Testing of Highway Materials.

The testing of road-metal and of other materials from many sources has been continued, and details of standard tests carried out by the Board's Petrologist appear in Table 6 appended to this report. Apart from laboratory testing, field investigations have also been undertaken for the purpose of locating deposits of suitable roadmaking materials to meet the special requirements of certain contemplated works.

In accordance with the usual practice, the Dominion Analyst has carried out, on the Board's behalf, a considerable number of tests in respect of tar, bitumen, road oil, and emulsion used for surfacing-work.

Operation of Magnetic Truck.

The Board's magnetic truck, which is used for clearing main highways of iron or steel puncture-producing articles, has been in operation in the South Island during the year. The length of road surface actually cleared during the year ended 31st March, 1937, was 2,139 miles, and the weight of material picked up by the magnet was 7,125 lb., which equals an average of 3·3 lb. per mile cleared. This considerably exceeds the average quantity of 2·6 lb. per mile for the preceding year, but is approximately the same as for the year 1934–35, when the amount was 3·25 lb. per mile.

Examination for Foremen and Overseers of Road-construction.

The eleventh examination for Foremen and Overseers of Road-construction was held on the 3rd November, 1936. Of the fifty-eight candidates who presented themselves, four passed both papers and four candidates who had previously secured a partial pass completed the examination. A further eight candidates were credited with a partial pass, having satisfied requirements in respect of one paper only.

Each of the eight candidates who passed or completed the examination has been issued with a certificate of competency, the names of the recipients being D. J. Cunningham, S. Sadler, M. H. Smith, R. W. Thomason, J. S. Coles, S. T. Owen, J. M. Scott, and H. H. S. Short.

During the year a certificate was issued to R. Jackman, who had passed a previous examination, but whose certificate had been withheld pending evidence of adequate practical experience.

In the past the examination, which consists of two papers, one relating to general road construction and maintenance, and the other to tar, bituminous, and concrete road construction, has been conducted without cost to candidates. It has been decided, however, that, commencing with the 1937 examination, there shall be payable by candidates a fee to accompany the application to sit for the examination.

Co-operation with Transport Department.

During the period covered by this report the Transport Department has been engaged in reviewing traffic legislation and regulations, and has called conferences of representative interests for the purpose of discussing tentative proposals and framing recommendations for submission to the Government.

On a number of occasions the Board has, at the request of the Commissioner, appointed delegates to express its opinions from the viewpoint of the national roading authority. In this and other directions the Board has collaborated from time to time with the Department in various administration matters affecting roading authorities.

Declarations and Adjustments of Main Highways.

In accordance with the provisions of section 11 of the Main Highways Act, 1922, the usual annual review of main highways was made during the year.

Recommendations were received from District Highways Councils for the declaration of 1,231 miles of roads as additional main highways and for the revocation of 16 miles of existing main highways. Due, however, to the heavy commitments against highways funds arising from the immediate requirements of the present main highways system the Board was unable to recommend any general extension.

However, in order to meet special circumstances and to give effect to desirable adjustments, a number of alterations were adopted.

The following list shows the lengths of main highways declared during the year ended 31st March, 1937, including formal adjustments:—

Main Highways declared.

	Miles.	Chains.
No. 2 Highway District—		
Horotiu–Whatawhata – Te Rore	3	36
No. 4 Highway District—		
Motu Front Road	8	0
Manutuke–Wairoa via Mangapoike Valley	3	64
No. 5 Highway District—		
Napier Park – Rissington	13	41
Taradale Cemetery Highway	0	56
Dannevirke–Waipukurau via Porangahau	1	16
No. 6 Highway District—		
Te Maire – Mangaohutu	6	40
No. 8 Highway District—		
Wanganui–Kauangaroa	13	0
Wanganui River (left bank)	40	40
No. 9 Highway District—		
Wellington–Auckland via Taranaki	0	26
Foxton–Shannon	1	16
Khandallah–Johnsonville	1	10
No. 11 Highway District—		
Picton–Havelock via The Grove	1	11
Blenheim Aerodrome	2	64
No. 14 Highway District—		
Summit Highway	9	36
West Melton – Lincoln	12	55
Lincoln – Tai Tapu	2	49
No. 15 Highway District—		
Temuka–Clandeboye	1	25
Temuka – Upper Stumps – Orton	0	45
No. 16 Highway District—		
Palmerston–Queenstown	4	40
Lumsden–Queenstown via Kingston	26	5
Clarksville–Springvale	0	60
No. 17 Highway District—		
Dunedin–Invercargill	1	30
No. 18 Highway District—		
Winton–Gore	37	36
Waitane–Mataura	4	48
Queenstown–Invercargill	49	37
Total	248	60

The following list shows the lengths of main highways revoked during the year ended 31st March, 1937, including adjustments :—

Main Highways revoked.

	Miles.	Chains.
No. 2 Highway District—		
Ngaruawahia–Whatawhata – Te Rore	5	60
No. 3 Highway District—		
Hamilton–Rotorua	3	64
Whakatane–Rotorua	1	0
No. 4 Highway District—		
Motu Front Road	8	0
No. 5 Highway District—		
Taradale–Rissington	14	30
Dannevirke–Waipukurau via Porangahau	1	33
Gisborne–Wairoa via Hangaroa	0	25
No. 8 Highway District—		
Wanganui – Mangamahu Road via Fordell	20	0
Wanganui–Karioi	26	0
No. 9 Highway District—		
Wellington–Auckland via Taranaki	0	40
No. 11 Highway District—		
Picton–Havelock via The Grove	0	40
No. 14 Highway District—		
West Melton – Tai Tapu	13	32
No. 15 Highway District—		
Temuka–Clandeboye	1	40
No. 16 Highway District—		
Lumsden–Kingston	1	30
Palmerston–Queenstown via Becks	4	0
Clarksville–Springvale	0	54
No. 17 Highway District—		
Dunedin–Invercargill	1	25
No. 18 Highway District—		
Gore–Winton	37	26
Waitane–Mataura	4	18
Invercargill–Tuatapere	3	0
Lorne–Castlerock	47	42
Total	196	29

On the 1st December, 1936, the boundaries of the No. 2 Highway District were altered to include the Otorohanga County, which had previously formed part of the No. 6 Highway District.

The last general census disclosed that the population of the Rotorua Borough exceeded 6,000 inhabitants, and as a result the borough has been entitled, since 1st April, 1936, to a proportionate share of the percentage of motor-spirits taxation set apart for distribution amongst cities and major boroughs. All main highways within the Rotorua Borough have accordingly been revoked.

PROGRESS REPORT.

The following statement shows the more important construction work carried out under the control of the Board during the year ended 31st March, 1937 :—

Whangarei–Awanui via Kawakawa :—

Kamo–Hikurangi—Kamo Crossing Overbridge : The construction of the bridge was commenced. All piles have been driven, and the boxing and fabrication of the steel is in hand. The formation of the approach ramps has been 60 per cent. completed. A deviation of 14 ch. of the No. 303 main highway has been formed and metalled as part of the work.

Kauri Crossing : The formation of a deviation leading to the overbridge is in progress, 37½ ch. being completed, and the formation of the northern approach ramp commenced.

Hikurangi Crossings : This deviation of 62 ch., which was in hand last year, has been completed, and the two dangerous crossings adjacent to Hikurangi Township thus eliminated.

In order to obtain material for the approach fillings to the Kamo Overbridge, a deviation on improved alignment has been carried out at Snake Hill, 1 m. of formation being practically completed.

Hikurangi Northwards : 75 ch. between Whakapara and Waiotu was widened and metalled.

Hukerenui Flood Alleviation : This work comprises a 74 ch. deviation, of which 45 ch. has been completed.

Waiomio Flood Alleviation : This embankment, 19 ch. in length, was 40 per cent. completed. Spoil was obtained by widening and improvement of the adjacent highway.

Milne's Flood Alleviation : The 14 ch. embankment constituting this work was practically completed, and metalling is in hand.

Kawakawa Town District: Resurfacing, priming, and one coat sealing were completed over a length of 22 ch. through the business area.

Kawakawa Flood Alleviation: This 54 ch. embankment, including three temporary bridges, was completed and opened to traffic. Formation of the approach ramps to the permanent bridges and stone-pitching of the batters are in hand.

Kaitaia Town District: 25½ ch. of reconstruction, priming, and two-coat sealing through the business area was completed.

Whangarei–Dargaville:—

Whangarei–Maungatapere: 23 ch. of reconstruction, priming, and two-coat sealing was carried out, completing 5 m. 4 ch. of continuous sealed surface from the Whangarei Borough Boundary.

Tangowahine Bridge: The erection of an additional span in steel and hardwood was necessitated by a subsidence of the eastern abutment.

Dargaville Borough: Second-coat sealing was carried out over a length of 1 m. 36 ch.

Dargaville–Maungaturoto:—

Dargaville Borough: Second-coat sealing was applied over a length of 19 ch.

Wallace and Creamery Bridges: These two timber structures were replaced with 6 ft. by 6 ft. concrete culverts.

Ruawai Plains: Improvements, comprising widening and metalling of a 6½ m. section in the vicinity of Ruawai Village, are in hand.

Oakleigh Crossing Overbridge: The formation of the approach ramps has been 80 per cent. completed, the spoil being obtained by improvements to the highway adjacent to the site. The formation of a minor railway deviation has also been carried out.

Birkenhead–Maungaturoto (No. 1 District):—

South of Silverdale 3 m. 30 ch. was reconstructed and primed, and 2 m. 70 ch. of first-coat sealing applied.

Between Silverdale and Orewa 1 m. 67 ch. of reconstruction and metalling has been carried out.

Orewa–Waiwera: Two lengths of 28 ch. and 24 ch. at Orewa and Hadfield's Bay have been reconditioned preparatory to sealing.

Waiwera Deviation: 67 ch. of heavy formation over the summit and on the grade south of Waiwera was completed, and base-course metal laid. Work is in hand on the balance of this deviation.

Waiwera Subway: The construction of this concrete bridge, which is of three 30 ft. spans with 24 ft. roadway, on a 1 in 11 grade and a 6 ch. curve, has been practically completed. This bridge is one of the main features of an interesting example of grade-separation and curve-improvement at a difficult intersection.

Waiwera–Puhoi: 2 m. 20 ch. of reconstruction and 1 m. 59 ch. of base-course metalling were carried out.

Puhoi–Warkworth: The formation and base-course metalling of the two lengths at Schedewy's Hill and Barker's Bridge have been completed. The formation of the deviation at Wilson's Bridge has been 70 per cent. completed.

Warkworth Town District: Reconstruction on the northern approach to the township is in hand.

Warkworth–Wellsford: A contract was let for the reconstruction and sealing of a two-mile length adjacent to Warkworth.

Widening south of the Hoteo Bridge and formation of approaches to a temporary overflow bridge on the north side have been practically completed.

Wellsford–Topuni: Included in a contract for reconstruction and sealing were lengths of 24 ch., 21 ch., and 86 ch. in Wellsford Village, north of Wellsford, and north of Te Hana. On all lengths reconstruction was practically completed.

Brynderwyn Deviation: 75 ch. was formed.

Rawene–Oue Junction: 3 m. of widening and straightening are nearing completion.

Waimamaku–Ohaeawai:—

Taheke Bridge: The erection of this 210 ft. concrete structure is in progress.

Waima Deviation: 17 ch. of deviation occasioned by flood damage was formed and metalled.

Dargaville–Tikinui.—Dargaville Borough: 110 ch. of second-coat sealing was carried out.

Waimate–Kaeo–Mangonui.—The raising of the highway near Kaeo Village, to alleviate flooding, was completed.

Kaukapakapa–Port Albert.—The formation of a 54 ch. deviation, to improve a tortuous section of this highway, was put in hand, and 21 ch. completed.

Wellsford–Leigh.—Barton's and Salt's Bridges: The erection of these two structures, together with formation and metalling of approaches, was completed.

Warkworth–Tauhoa via Kaipara Flats.—Hoteo Crossings: The formation of the deviation, which eliminates two level crossings, is 40 per cent. completed. The work involves two new bridges, the erection of which is in hand.

Waipoua Forest.—Improvements, by widening and cutting back corners over 16 m. of this highway, were effected.

Hikurangi–Marua.—A contract was let for the reconstruction and sealing of 42 ch.

Kaitaia–Motukaraka via Broadwood.—Landing for Motor-vehicles at Kohukohu: A 10 ft. concrete roadway 132 ft. long was constructed down to low-water mark, and a deviation of the highway effected to form the approaches.

Birkenhead–Maungaturoto (No. 2 District).—Waitemata County: Reconstruction is in hand on the Albany Hill Deviation, over a length of 2 m.

Auckland–Helensville–Waiwera:—

Waitemata County: A contract has been let for 5 m. 8 ch. of plant-mix smoothing-coat. Reconstruction is in hand over 5 m. 61 ch., of which 3 m. has been completed and metalled. The work included a 6 ft. by 6 ft. concrete culvert at Rewiti.

Huapai Overbridge: All piles have been driven, and the approaches and railway deviation practically completed.

A contract has been let for 23 ch. of reconstruction at the Waiwera end.

Auckland–Hamilton:—

Franklin County: 2 m. 72 ch. of bituminous penetration surfacing was laid, completing the length of 4 m. 74 ch.

The Mangatawhiri Bridge, 144 ft. long, in concrete, was completed, together with the formation, metalling, and sealing of 25 ch. of approaches on improved alignment.

Pokeno Overbridge: A new structure is being built on improved alignment. All piles were driven.

Waikato County: The placing of plant-mix on the length from Huntly to Kimihia Bridge, and in the Taupiri Gorge, has been commenced.

A deviation 35 ch. in length was completed at Tilsley's.

Hopu Hopu Overbridge: Pile-driving and concreting, and the construction of the approaches are in progress.

Ngaruawahia Borough: The plant-mix surfacing of this section was completed.

Waipa County: A further length of 2 m. 14 c. was surfaced with plant-mix.

Hamilton–Te Kuiti:—

Waipa County: The reconstruction work commenced last year has been continued, and 5 m. 17 ch. of sealing completed between Hamilton and Ohaupo. Work is in hand between Ohaupo and Te Awamutu, where 3 m. 79 ch. of formation, 1 m. 49 ch. of metalling, and 43 ch. of one-coat sealing have been carried out.

From Hamilton to beyond Ohaupo a plant-mix coat has been laid for 10 m. 33 ch. Between Te Awamutu and the county boundary reconstruction has been completed; this comprised 2 m. 69 ch. of formation and 5 m. 3 ch. of metalling and sealing.

The Puniu Bridge, 228 ft. long, in concrete, was erected.

Otorohanga County: Reconstruction is being carried out throughout this section. The work completed comprises 2 m. 67 ch. of formation and base-course metalling.

Pokeno–Paeroa via Ngatea:—

Franklin County—Reconstruction: Earthwork is in hand between $1\frac{1}{4}$ m. and $4\frac{3}{4}$ m. from Pokeno. The Mangatawhiri and Mangatangi Bridges have been commenced.

Hauraki Plains County: A length of 7 m., west of Ngatea, was reconstructed and sealed. Improvements and sealing were completed at three corners.

A concrete bridge of three 30 ft. spans was completed at the Waitakaruru Canal.

Thames–Paeroa:—

Thames Borough: Second-coat sealing was applied over the length of 2 m.

Thames County: 2 m. 60 ch. was reconstructed and sealed.

Paeroa–Whakatane (No. 2 District):—

Waihi Borough: The Ohinemuri River Bridge, a concrete structure 110 ft. long, was erected.

Ohinemuri County: Heavy reconstruction is in progress, 20 ch. having been completed at the Paeroa end of the gorge, and a 2 m. length adjoining the borough has been sealed in two coats.

The work in the Karangahake Gorge was continued, and the major improvements over 40 ch. are nearing completion.

Waitete (Waihi) Deviation: This deviation, 70 ch. in length, replaces two level crossings and an obsolete overbridge, and has been completed, including sealing.

Hamilton–Paeroa:—

Waikato County: A plant-mix smoothing coat was laid over 3 m. 65 ch., and 70 ch. sealed, which completed the length across Hinton's Gully Deviation. A contract is in hand over 3 m. 54 ch., and 56 ch. of re-formation and metalling has been completed.

Morrinsville Borough: A concrete culvert 46 ft. by 7 ft. by 6 ft. was constructed.

Hamilton–Rotorua (No. 2 District):—

Waikato County: 17 ch. of plant-mix surfacing was applied.

Cambridge Borough: A contract for the erection of the Karapiro Bridge, 220 ft. long, has been let, and the approaches are in hand.

Matamata County: Between Cambridge and Tirau earthwork on new alignment has been completed over 40 ch., and is in hand over a further mile. 1 m. 60 ch. of two-coat sealing was completed at Tapapa. Widening was carried out on the hill section between Tapapa and Mamaku, where a length of 8 m. of re-formation, metalling, and sealing is in progress.

Tirau Subway: The formation of both approaches is in hand.

Pipiroa–Coromandel.—Coromandel County: A contract has been let for the replacement of the Otakehaeo bridge, in concrete, and one abutment completed.

Hamilton–Raglan.—Waipa County: Reconstruction was carried out and one-coat sealing completed over the whole length.

Waitoa–Taupo:—

Piako County: Reconstruction and two-coat sealing were completed over the remaining length of 4 m. 32 ch., thus completing the section. The four-mile bridge, consisting of a 10 ft. concrete span, was erected.

Matamata County: South of Lichfield, 102 ch. was sealed in two coats.

The level-crossing at Lichfield has been realigned and sealed.

The approaches to the Mangawhero Bridge, 14 ch. in length, have been sealed. The construction of a concrete culvert to replace the bridge over the Okoroire Stream is in hand. The approaches to the Oraka Stream bridge have been completed.

Hamlin's Overbridge: The approaches are in progress.

Matamata–Tauranga (No. 2 District).—Matamata County: The approaches to the Mangawhero and Waihou No. 2 bridges were sealed.

Papakura–Kawakawa via Clevedon:—

Papakura Town District: Tenders were called for sealing the remaining 72 ch. of this section.

Manukau County: The Waitarata Bridge, a concrete structure of two 25 ft. spans, was completed during the year.

Onewa Highway.—Northcote Borough: This section was sealed in two coats.

Coromandel – Mercury Bay.—Coromandel County: General improvements on the worst sections of this highway have been completed, widening being carried out over a length of 4 m. The improved alignment provides much safer travelling.

Tahuna–Ohinewai.—Waikato County—Ohinewai Overbridge: Piles have been cast, and the approaches are in progress.

Te Aroha – Waharoa.—Piako County: Second coat sealing was completed over 2 m. 60 ch., and a length of 2 m. reconstructed and metalled. Improvements are in hand at Wardville corner, formation being completed.

Mount Albert – Royal Oak.—Mount Roskill Road District: Reconstruction was completed over 34·62 ch., and the length paved in concrete for a width of 12 ft., with a 9 ft. central strip of two-coat sealing.

Henderson–Kumeu via Swanson:—

Henderson Town District: Reconstruction was carried out in conjunction with that on the county section, 35 ch. of reconstruction and first-coat sealing being completed.

Waitemata County: Reconstruction was carried out over a length of 57 ch.

Waikumete – West Coast:—

Glen Eden Town District: Reconditioning was carried out, and one-coat sealing applied over the whole length.

Waitemata County: Reconstruction was carried out and sealing commenced, but owing to unfavourable weather the work has been postponed.

Papakura–Hunua.—Franklin County: Lockwood's Bridge, an 18 ft. concrete structure, was erected.

Puni–Otaua.—Franklin County: Sommerville's Bridge, a concrete structure of one 40 ft. span, was renewed.

Papatoetoe–Howick.—Manukau County: The sealing of 84 ch. was completed, and preparation for a further 62 ch. put in hand.

Howick–Manurewa.—Manukau County: A concrete culvert has been built, and the alignment improved, at Andrew's Corner.

Matamata Station Highway.—Matamata Borough: The reconstruction and two-coat sealing of 19½ ch. are in hand.

Ngatea–Waharoa via Morrinsville:—

Piako County: Second-coat sealing was applied over a length of 4 m. 31 ch. from Kiwitahi Station southwards, and 2 m. 67 ch. from Dickey's Corner to Walton Turnoff. A 15 ft. concrete bridge was completed over Tonepi Stream. The reconstruction and sealing of 6 m. between Morrinsville and Tahuna were commenced, and formation work completed.

Matamata County: The approaches to the Waitoa Stream Bridge, 17 ch. in length, were sealed.

Waitoa–Maukoro.—Piako County: The sealed surfacing was widened over 1 m. 66 ch.

Papakura–Titi.—Papakura Town District: Preparation for the sealing of 39 ch. is in hand.

Ngatea–Turua.—Hauraki Plains County: The reconstruction and two-coat sealing of 1 m. 59 ch. were completed.

Morrinsville–Ngarua.—Piako County: A section of 2 m. has been sealed in two coats.

Taupiri–Morrinsville via Tauhei.—Taupiri Overbridge: Piles have been cast, and the approaches are in hand.

Horotiu – Whatawhata – Te Rore:—

Waipa County: 14 ch. of deteriorated original sealing at Whatawhata was reconstructed and sealed in one coat.

Raglan County—Kaniwhaniwha Stream Bridge: A contract has been let for the reconstruction of this bridge in concrete.

Buckland's Beach Highway.—Reconstruction was commenced on this highway.

Panmure–Otahuhu.—Otahuhu Borough: Reconstruction and two-coat sealing have been carried out.

Paeroa–Whakatane (No. 3 District):—

Tauranga County—Kaituna Bridge: This concrete bridge, 121 ft. long, was erected. 2 m. 44 ch. of sealing was carried out.

On the Otamarakau Section a length of 2 m. was raised above flood-level.

Hamilton–Rotorua (No. 3 District).—Rotorua County: The Tarukenga Overbridge, comprising three 18 ft. spans, with 55 ch. of approaches, was constructed.

Rotorua–Whakatane.—Rotoma Hill: 1 m. 46 ch. of heavy formation was completed and metalled.

Whakatane–Gisborne via Waioeka (No. 3 District):—

Upper Opato Bridge: The erection of this bridge is in progress.

Waioeka Bluff Protection: A sea-wall, 15 ch. in length, has been erected to protect the highway from erosion.

Rotorua–Taupo.—3 m. 62 ch. of reconstruction, 6 m. 60 ch. of metalling, and 4 m. 15 ch. of two-coat sealing were carried out. The work included the raising of 1 m. of sunken road to its former level.

Matamata–Tauranga (No. 3 District).—68 ch. of formation on new alignment has been completed on the Kaimai Hill.

Opotiki – Te Araroa.—Raukokore Bridge: The western approach, approximately 1½ m. long, was completed and metalled. A contract was let for the construction of the bridge, which is to be 660 ft. in length.

Rotorua–Tauranga (Direct).—4½ m. was widened and metalled.

Papamoa – Mount Maunganui.—85 ch. of reconstruction was carried out.

Rotoma – Matata.—An 8 ft. by 6 ft. culvert 44 ft. long was installed at Awakaponga.

Wainui Highway.—18 ch. of low road was regraded to a higher level.

Gisborne – Wairoa via Morere.—Cook County—Wharerata Hill: Reconstruction between 22 m. and 24·25 m. has been continued. The realignment being now practically complete, 78 ch. was metalled.

Gisborne–Wairoa via Hangaroa (No. 4 District):—

The length between 14·95 m. and 16·95 m. was reconstructed and metalled.

Sealing from 21·4 m. to 25·4 m. is in hand, 1 m. 60 ch. of first-coat work being completed.

Reconstruction from 25·8 m. to 27·8 m. has been completed, and 1 m. 72 ch. metalled.

The construction of a new concrete bridge at Glassfords, 42·3 m., is in progress.

Whakatane–Gisborne via Waioeka (No. 4 District):—

Kaiteratahi Bridge: A contract has been let for the erection of a new structure, of six 90 ft. spans, in concrete.

Waikohu Level Crossing No. 80: The deviation of the section from 25 m. to the east end of the combined road-rail bridge was completed and opened to traffic.

Gisborne–Te Araroa:—

From 12½ m. to 14 m., 32 m. 40 ch. to 34 m. 27 ch., and 34 m. 62 ch. to 35 m. 69 ch. the highway was reconstructed and sealed in three coats.

In the Mangahaunini Valley, between 60 m. and 64 m., a number of groynes were built to protect the highway.

Uawa River Bridge: The erection of this bridge is in progress.

The Kopuaroa No. 3 bridge at 76·7 m. was wrecked by a lorry, and was reconstructed.

Karakatuwhero Bridge: The erection of this bridge, of six 50 ft. spans, is in progress.

Kanakanaia Highway.—The bridge at 1 m. was replaced with a concrete culvert.

Patutahi–Rere.—Cook County: 1 m. 47 ch. of reconstruction and two-coat sealing was carried out.

Hicks Bay Wharf Highway:—

The Wharekahika Bridge and its approaches were completed.

From 1 m. 59 ch. to 2 m. 49 ch., reconstruction and sea-wall protection work were carried out.

Te Puia–Waipiro Bay.—A bridge at 3·7 m. and its approaches were completed.

Tapuwaeroa Valley.—The Mangarua Bridge and its approaches were completed.

Taupo–Napier :—

Reconstruction and Widening—Glengarry Section: The highway has been widened and realigned from 10 m. to 13 m. 26 ch.

Baker's Deviation: The deviation, 30 ch. long, in pumice country, is well in hand.

Runanga Deviation: This deviation, 8¼ m. in length, leaves the present highway at the Nunneries Bridge, beyond Tarawera, and follows up the Waipunga River. Work on the first 30 ch. is in progress.

Gisborne–Napier via Hangaroa (No. 5 District) :—

Napier–Mohaka River: The 40 ch. deviation at Whirinaki was completed, including metalling and fencing.

Widening and realignment were completed round Lake Tutira and through the Matahoura Gorge. Several block cuttings were made through spurs, eliminating semi-circular curves and awkward corners.

Widening was also carried south to the Matahoura Gorge, and is in progress near the Waikare Gorge. This work is now complete from Te Ngaru Bridge to the top of the Waikare Gorge on the north side, a distance of 23 m. 30 ch.

Wairoa Borough: 19 ch. was reconstructed preparatory to sealing.

Napier–Palmerston North :—

Waitangi Stream Bridge: This bridge, consisting of fifteen 40 ft. concrete spans with a 24 ft. roadway, was completed.

The approaches to this and the Waitangi Washout Bridge were metalled and sealed over a total distance of 40 ch.

The widening of the pavement between Napier and Hastings in bituminous penetration work by 3 ft. on each side was undertaken, and was completed over the greater part of the distance.

Woodville County: 65 ch. of two-coat sealing on the reconstructed length of deteriorated original surfacing was carried out.

Dannevirke County—Manawatu Hill Deviation: The formation, metalling, and fencing of this 66 ch. deviation were completed.

Manawatu River Bridge (North of Norsewood): A contract was let for the erection of a new concrete bridge, of two 30 ft. spans, at the site of the old one-way concrete bridge, and the work is in hand.

Butcher Creek Bridge: A contract was let for erecting a 25 ft. concrete bridge, replacing the one destroyed by flood last year.

Oringi North Overbridge and Approaches: Two contracts were let for these works, which will eliminate a level crossing. The approaches, 40 ch. in length, are in progress.

Maharahara Deviation: This deviation, which is 1 m. 70 ch. long, eliminates two level crossings. The crossing on Heretaunga Road will also be eliminated by a small deviation as part of the major scheme. The formation is practically completed, and metalling is in progress.

Woodville–Masterton (No. 5 District).—Manga-atua Stream Bridge, near Woodville: A contract was let for the erection of a concrete structure of two 40 ft. spans.

Waipawa–Tikokino.—The Two-mile Creek Bridge was completed and the approaches filled in.

Waipawa – Onga Onga.—The reconstruction of 1 m., preparatory to sealing, is in progress.

Dannevirke–Waipukurau via Porangahau :—

Waipukurau County: 2 m. 73 ch. was sealed in one coat.

Patangata County: The widening of the Wanstead Hill, in preparation for sealing, is nearly completed. A 7 ft. by 7 ft. concrete culvert was put in near Porangahau to replace a timber bridge.

Dannevirke County: 3 m. 5 ch. was prepared and sealed.

A 5 ft. by 4 ft. concrete culvert, 55 ft. long, was constructed through an old water drive.

Weber County—Morgan's Bridge: This concrete bridge, consisting of three 30 ft. skew spans, was erected, and the approaches formed and metalled.

Hastings–Maraekakaho.—2 m. 32 ch. was sealed in two coats.

Ruakituri Valley.—Te Reinga Falls Bridge: This bridge, consisting of one 20 ft. and two 30 ft. concrete spans on steel joists, and a 198 ft. suspension span was completed.

Fernhill–Takapau via Maraekakaho.—Waipawa County—Tikokino Bridge: This 20 ft. concrete bridge was erected.

Waipawa–Pourerere.—Waipawa County: The reconstruction of 1 m. at the Waipawa end is in hand.

Waipukurau–Matamau via Hatuma.—Waipukurau County: 1 m. 54 ch. was sealed. A further length of 1 m. 55 ch. was prepared, and the priming-coat applied.

Wairoa Marine Parade.—8 ch. at the north end was reconstructed and sealed.

Takapau Saleyards.—This highway, 36 ch. in length, was sealed.

Takapau West :—

This highway, of 72 ch., was reconstructed and sealed.

McMillan's Bridge : A 14-ft.-span concrete bridge was built.

Rotorua–Waikaremoana.—Hopuruahine – Lake House : Metalling is in progress.

Hastings–Waimarama.—Hawke's Bay County : 40 ch. of widening of the asphaltic concrete pavement was carried out.

Neave–Harpham.—Taradale Town District : This 58 ch. section was sealed in two coats.

Waipukurau Racecourse :—

Waipukurau Borough : This section was reconstructed and sealed, the length being 84 ch.

Waipukurau County : 72 ch. was prepared for sealing and a priming coat applied.

Te Kuiti – New Plymouth (No. 6 District) :—

Te Kuiti – Pio Pio Section—7 m. to 10 m. : Reconstruction was commenced, and 1 m. 57 ch. of formation completed. 10 m. to 12 m. : 2 m. 6 ch. of two-coat sealing was carried out.

Pio Pio Township : Reconstruction and first-coat sealing were carried out over 23 ch.

Pio Pio – Mahoenui : A 12 ch. deviation was constructed and metalled.

Second-coat sealing was applied on 3 m. 45 ch. near Mahoenui.

Te Kuiti – National Park :—

Mangaiti Turnoff – Mapiu Gates : 1 m. 46 ch. of formation, 4 m. 36 ch. of base-course, and 4 m. 36 ch. of top-course metalling were completed.

Manunui Township : 2 m. 37 ch. was reconstructed, metalled, and prepared for sealing.

Piriaka Overbridge : The construction of this bridge is in hand ; all piles have been driven and the approaches formed up to the abutments.

Owhango–Oio : 40 ch. of base-course metalling was completed.

Oio Overbridge : Pile-driving is in progress, and the approaches have been completed up to the abutments.

Stratford–Taumarunui (No. 6 District) :—

Ohura County : Widening of dangerous corners on the Tokirima Hill was carried out over a length of 32 ch.

Taumarunui County : The elimination of two sharp bends, one at Te Maire Bluff and the other at Herlihy's Bluff, was completed, the total length of the two deviations being 40 ch.

Raurimu – Wades Landing.—3 m. of top-course metalling was carried out.

Pio Pio – Tatu :—

Waitewhena Road Section : 2 m. of metalling was completed.

Ohura Township—Mangaroa Bridge : A concrete bridge, 120 ft. in length, is in hand.

Okahukura–Ohura.—2 m. of re-formation and metalling was completed at the foot of the Okahukura Hill.

Tokirima Highway.—45 ch. of top-dressing on the burnt papa sections on Old's and Dwyer's Bluff was completed.

Manunui–Owhango.—35 ch. of formation was completed in connection with the elimination of several sharp curves in the vicinity of Hikimutu.

Taumarunui–Ongarue.—Taumarunui Borough—Short Street Level Crossing : The construction of a subway, including 25 ch. of approaches, is in progress.

Te Kuiti – New Plymouth (No. 7 District) :—

Clifton County : In the Mimi Valley a further 42 ch. of deviation has been formed, and 27 ch. of metalling carried out. Work is in progress over 4 m. of this deviation.

On the Waitoitoi Deviation 17 ch. of formation and 30 ch. of metalling were undertaken.

Second-coat sealing was applied to 2 m. 41 ch. between Urenui and the Ohanga Road Junction.

Taranaki County : A concrete bridge, 54 ft. long, was erected over the Mangaoraka Stream, and a 22½ ch. deviation formed from the new bridge northward.

Waitara Borough—Waitara Bridge : This bridge, which was considerably damaged by the flood of February, 1935, has been restored to its former condition. The work involved the construction of three concrete cylinder piers.

New Plymouth–Hawera :—

1 m. 13 ch. of plant-mix bituminous surfacing was laid on the deviation west of the Waiwakaiho River.

The Tariki and Waipuku level crossings are being eliminated by the construction of a deviation and a new bridge over the Waipuku Stream. The bulk of the formation, including a water-drive, has been completed.

The Midhurst overbridge is in progress, and that at Normanby is nearing completion.

Hawera–Wanganui (No. 7 District) :—

Hawera County : The Tangahoe Stream Bridge has been completed, and the deviation, 56 ch. long, constructed and sealed.

The Mokoia level crossing is being eliminated by an overbridge and deviation. The bridge is in course of construction, and the deviation has been metalled.

New Plymouth – Hawera via Opunake :—

Egmont County : A concrete bridge, 82 ft. long, has been erected over the Ouri Stream.

Taranaki County : The earthwork of a realignment on Oakura Hill has been carried out.

Kaimata–Purangi.—Inglewood County : 1 m. of road-mix emulsion smoothing-coat was applied.

Egmont Road – Radius Line.—Inglewood County : Similar work was carried out over 1 m. of this highway.

Opunake–Eltham :—

Egmont County : A temporary bridge, 85 ft. long, was erected over the Taungatara Stream, and the construction of a concrete bridge over the Punehu Stream is in hand.

Eltham County : A concrete culvert, 110 ft. long, was constructed, and 24 ch. of deviation formed at Hunter's Road.

30 ch. of widening of the pavement has also been carried out.

Stratford–Taumarunui (No. 7 District).—Moki Tunnel Approaches : 61 ch. of metalling and 14 ch. of fencing were completed. 95 ft. of water-drive and 5 ch. of formation have been carried out between Moki and Mangapapa Road.

Stratford–Junction No. 41 Highway.—Stratford County : A concrete bridge, consisting of two 20 ft. and one 40 ft. spans, has been erected over the Kapuni Stream.

Ngatimaru Highway.—Clifton County : The reconstruction and two-coat sealing of 2 m. 30 ch. were undertaken.

Oxford–Saunders.—Taranaki County : A concrete bridge over the Mangateitei Stream is in progress.

Hawera–Mokoia.—Hawera County : The widening of 1 m. 45 ch. of sealed roadway is in hand.

Inglewood–Everett.—Inglewood County : 1 m. of road-mix emulsion smoothing-coat was applied.

Hawera–Wanganui (No. 8 District) :—

Patea County : 52 ch. of the Waitotara Hill was reconstructed and metalled, and 30 ch. of the Manawapou Hill sealed in one coat. The sealing of 24 ch. of the Whenuakura Hill is in hand.

Waitotara County : 62 ch. at Westmere was reconstructed, and a contract let for the sealing.

Wanganui–Levin (No. 8 District).—Rangitikei County : 54 ch. of second-coat sealing was applied on Glasgow's Deviation at Turakina.

National Park – Wanganui.—Wanganui County : 6 m. 20 ch. of reconstruction and metalling, a concrete culvert 10 ft. by 8 ft. by 57 ft., 1,850 ft. of water-tunnels, and 4 m. of fencing were carried out. A contract was let for the sealing of 2 m. 4 ch. near Wanganui.

Horopito–Bulls via Taihape :—

Tohanga Road : The Rongokaupo Stream culvert, 10 ft. by 8 ft. by 44 ft., in concrete, has been completed ; and a length of 12 ch. re-formed and metalled.

Waiouru Level Crossing Deviation : This 1 m. 36 ch. deviation, which eliminates a level crossing and a timber overbridge, was put in hand, 1 m. 21 ch. of the formation being completed.

Mangaweka–Utiku : 4 m. 75 ch. of formation and 38 ch. of metalling were carried out and 99 ft. of water-tunnel driven.

Vinegar Hill : 1 m. 65 ch. of formation was completed.

Taihape Borough : The reconstruction and metalling of two lengths, totalling 1 m. 46 ch., were completed.

Hunterville–Greatford : The Porewa Stream Bridge was widened.

Greatford–Bulls : 3 m. 50 ch. of top-course metal was laid, and a contract let for the sealing of this length.

Kohi Highway.—38 ch. was sealed and 68 ch. reconstructed and metalled.

Rangitatau East and Watershed Highway.—The metalling of the clay length of 75 ch. between the Kauangaroa and Ahu Ahu Road junctions was carried out.

Pipiriki–Raetihi–Ohakune.—Raetihi Borough : 8 ch. of reconstruction was undertaken.

Wanganui–Kauangaroa.—Wanganui County : A contract was let for the sealing of 1 m. between Wanganui and Fordell, and the reconstruction of a further mile is in hand.

Greatford–Ashhurst (No. 8 District).—Between Greatford and Kakariki an extensive deviation, which avoids a level crossing, is in progress. During the year 68 ch. was formed, and 42 ch. metalled.

Springvale–Francis.—Waitotora County : 82 ch. of reconstruction and metalling was carried out, and a contract let for the sealing of the length.

Turakina – Cliff Road via Marton :—

Rangitikei County : 6 m. 6 ch. of reconstruction, 6 m. 6 ch. of base-course metalling, 8 m. 20 ch. of top-course, and 8 m. 20 ch. of first coat sealing were completed.

Tenders were invited for the construction of the Bonny Glen level crossing overbridge.

Waitotara Valley Highway.—Waitotara County : The Makokako Stream Bridge, of three 40 ft. spans in concrete, was erected, and the formation of the approaches is in progress. 15 ch. was widened on the Parekama Hill.

Wanganui River (Left Bank) Highway :—

This highway suffered serious damage in a cyclonic storm in February, 1936, and the work of restoration, including extensive repairs to the Mangoihe Stream Bridge at Jerusalem, has been undertaken.

The construction of a new bridge over the Operiki Stream at Koriniti was commenced.

Wanganui–Levin (No. 9 District) :—

Manawatu County—Himatangi–Sanson : Near Sanson 6 m. of reconstruction, 5 m. of base-course metalling, 2¼ m. of top-course, and 1 m. 10 ch. of tar-priming were carried out. At Himatangi 40 ch. was sealed.

Whirokino Deviation : On this 2 m. 62 ch. deviation, which will eliminate flooding of the State highway by the Manawatu River, formation has been completed over 1 m. 7 ch., metalling 55 ch., and tar-priming 55 ch. The new formation is for some distance through swampy country, and, to ensure a solid foundation, 16,000 cubic yards of peaty material has been excavated and back-filled from borrow-pits. A contract has been let for the concrete trestle-bridge, comprising ninety-three 40 ft. spans, which provides the flood-opening.

Levin–Porirua :—

Horowhenua County : 1 m. 23 ch. of old sealing south of Levin, which had an excessive camber, was scarified, reshaped, primed, and sealed.

Manukau Overbridge : Tenders were called, and a contract has now been let for this bridge, consisting of six 40 ft. and two 30 ft. concrete spans.

Otaki Overbridge : This bridge, consisting of three 45 ft. concrete spans, together with 31 ch. of approaches, is in progress.

Hutt County—Paraparaumu Overbridge : A contract has been let for this structure, comprising two 40 ft. and one 50 ft. concrete spans, together with 28 ch. of approaches.

Makara County : Between Porirua and Paremata, 72 ch. of sealing was completed on deviations.

Porirua Overbridge : Work has commenced on this overbridge, which consists of six 40 ft. and two 35 ft. concrete spans, together with 34 ch. of approaches. Included in the deviation is a new concrete bridge, of four 40 ft. spans, over the Porirua Stream.

Masterton–Upper Hutt (No. 9 District).—Widening was completed over a length of 63 ch. on the Mungaroa and Rimutaka Hills.

Sanson – Palmerston North.—Awahuri Bridge, Oroua River : A contract is in progress for the renewal of this bridge, consisting of five 56 ft. and two 44 ft. spans in concrete.

Awahuri–Mangaweka via Kimbolton.—Kiwitea County : Between Cheltenham and Kimbolton a contract was let for 5 m. of reconstruction and sealing. 4 m. of reconstruction, 4 m. of base-course metal, 3 m. of top-course, and 60 ch. of priming were completed.

Feilding – Cliff Road via Stanway.—Oroua County : Reconstruction and priming have been completed over 3 m.

Greatford–Ashhurst (No. 9 District).—Feilding Borough : Reconstruction, priming, and sealing were completed over 40 ch.

Levin – Palmerston North via Shannon :—

Horowhenua County : Between Levin and Shannon, 2 m. 60 ch. was reconstructed, primed, and sealed. On the Makerua Hill, 29 ch. of formation of deviations has been completed and 18 ch. metalled.

Kairanga County : The reconstruction and sealing of 4 m. immediately south of Palmerston North has been commenced.

Ashhurst–Pohangina.—Oroua County : Priming and sealing were completed over 3 m.

Upper Hutt – Waikanae :—

Hutt County : Widening was completed over a length of 2 m. 4 ch.

Harvie's Bridge : This timber bridge was replaced by a concrete culvert, 7 ft. by 7 ft. by 45 ft. long.

Horowhenua County : In the Waikanae Township, 11 ch. was tar-primed.

Waikanae–Waimea.—Reconstruction is in hand over 1 m.

Levin–Hokio.—1 m. was reconstructed, primed, and sealed.

Pohangina Valley – Apiti.—A deviation at Church Hill, 36 ch. in length, is in hand, and formation has been completed over 27 ch. A contract has been let for a concrete bridge comprising three 40 ft. spans.

Otaki Beach Highway.—Sealing was carried out over 2 m. 56 ch.

Waitarere Beach Highway.—1 m. was reconstructed and primed.

Paraparaumu Beach Highway.—A contract has been let for the reconstruction and sealing of this highway, 2 m. 11 ch. in length, and work commenced.

Milson's Line :—

Reconstruction was completed, the length being 2 m. 35 ch. 1 m. 40 ch. of tar-priming has been applied.

Benton's Bridge : This concrete bridge, of one 20 ft. span, was completed.

Paremata–Plimmerton :—

Formation, metalling, and sealing of this highway were completed, the length being 1 m. 19 ch.

Paremata Bridge: This concrete bridge over the Porirua Harbour, consisting of nine 50 ft. spans, with 22 ft. roadway and two 4 ft. footways, was completed.

Khandallah–Johnsonville: This highway was primed over its full length, 1 m. 10 ch.

Woodville–Masterton (No. 10 District):—

Pahiatua County: 5 m. 4 ch. was primed and sealed. This section is now sealed throughout.

Eketahuna County: Reconstruction and priming were completed over 4 m. 10 ch. Sealing was carried out over 1 m. 53 ch.

Mauriceville County: Reconstruction, priming, and sealing were completed over 4 m. 60 ch. The whole of this section is now sealed.

Masterton County: Priming and sealing were completed over 41 ch.

Opaki Overbridge: Tenders were called and a contract has since been let for a concrete bridge comprising four 50 ft. spans.

Masterton–Upper Hutt (No. 10 District).—Featherston County: North of Featherston a high-cambered sealed length of 55 ch. was scarified, reshaped, and primed. On the Rimutaka Hill heavy widening in rock was completed for a length of 5 ch.

Pahiatua–Akitio via Pongaroa :—

Pahiatua County: Horse-shoe Bridge was eliminated by a water-drive and 30 ch. of widening. Hotel Bridge, a concrete arch of one 34 ft. span, was completed.

Akitio County: Meech's Bridge was replaced by a concrete culvert, 8 ft. by 6 ft. by 97 ft. long, and approaches.

Masterton–Weber via Alfredton :—

Masterton County: Reconstruction, priming, and sealing were carried out over a length of 2 m. 44 ch.

Eketahuna County: Napier's Bridge West, comprising one 45 ft., two 42 ft., and one 33 ft. concrete spans, was completed.

Akitio County: Kohiku Bridge, of one 30 ft. span, and Kayser's Bridge, of one 40 ft. span, were completed, in concrete.

Masterton–Castlepoint.—Castlepoint County: A deviation, 20 ch. in length, was formed and metalled

Masterton–Stronvar.—A deviation, 26 ch. in length, is in hand.

Martinborough–Masterton :—

Featherston County: Priming and sealing were completed over 70 ch.

Wairarapa South County: Preparation for sealing is in hand over 2 m. 40 ch.

Masterton County: Reconstruction, priming, and sealing were completed over 3 m. 72 ch. A further mile was reconstructed and primed.

Tupurupuru – Te Wharau.—Widening is in hand for a distance of 1 m.

Carterton–Longbush.—Wairarapa South County: Reconstruction and priming were carried out over 2 m. 27 ch. Two concrete bridges, of one 20 ft. and one 17 ft. span respectively, were completed, together with three large concrete box-culverts, totalling 21 ft. of deck.

Martinborough–Awhea.—2 m. of preparation work and 40 ch. of sealing were carried out.

Martinborough – Lake Ferry.—Featherston County: 1 m. 73 ch. was prepared, of which 1 m. 35 ch. has been sealed.

Kahautara Highway.—Reconstruction was completed over 3 m. 66 ch., and of this length 1 m. 36 ch. has been sealed.

Featherston – Pigeon Bush.—Reconstruction was completed for 1 m. 50 ch., and of this length 1 m. 35 ch. was tar-primed and sealed.

Mangaone Valley.—Eketahuna County: Godfrey's Bridge, comprising one 52 ft. and two 19 ft. concrete spans, was completed.

Eketahuna–Nireaha.—Eketahuna Borough: Reconstruction, priming, and sealing were completed over 1 m. Work is in hand on Tyler's Bridge, a 55 ft. arched concrete span. The approaches to this bridge, on a deviation, have been formed and metalled over a length of 30 ch.

Blairlogie–Langdale.—Widening was completed on a length of 25 ch.

Picton–Christchurch (No. 11 District) :—

Picton Borough: This section has been prepared for sealing, which has been commenced on a length of 48 ch.

Elevation Level Crossing Overbridge: The approaches, 39 ch. long, are in progress, and tenders have been called for the bridge.

Blenheim Borough: Widening in Main Street was carried out.

Marlborough County—St. Andrews Corner: Widening at this corner was carried out, making a considerable improvement in the alignment.

Awatere County—Hog Swamp Bridge: The bridge, a 36 ft. concrete span, has been completed.

Blenheim–Nelson :—

Havelock Township : A contract was let for the sealing of 30 ch.

Raising Formation at Canvastown : This work has been completed, the length being 27 ch.

Rai Valley Township : A contract has been let for the sealing of 28 ch.

Rai Hill, Wangamoa Valley, and Wangamoa Hill—Reconstruction : With the exception of isolated sections on Rai Hill and in Wangamoa Valley, the major portion of the work for the year has been on the Wangamoa Hill. A 26 ch. deviation at the foot of this hill, on the Blenheim side, has been completed. 1 m. 73 ch. of widening and improvements to alignment have been completed, and a further 21 ch. is in hand. Base-course metal has been laid over 4 m. 74 ch., and top-course over 4 m. 25 ch.

Bulls Hole Bridge : A 10 ft. by 5 ft. concrete box-culvert, and the formation and metalling of 6 ch. of approaches, have been completed.

Lud Bridge – Nelson—Reconstruction and Plant-mix Surfacing : A contract was let providing for 65 ch. of concrete and boulder sea-wall and 5 m. 31 ch. of preparation and plant-mix surfacing. The sea-wall, filling, and practically all the preparation work have been completed, and 2 m. of preliminary seal-coat applied.

Richmond–Collingwood :—

Waimea County—Appleby Bridge, Foot of Moutere Hill : The preparation and plant-mix surfacing of 3 m. 25 ch. have been carried out.

Motueka and Riwaka Bridges—Approaches : The widening and realignment of 12 ch. at the Motueka Bridge and 6 ch. at the Riwaka Bridge were completed.

Takaka County—Paynes Bridge – Takaka Bridge : The two-coat sealing of 74 ch. was carried out.

Takaka Hill : The widening and improvement to grade and alignment have been continued and have covered a total distance of 7 m. 32 ch. Base-course metalling has been carried out over 10 m. 33 ch., and top-course over 4 m. 50 ch.

Nelson–Westport (No. 11 District) :—

Tahunanui Town District : A plant-mix smoothing coat was applied on 67 ch.

Richmond Borough : 41 ch. of plant-mix was applied.

Salisbury Road Culvert : The construction of a concrete culvert, 6 ft. by 6 ft. by 55 ft. long, is in hand.

Waimea County : 3 m. 66 ch. of plant-mix was applied between Tahunanui and Richmond.

Wakefield Railway-crossing : 10 ch. of plant-mix surfacing was laid at this crossing.

Boulder Creek Bridge : This bridge, of one 41½ ft. span, has been completed.

Piper's Creek Culvert : The erection of an 8 ft. by 4 ft. concrete culvert, and the formation and metalling of 6½ ch. of approaches, were completed.

Arnold's Creek No. 2 Bridge : This bridge, of one 34 ft. span, and 5 ch. of approaches, have been completed.

Murchison County—Kawatiri Creek Bridge : This bridge, of one 21 ft. span, and the formation of 7 ch. of approaches was completed.

Pollocks Creek Culvert : This work comprised the construction of an 8 ft. by 6 ft. concrete culvert and 25½ ch. of deviation, and has been completed.

Hope Saddle – Glenhope and Glenhope – Eight-mile Sections : The widening and improvements to grade and alignment have been continued. The work completed amounts to a total of 3 m. 11 ch., while a length of 1 m. 62 ch. is in hand. Base-course metal has been laid on 3 m. 6 ch., and top-course on 2 m. 68 ch.

O'Rourke's No. 2 Bridge : This bridge, of one 45 ft. span with 4 ch. of approaches, has been completed.

Matakitaki Bridge : Protective works, comprising stone-crates and large concrete blocks, have been carried out.

Buller Gorge—Concrete Retaining-walls : The No. 1 retaining-wall, 78 ft. long, has been completed.

Takaka–Terakohe.—Takaka Town District : The sealing of 49 ch. has been undertaken.

Dashwood–Upcot :—

Woodmans Bend Deviation : This deviation, 26 ch. in length, was completed, and 6 ch. widened.

At Cow Creek Bluff 9 ch. has been widened.

Hodder River Bridge : Tenders have been called for this 210 ft. suspension bridge, with two 17 ft. end spans, and 14 ch. of approaches.

Wakefield–Woodstock :—

Davis Creek Bridge : This bridge, of one 25 ft. span, and 6 ch. of approaches, have been completed.

Dove Creek and Hodgens Creek Bridges : A contract has been let for these two short bridges.

Spring Creek – Raranga.—Chaytor's Bridge : This 35 ft. bridge has been erected, and the approaches formed and metalled.

Nelson–Stoke via Jenkins Hill.— Bishopdale–Wakatu Level Crossings : The formation of a 60 ch. deviation is in hand, 4½ ch. being completed. Tenders have been invited for Jenkins Creek Bridge.

Nelson–Westport (No. 12 District) :—

Retaining-wall at 13 m. : In order to ease a sharp curve a grouted masonry wall was constructed and 9 ch. of road widened in rock.

Improvements, 7 m.–8 m. : This is a narrow, tortuous length through hard rock country. 32 ch. of formation has been completed, and a further 16 ch. is in hand.

Buller George Improvements : 1 m. 72 ch. of widening and 3 m. of metalling were completed.

Batty's Creek Culvert : A concrete culvert, 8 ft. by 8 ft. by 37 ft. long, has been built. The construction of the approaches, on improved alignment, is in hand.

Sealing through Railway Camps : A total of 42 ch., at the Tiroroa and Blackwater Camps, has been prepared for sealing.

Fern Arch Wall No. 3 : The third of the retaining-walls replacing old timber bridges has been completed. The wall, 162 ft. long, is principally of the reinforced concrete cantilever type.

Ohika-iti River Bridge : Work is in hand on the construction of a concrete bridge of two 45 ft. and two 30 ft. spans.

Inangahua–Greymouth :—

Big Grey River Protective Works : 10 ch. of heavy bank protection, in wired-stone crate-work, has been completed, and further work is necessary.

Reefton Township : A 92 ch. length, from the town to the railway-station, was sealed in two coats.

Tawhai and Reefton Tunnel Level Crossings : These crossings are being eliminated by a deviation, 1 m. 53 ch. in length, 50 ch. of formation being completed.

Ahaura Township : Preparation for sealing 28 ch. was completed.

Brunner–Ngahere Improvements : Improvements to alignment, grades, and width were commenced on this 4 m. 73 ch. length.

Kamaka and Spring Creek Level Crossings : These crossings are being eliminated by a deviation 1 m. 39 ch. in length. The deviation necessitates the construction of new bridges over Spring, Notown, and Mullins Creeks. Half the formation has been completed, and the concrete piles for Spring and Notown Creek Bridges have been cast.

Kiwi Level Crossing : This crossing is being eliminated by a 30 ch. deviation and a 250 ft. overbridge. The excavation for the foundations of the overbridge has been opened up, and 15 ch. of the deviation completed.

Greymouth–Brunner, Sealing : Preparation of this 4 m. 12 ch. length was completed, and a contract let for first-coat sealing. 2 m. 40 ch. of the priming coat and 20 ch. of sealing were carried out.

Greymouth–Omoto : The improvement of this 1 m. 55 ch. length was completed, the highway, which was narrow and winding, being straightened and widened and the grades improved.

Greymouth–Weheka :—

South Beach Level Crossings : The elimination of two crossings by a deviation, 58 ch. in length, was commenced.

New River Bridge : The construction of a highway bridge, in place of the combined road-rail bridge, was commenced.

Taramakau–Kumara Railway : The preparation and sealing of this 1 m. 77 ch. section have been completed.

Kumara–Flowery Creek Deviation : Formation has been completed on this 8 m. deviation, except 13 ch. in bridge approaches, and metalling is in progress. The deviation includes the construction of five bridges and one large culvert, all in concrete, and these have been completed.

Kaihinu Overbridge : Tenders have been called for the construction of this overbridge, which will consist of one 50 ft. and two 35 ft. concrete spans.

Hokitika River Bridge at Kanieri : This bridge, of thirteen 62 ft. spans in concrete, is in course of erection.

Deep Creek Bridge : An old timber bridge has been replaced by a 10 ft. by 10 ft. rigid frame reinforced concrete culvert 132 ft. in length. The work included 38 ch. of improvement to alignment and grades.

Improvements near Ruatapu Road : Improvements to grades and width have been completed over a length of 20 ch.

Gow's Creek Bridge : A 10 ch. deviation, together with a 12 ft. by 11 ft. by 23 ft. long concrete culvert, has been completed.

Angle Creek Bridge : The construction of a concrete culvert to replace this bridge and the improvement of 27 ch. of highway are well advanced.

Minehan's Creek Bridges : Two concrete bridges, one 40 ft. and the other 30 ft. in length, have been completed. A 37 ch. deviation has also been constructed.

Christchurch – Kumara Junction (No. 12 District) :—

Goat Creek Bridge : Work on this bridge had been commenced when the October floods altered the course of the stream, and it became necessary to redesign the structure. Construction was recommenced in March.

Kelly's Creek and Aickens Level Crossings : A deviation of 70 ch. is being constructed to eliminate these crossings. Heavy excavation in rock and rubble is involved. 70 ch. of clearing and 15 ch. of formation have been completed.

North Creek Culvert : The ford at this creek has been eliminated by the construction of an 8 ft. by 8 ft. by 32 ft. concrete culvert and 22 ch. of deviation.

Culverts near Jacksons : The alignment and grades have been improved over a length of 24 ch., and concrete culverts constructed at two fords.

Taipo River Bridge: This bridge, which consisted of four 110 ft. timber truss-spans on cylinder piers, has been reconstructed, utilizing two of the existing piers. The new structure consists of two 110 ft. plate-girder spans and one 40 ft. steel joist span, with concrete deck.

Kumara Borough: 30 ch. in the business area has been sealed.

Westport–Karamea:—

Raising at 60 m.: A length of 28 ch. has been raised above flood-level.

Mokihinui Bluff: Five masonry retaining-walls, aggregating 8 ch. in length, are being built; and 10 ch. of highway protected by guard-rail.

Mokihinui Bridge: The eight timber spans at the southern end have been replaced by five 40 ft. concrete spans.

Ngakawau River Bridge: A contract has recently been let for a highway bridge of nine 40 ft. spans, on improved alignment, to replace the present combined road-rail structure.

Waimangaroa–Birchfield Level Crossings: A 77 ch. deviation to eliminate two crossings is in progress. The work in hand consists chiefly of bush-felling and drainage, over half the deviation being through swamp.

Waimangaroa Station Level Crossing: This crossing is being eliminated by an overbridge of one 45 ft. and two 35 ft. spans. Construction is in hand.

On the approaches most of the culverting has been completed, and the new station access road formed.

Fairdown Creek Bridge: A 12 ft. 6 in. by 6 ft. concrete culvert has been built to replace a timber bridge, and 26 ch. of approaches straightened and widened.

Orowaiti River Bridge: A contract has been let for this bridge, which is to consist of twelve 40 ft. concrete spans.

Westport Borough: A length of 14½ ch. has been reconstructed, in preparation for sealing.

Westport–Greymouth Coast Highway:—

Four Mile, Charleston Section: 30 ch. of protective fencing has been erected.

Barrytown Sea Erosion: 40 ch. of rubble wall has been built along the sea-front.

Charleston–Punakaiki Improvements: Widening on improved alignment has been completed at Deep Creek and between Charleston and Candlelight; work is being continued near White Horse Creek and between Rockford and Limestone Creeks. At Jessie's Bend, near Punakaiki, a deviation, involving a 30 ft. fill, has been carried out.

Seventeen-mile Bluff: Grades, width, and alignment have been improved over a length of 35 ch. in rock bluffs and loose rubble faces, thus eliminating two dangerous corners.

Runanga Borough: This 70 ch. section has been sealed.

Cobden Bluff – Runanga: Improvements to line, grades, and width are in hand over a length of 3 m. 32 ch., 68 ch. being completed.

Camp Creek Level Crossing: A contract has been let for a concrete overbridge to eliminate this crossing, and the construction of the approaches, 21 ch. in length, is in hand.

Cobden Bluff Level Crossing: An overbridge on a deviation is being constructed to eliminate a level crossing. At the same time the section over the Bluff is being improved by widening and lowering the summit. The length of the deviation and improvements is 44 ch.

Kanieri–Koiterangi.—Protective work has been constructed at the northern approach to Kokatahi Bridge.

Lake Kanieri Highway:—

Stripland's Creek Bridge: A 40 ft. concrete bridge has been completed, together with 12 ch. of approaches.

Coal Creek Bridge: The old timber bridge has been replaced by a concrete structure of one 50 ft. span.

Reefton–Maruia:—

Improvements to grade, width, and alignment have been put in hand on the worst sections of this narrow highway. The work completed consists of 1 m. 62 ch. of formation, 53 ch. of metalling, and the placing of numerous culverts.

Bridge near Crushington: A 12 ft. by 5 ft. concrete culvert has been installed.

Right Hand Branch Bridge: This concrete bridge, of three 40 ft. spans, has been completed.

Granity–Stockton.—The reconstruction undertaken last year has been finished off by the completion of the metalling.

Picton–Christchurch (No. 13 District).—Kaikoura Township: 1 m. 54 ch. of two-coat sealing was carried out.

Waipara–Kaikoura via Culverden:—

Kaikoura Township: The sealing of 23 ch. was completed.

Hurunui – Red Post: This section, of 9 m. 36 ch., was sealed in two coats.

McFarlane's Hill – Karaka Creek: First-coat sealing was carried out over a length of 2 m. 74 ch.

Waikari Creek – McFarlane's Hill: 88 ch. of second-coat sealing was applied.

Conway River Bridge: One abutment, seven piers, and four spans were concreted, and 48 ch. of approaches formed.

Kaikoura Beach Highway.—34 ch. of two-coat sealing was completed.

Mina – Gore Bay.—Groynes and protective works at Gore Bay were completed.

Picton–Christchurch (No. 14 District) :—

Kowai County : The second-coat sealing of 8 m. 47 ch. was carried out.

Ashley River Bridge : This bridge, 1,190 ft. long, was well advanced at the end of March, and has since been completed.

Waimairi County : The Styx Crossing Overbridge, 575 ft. in length, was erected.

Christchurch – Kumara Junction (No. 14 District) :—

Masham – West Melton : The plant-mix surfacing of 3 m. 52 ch. was carried out, which completed the 8 m. 52 ch. section.

Porter's Pass – Bealey—Bruce Creek Bridge : This bridge, of six 44 ft. spans, was commenced, 132 ft. together with 62 ch. of approaches being completed at the end of the year.

Cass Creek Bridge : This bridge, of four 44 ft. spans, was put in hand, and all piers concreted

Bealey – Arthur's Pass : Widening over 4 m. 3 ch. was undertaken.

Christchurch–Akaroa :—

Halswell County—Tai Tapu – Motukarara : 15 ch. of reconstruction was carried out.

Wairewa County : 20 ch. was widened.

Christchurch–Motukarara.—Evans Pass – Lyttelton : Widening was carried out over 44 ch.

Rangiora–Oxford.—Oxford Township : Plant-mix surfacing was applied on 65 ch.

Kaiapoi–Waddington.—Oxford Township : Plant-mix surfacing was carried out on 1 m. 33 ch.

Sockburn–Southbridge.—Springs County : A length of 5 m. was prepared for sealing.

Christchurch – Governor's Bay.—Mount Herbert County : Widening was completed over 72 ch.

Ashley Gorge :—

A further 70 ch. of widening was completed.

Upper Ashley Bridge : This bridge, 240 ft. long, was erected, and 12 ch. of approaches formed.

Whistler River Bridge : This bridge, 99 ft. long, was erected, together with 22 ch. of approaches.

Masham–Belfast.—Waimairi County : 3 m. 9 ch. of first-coat sealing was applied.

Ilam Highway.—64 ch. of two-coat sealing was carried out.

Summit Highway.—Formation was completed over the whole length of 9 m. 36 ch., of which 4 m. has been metalled.

Christchurch–Timaru.—Rangitata Deviation : 8 m. 36 ch. of formation and metalling was completed.

Timaru–Dunedin (No. 15 District).—Levels County : Second-coat sealing was applied over 3 m. 54 ch.

Timaru–Cromwell (No. 15 District).—Washdyke – Pleasant Point : 9 m. 29 ch. of second-coat sealing was carried out.

Ashburton–Junction Darfield – Arundel Main Highway.—Ashburton–Winchmore : 1 m. 63 ch. was sealed in two coats.

Deep Creek – Waihao Downs – Dip Creek.—Waimate County : A length of 5 m. was prepared for sealing.

Waimate–Makikihi.—Waimate Borough : One-coat sealing was applied on this section.

Lake Pukaki – Hermitage.—Bush Creek Bridge : The bridge was completed, the length being 400 ft.

Timaru–Dunedin (No. 16 District) :—

On the 7 m. 59 ch. length between the Waitaki River and Pukeuri a bituminous plant-mix smoothing-coat was substituted for the second-seal coat and this was applied, together with similar work between Oamaru and Maheno, a distance of 7 m. 35 ch.

Deborah Crossing Subway : This work, by which the highway is carried under a new railway bridge, was completed.

Waianakarua Level Crossing : An overbridge and approach banks will eliminate this crossing, and the latter are in hand.

Kartigi Overbridge : This bridge and its approaches have been completed.

Extensive improvements are in progress along Kartigi Beach and near Shag Point. A heavy stone sea-wall is being erected, and the widened formation is practically completed. Two unsatisfactory narrow subways under the railway are eliminated by this development.

Reconstruction between Shag Point and Palmerston, a length of 4 m. 70 ch., was carried out.

The metalling of the Palmerston – Merton Section, of 12 m. 60 ch., in preparation for sealing, is in progress.

The Pleasant River Bridge was replaced by a 40 ft. concrete span, and the approaches regraded.

Timaru–Cromwell (No. 16 District).—Reconstruction has proceeded throughout the year on the Lindis Pass Deviation and improvements, 8¼ m. of new formation being carried out, together with 6 m. of gravelling. This brings the completed work to within 4 m. of the top of the pass.

Milton–Queenstown (No. 16 District) :—

The 70 ch. deviation necessitated by the construction of the Butcher's Creek Irrigation Dam was completed.

The reconstruction of the Clyde–Cromwell Section was commenced, and by the 31st March 7 m. 50 ch. of formation and 3 m. of base-course metalling had been completed.

Queenstown–Invercargill (No. 16 District).—Kingston–Queenstown Section: A 6 m. deviation between Fairlight and Kingston was formed and metalled. At the Queenstown end deviations and improvements were carried out through Frankton Township and for 1½ m. south of the Kawarau Bridge, the total length being 2½ m.

Pukeuri–Kurow–Omarama.—Realignment and widening were carried out at two bluffs near Kurow. Three concrete culverts, each of 10 ft. span, were constructed between Peebles and Georgetown.

Palmerston–Clyde.—Waihemo County: Tenders were invited for a deviation of 48 ch. at the Red Cutting.

St. Bathan's Loop.—The erection of Shepherds Creek Bridge, of one 35 ft. span, was completed.

Kyeburn–Middlemarch.—A 15 ft. bridge was erected over Last Creek, and the Six-mile Creek Bridge is in hand.

Port Chalmers–Aramoana.—50 ch. in the Port Chalmers Borough was sealed in two coats.

Dunedin–Gore (No. 17 District) :—

Otokia–Henley: 88 ch. of plant-mix smoothing-coat was applied.

Tokomairiro River Bridge, Clarksville: The renewal of this bridge is in hand.

Lovell's Flat Level Crossing: A contract was let for the erection of an overbridge, and the approaches are in progress.

Milton–Balclutha: Extensive improvements were commenced, and the formation well advanced over a length of 14 m.

Balclutha Borough: 28 ch. was sealed in two coats. This work included the sealing of the approaches to the new Balclutha Bridge.

Milton–Queenstown (No. 17 District) :—

A combined culvert and concrete-lined tunnel has been constructed at Manuka Creek.

Clarksville Level Crossing: A contract for an overbridge has been let, and work commenced.

Balclutha–Papatowai.—The Purahaua Stream Bridge, 20 ft. long, was erected, and several sharp corners widened.

Willowbank–Mathesons Corner (No. 17 District).—A deviation, 8 ch. in length, was constructed to obviate a dangerous corner near Heriot.

Dunedin–Portobello–Otakou.—Pero's Corner: Realignment and widening were carried out for 3 ch. on either side of the corner.

Green Island–Taieri Mouth.—A contract was let for the improvement and sealing of 5 m. 57 ch. between Green Island and Brighton. Reconstruction and the erection of the Kaikorai Stream Bridge, of four 30 ft. spans, are in hand.

Waipahi–Pomahaka.—The Pomahaka Bridge was renewed by a 121 ft. hardwood truss span on pile piers.

Dunedin–Gore (No. 18 District) :—

Pukerau–McNab: A deviation of 5 m. 27 ch., to avoid flooding, was commenced, and 21 ch. of formation completed.

Bridge Inn–Dacre: A contract has been let for the reconstruction, prior to sealing, of 10 m. 45 ch.

Invercargill–Bluff.—Tenders were invited for the reconstruction of 3 m. 76 ch. between Greenhills and Bluff.

Invercargill–Queenstown (No. 18 District) :—

Cooper's Corner–Buxton Road: 1 m. 73 ch. of sealing was completed.

Branxholm Level Crossing: A contract has been let for an overbridge at this crossing.

Invercargill–Tuatapere.—2 m. of plant-mix smoothing-coat was applied.

Lorne–Tuatapere.—Lorneville Level Crossing: The construction of an overbridge and approaches is in progress.

Edendale–Wyndham–Mokoreta.—Wyndham Town District: 82 ch. was sealed in two coats.

Lorne–Hedgehope.—A length of 92 ch. received a second sealing-coat.

Dunn's Highway.—2 m. 34 ch. of first-coat sealing was applied.

Gore–Lumsden.—Riversdale Township: 18 ch. was sealed in 1 coat.

Winton–Gore.—The Charlton Creek Bridge, of 16 ft. span, was erected.

Willowbank – Mathesons Corner (No. 18 District).—Shepherd's Creek and Pembles Bridges, of 15 ft. and 8 ft. span respectively, were erected.

Lumsden – Te Anau – Milford Sound:—

Key – Te Anau: 4 m. 50 ch. was reconstructed, and contracts let for metalling and the erection of a small bridge.

Mararoa Bridge: A contract has been let for the renewal of this bridge, and the piles have been cast.

Linwood Deviation: This deviation, 1 m. 4 ch. in length, has been completed.

The alignment of 1 m. 24 ch. near Te Anau was improved.

Hollyford Valley: 1 m. 39 ch. of formation and metalling and 100 ft. of bridges have been carried out.

Homer Tunnel: This has now been driven for 439 ft.

Milford Sound: 2 m. 40 ch. of bush-work, 2 m. 27 ch. of formation, and 70 ft. of bridges were completed.

The Board acknowledges the continued co-operation of the Public Works Department in matters relating to main highways administration and records its appreciation of the valuable services rendered by officers of the Department in carrying out an extended programme during the period under review.

The accompanying tables contain statistical information relative to finance, construction, maintenance, &c., in respect of the main highways system.

Signed on behalf of the Main Highways Board,

J. Wood, M.Inst.C.E.,
Chairman.

TABLE 1.—MAIN HIGHWAYS ACCOUNT.

Income and Expenditure Account for the Year ended 31st March, 1937, and Total to Date.

EXPENDITURE	Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922, to 31/3/37.
	£ s. d.	£ s. d.
Net expenditure on construction and improvement of main highways—		
Highway District—		
No. 1	91,353 7 5	*765,310 9 3*
No. 2	203,986 13 0	*1,084,109 12 9*
No. 3	43,407 14 7	*223,708 16 9*
No. 4	48,832 4 9	*452,624 15 7*
No. 5	51,624 14 5	*351,324 10 5*
No. 6	37,208 6 2	*387,288 4 9*
No. 7	47,891 1 0	*406,337 19 4*
No. 8	92,625 11 7	*307,464 13 8*
No. 9	95,543 4 3	*700,833 12 9*
No. 10	49,243 4 9	*281,937 3 7*
Totals for North Island	761,716 1 11	*4,960,939 18 10*
No. 11	85,239 19 0	*270,148 17 0*
No. 12	140,498 14 7	*309,027 6 5*
No. 13	10,704 6 11	*179,143 14 6*
No. 14	96,665 11 9	*436,500 13 6*
No. 15	27,099 17 8	*203,822 3 11*
No. 16	113,187 16 8	*309,329 2 5*
No. 17	33,314 8 2	*413,824 12 5*
No. 18	126,429 19 3	*290,615 9 11*
Totals for Dominion	1,394,856 15 11	*7,373,351 18 11*
Net expenditure on renewals of main highways :—		
Highway District—		
No. 1	5,925 7 7	*5,925 7 7*
No. 2	21,068 14 2	*21,068 14 2*
No. 3	5,388 10 5	*5,388 10 5*
No. 4	8,779 6 3	*8,779 6 3*
No. 5	11,371 4 8	*11,371 4 8*
No. 6	1,872 13 8	*1,872 13 8*
No. 7	9,135 7 10	*9,135 7 10*
No. 8	381 11 10	*381 11 10*
No. 9	1,430 13 11	*1,430 13 11*
No. 10	9,762 3 10	*9,762 3 10*
Totals for North Island	75,115 14 2	*75,115 14 2*
No. 11	1,128 10 3	*1,128 10 3*
No. 12	23,447 11 2	*23,447 11 2*
No. 13	819 17 2	*819 17 2*
No. 14	531 8 3	*531 8 3*
No. 15	11 16 8	*11 16 8*
No. 16	2,592 11 7	*2,592 11 7*
No. 17	1,509 1 10	*1,509 1 10*
No. 18	1,247 5 6	*1,247 5 6*
Totals for Dominion	106,403 16 7	*106,403 16 7**
Carried forward	1,501,260 12 6	*7,479,755 15 6*

INCOME.	Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922, to 31/3/37.
	£ s. d.	£ s. d.
Loans raised under Main Highways Act, 1922—		
Stock and Debentures issued—		
At 3 per cent. interest	649,000 0 0	*665,365 0 0*
At 3½ per cent. interest	204,500 0 0	*610,775 0 0*
At 3¾ per cent. interest	..	*190,895 0 0*
At 4 per cent. interest	..	*1,295,185 0 0*
At 4½ per cent. interest	..	*542,004 10 10*
At 5½ per cent. interest	..	*2,100 0 0*
Securities redeemed, Loans Redemption Account	..	*646,070 0 0*
Consolidated Fund—Public Debt Repayment Account	..	*55,720 0 0*
	853,500 0 0	*4,008,114 10 10*
Receipts under section 15, Finance Act, 1923, from Public Works Fund, General Purposes Account (at 5 per cent. interest)	..	*1,226,000 0 0*
Income from—		
Motor-registration licenses, fees, and fines (section 24, Motor-vehicles Act, 1924)	578,228 6 2	*4,508,480 8 4*
Less Commission on collection by Post and Telegraph Department—		
Motor-registration fees and licenses (£ 22,753 15 1)		
Fees for registration of change of ownership (£ 9,711 9 0)		
	32,465 4 1	*229,969 14 10*
	545,763 2 1	*4,278,510 13 6*
Interest from investments	305 18 9	*216,452 4 2*
Interest from local authorities on plant purchased on their behalf	1,266 0 9	*22,474 6 11*
Interest on advances to local authorities	3,968 10 10	*26,494 5 9*
Mileage Tax (Finance Act, 1931–32 (No. 2), section 19)	3,290 4 11	*7,323 3 8*
Miscellaneous receipts	159 0 1	*1,738 16 8*
Motor-spirits tax (section 9, Motor-spirits Taxation Act, 1927)	1,697,942 3 0	*9,616,222 4 10*
Tire-tax (sections 13 and 14, Main Highways Act, 1922)	138,894 8 10	*2,060,136 4 2*
Transfer from Consolidated Fund (section 14, Main Highways Act, 1922)	..	*210,000 0 0*
Rent of and tolls from ferries	..	*2,081 10 6*
Temporary transfers from other accounts	100,000 0 0	*250,000 0 0*
Carried forward	3,345,089 9 3	*21,925,548 1 0*

* Expenditure from 1/4/36 only. Previously included under maintenance, repairs, &c.

TABLE 1.—MAIN HIGHWAYS ACCOUNT—*continued.*

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1937, AND TOTAL TO DATE—*continued.*

EXPENDITURE.			Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922, to 31/3/37.	INCOME.	Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922, to 31/3/37.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Brought forward			1,501,260 12 6	*7,479,755 15 6*	Brought forward	3,345,089 9 3	*21,925,548 1 0*
Net expenditure on maintenance, repairs, &c., of main highways :—							
Highway District—							
No. 1			76,585 6 7	*647,701 1 1*			
No. 2			119,141 3 2	*1,182,045 11 7*			
No. 3			55,186 7 0	*522,879 5 5*			
No. 4			56,841 6 8	*415,474 13 10*			
No. 5			48,455 18 5	*674,925 8 6*			
No. 6			60,845 9 0	*456,802 1 7*			
No. 7			39,793 0 5	*488,011 14 8*			
No. 8			52,898 8 10	*429,861 4 5*			
No. 9			49,471 13 10	*595,166 10 11*			
No. 10			42,663 4 1	*510,224 3 0*			
Totals for North Island			601,881 18 0	*5,923,091 15 0*			
No. 11			45,382 16 2	*498,488 10 8*			
No. 12			70,037 2 8	*877,857 12 2*			
No. 13			17,677 5 5	*220,291 14 11*			
No. 14			31,673 14 8	*361,977 11 7*			
No. 15			35,862 14 7	*450,150 18 5*			
No. 16			33,257 14 1	*299,159 4 1*			
No. 17			23,276 17 7	*299,746 16 0*			
No. 18			41,680 12 8	*345,730 9 11*			
Totals for Dominion			900,730 15 10	*9,276,494 12 9*			
Total expenditure by Highways Districts			2,401,991 8 4	*16,756,250 8 3*			
Administration—							
Administration expenses (including salaries, travelling-expenses, office rents, printing, stationery, postages, and miscellaneous expenses)	104,077 19 8			*480,487 0 3*			
Fees and travelling-expenses of members of the main Highways Board other than Government members ..	923 0 5		..	*15,721 15 0*			
Miscellaneous expenses—							
Advertising, maps, rent of halls, traffic tallies, transport of samples, depreciation of furniture, &c.	407 12 11		..	*5,519 3 0*			
Compensation under section 3, Public Works Amendment Act, 1925	..		..	*1,015 1 6*			
Exchange on remittances	2,746 13 2		..	*4,666 16 1*			
Petrological laboratory and other experimental work, Expenses of	1,210 2 5		..	*9,352 14 5*			
Total administration			109,365 8 7	*516,762 10 3*			
Carried forward	..	..	2,511,356 16 11	*17,273,012 18 6*	Carried forward	3,345,089 9 3	*21,925,548 1 0*

TABLE 1.—MAIN HIGHWAYS ACCOUNT—*continued.*

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 1937, AND TOTAL TO DATE—*continued.*

EXPENDITURE.		Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922 to 31/3/37.	INCOME.	Total for Year 1936–37.	Total since Inception of Main Highways Act, 1922 to 31/3/37.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.
Brought forward		2,511,356 16 11	*17,273,012 18 6*	Brought forward	3,345,089 9 3	*21,925,548 1 0*
Loan charges—						
Charges and expenses of raising loans, management charges of Consolidated Stock on account of Construction Fund, &c.	1,139 13 8	..	*68,481 12 5*			
Interest on amount appropriated out of Public Works Fund and paid into Main Highways Account Construction Fund	61,300 0 0	..	*429,100 0 0*			
Interest on loans, recoupment to Consolidated Fund (section 4, Finance Act, 1919)	125,578 1 1	..	*960,541 12 4*			
Transfer to reserve for redemption of main highway securities	93,567 0 0	..	*593,202 0 0**			
Payment to local authorities in commutation of toll-gate charges (Finance Act, 1925, section 20)	1,457 1 2	..	*25,752 7 5*			
Payment to Wellington City Council in commutation of fees chargeable in respect of motor-vehicles using Hutt Road (Finance Act, 1927 (No. 2), section 33) ..	24,474 6 2	..	*206,084 15 10*			
Repayment of temporary transfer from other accounts ..	200,000 0 0	..	*250,000 0 0*			
Total loan charges		507,516 2 1	*2,53 ,162 8 0*			
Subsidies, &c., in respect of other than main highways—						
Municipal Corporations (Municipal Corporations Act, 1933, section 71)	29,400 4 8	..	*179,150 17 1*			
County Councils and other local authorities (Finance Act, 1930, section 37)	165,685 2 2	..	*1,131,427 3 7*			
Subsidies to County Councils for rebate to ratepayers (Finance Act (No. 4), 1931, section 45)	..	..	*253,892 12 1*			
Subsidy on rates levied on farming land (Finance Act (No. 3), 1934, section 28)	237 17 6	..	*364,601 8 3*			
Maintenance and construction of roads giving access to outlying areas (Finance Act (No. 3), 1931)	..	..	*45,918 8 8*			
Total subsidies		195,323 4 4	*1,974,990 9 8*			
		3,214,196 3 4	*21,781,165 16 2*			
Balance, being excess of income over expenditure, carried to general balance-sheet		130,893 5 11	*144,382 4 10*			
		3,345,089 9 3	*21,925,548 1 0*		3,345,089 9 3	*21,925,548 1 0*

* Excludes £60,408 10s. 7d. interest credited.

NOTE.—No charge for the cost of exchange on interest payments made in London is included in the accounts.

TABLE 1.—MAIN HIGHWAYS ACCOUNT—*continued.*

General Balance-sheet as at 31st March, 1937.

LIABILITIES.	£ s. d.	£ s. d.	ASSETS.	£ s. d.	£ s. d.
Excess of income over expenditure for 1936–37	130,893 5 11		Cash in Public Account—		74,327 0 8
Add Balance at 31/3/36	13,488 18 11		At call		
		144,382 4 10	Sundry debtors—		
			Public Works Department	3,125 8 2	
Sundry creditors—			Other Government Departments	830 2 0	
Public Works Department	27,465 7 8		Non-departmental	16,965 6 10	
Other Government Departments	5,667 8 8				20,920 17 0
Non-departmental	244,034 5 1		Advances to local authorities (Main Highways Amendment Act, 1926, section 2)		100,904 10 7
		277,167 1 5	Advance on subsidies (Finance Act, 1930, sections 37 and 39, and Finance Act, 1932, section 36)		
Interest accrued on loans		25,499 0 5			8,891 17 8
Reserves for redemption of securities		7,540 10 7	Motor-registration fee in hands of Postal Department		2,909 8 10
Writings-off in Suspense		612 17 1	Interest due and accrued		109,773 13 7
			Stocks of materials, tools, &c.		
			Furniture, fittings, &c.—		
			Expenditure to 31/3/37	4,415 7 6	
			Less depreciation to 31/3/37	931 8 3	3,483 19 3
			Plant and equipment—		
			For Main Highways Board—		
			Expenditure to 31/3/37	194,168 8 11	
			Less depreciation charged to works	96,091 19 5	98,076 9 6
			Purchased for local authorities—		
			Expenditure to 31/3/37	208,587 13 2	
			Less repayments of principal	180,827 3 7	27,760 9 7
			Amount transferred to Loans Redemption Account	653,610 10 7	
			Less amount utilized for redemption of securities	646,070 0 0	7,540 10 7
			Stocks Deficits Account		612 17 1
		455,201 14 4			455,201 14 4

Notes.—(*a*) No liability is included for interest on loans redeemed out of Public Debt Repayment Account. (*b*) The two accounts, previously known as "Construction" and "Revenue," were amalgamated as from 1st April, 1936, and the account is now termed the "Main Highways Account." The segregation of this account for balance-sheet purposes is under consideration with a view to the framing of future balance-sheets on the "double-account" system.

H. G. Priestley, A.R.A.N.Z., Acting Chief Accountant, Public Works Department.
J. Wood, Chairman, Main Highways Board.

I hereby certify that the Income and Expenditure Accounts and Balance-sheet have been duly examined and compared with the relative books and documents submitted for audit, and correctly state the position as disclosed thereby, subject to the departmental notes enfaced thereon.—J. H. Fowler, Controller and Auditor-General.

TABLE 2.—LENGTHS OF MAIN HIGHWAYS AT 31ST MARCH, 1937.

Number and Name of Highway District.	Type of Surface.			Total.
	Dustless.	Gravel or Macadam.	Pumice or Clay.	
	M. ch.	M. ch.	M. ch.	M. ch.
1. Auckland North	61 10	924 40	..	985 50
2. Auckland South	390 54	894 50	5 52	1,290 76
3. Tauranga	77 11	347 25	300 18	724 54
4. Gisborne	74 27	305 6	..	379 33
5. Napier	180 37	557 10	..	737 47
6. King-country	28 75	553 45	17 0	599 40
7. Taranaki	326 38	135 67	10 75	473 20
8. Wanganui	106 40	420 65	3 0	530 25
9. Wellington West ..	206 61	292 57	..	499 38
10. Wellington East	131 52	372 47	..	504 19
Totals, North Island ..	1,584 5	4,804 12	336 65	6,725 2
11. Nelson	46 77	615 21	10 27	672 45
12. West Coast	28 12	512 19	..	540 31
13. Canterbury North ..	47 11	286 53	..	333 64
14. Canterbury Central ..	148 20	596 48	5 36	750 24
15. Canterbury South ..	119 59	701 46	..	821 25
16. Otago Central	64 4	776 35	..	840 39
17. Otago South	48 56	474 8	..	522 64
18. Southland	40 38	867 4	..	907 42
Totals, South Island ..	543 37	4,829 74	15 63	5,389 14
Totals, Dominion ..	2,127 42	9,634 6	352 48	12,114 16
Summary.				
State highways	1,321 42	2,421 36	199 7	3,942 5
Main highways	806 0	7,212 50	153 41	8,172 11
Total	2,127 42	9,634 6	352 48	12,114 16

TABLE 3.—CONSTRUCTION WORK COMPLETED DURING YEAR 1936–37.

Number and Name of Highway District.	Formation and Widening.	Gravelling and Metalling.	Tar and Bituminous Sealing.	Road- and Plant-mix Bituminous Surfacing.	Bituminous Macadam (Penetration).	Portland Cement Concrete.	Bridges.	Engineering Surveys.
	M. ch.	M. ch.	M. ch.	M. ch.	M. ch.	M. ch.	Ft.	M. ch.
1. Auckland North	8 33	5 54	8 19	..	..	..	202	28 78
2. Auckland South ..	17 40	15 46	59 76	18 48	2 72	0 35	713	64 60
3. Tauranga	12 20	17 70	7 66	..	..	..	348	22 35
4. Gisborne	10 61	11 6	6 1	..	..	..	437	17 51
5. Napier	11 36	6 31	14 37	..	..	..	1,093	12 57
6. King-country	10 78	14 56	2 29	..	..	..	..	3 17
7. Taranaki	2 5	2 37	2 30	4 13	0 44	..	652	..
8. Wanganui	26 40	2 25	9 8	..	..	..	120	12 49
9. Wellington West ..	26 67	1 39	13 70	2 53	..	..	477	14 74
10. Wellington East ..	31 70	0 50	25 10	0 24	..	..	422	18 40
11. Nelson	14 15	11 50	1 43	8 49	..	..	265	18 52
12. West Coast	22 33	8 45	4 29	..	..	..	1,238	50 42
13. Canterbury North ..	..	..	15 69	..	..	..	..	1 4
14. Canterbury Central ..	17 51	4 0	4 1	6 77	..	..	2,984	33 69
15. Canterbury South ..	5 0	8 36	2 28	..	..	..	..	15 27
16. Otago Central	31 15	14 40	0 50	22 20	..	..	278	0 49
17. Otago South	11 54	0 14	0 61	1 8	..	..	141	30 0
18. Southland	11 31	5 35	4 78	2 0	..	..	205	28 19
Totals	272 9	130 74	183 65	66 52	3 36	0 35	9,575	374 3

TABLE 4.—LENGTHS OF MAIN HIGHWAYS METALLED AND SURFACED SINCE INCEPTION OF BOARD'S OPERATIONS (9TH JUNE, 1924).

At close of Period ending	Total Main Highways.	Type of Surface.			Dustless Surfacing added during Year.	Percentage of Dustless Surfacing to Total Main Highways.
		Pumice and Clay.	Gravel and Macadam.	Dustless Surfacing.		
	Miles.	Miles.	Miles.	Miles.	Miles.	
9th June, 1924 ..	5,954	1,535	4,171	248	..	4·2
31st March, 1925 ..	5,954	1,472	4,222	260	12	4·4
,, 1926 ..	6,272	1,384	4,557	331	71	5·3
,, 1927 ..	6,391	1,233	4,726	432	101	6·8
,, 1928 ..	6,608	1,100	4,953	555	123	8·4
,, 1929 ..	10,403	915	8,735	753	198	7·2
,, 1930 ..	10,408	736	8,705	967	214	9·3
,, 1931 ..	10,419	608	8,685	1,126	159	10·8
,, 1932 ..	10,846	539	9,009	1,298	172	12·0
,, 1933 ..	10,878	494	9,005	1,379	81	12·7
,, 1934 ..	10,974	466	9,047	1,461	82	13·3
,, 1935 ..	11,557	397	9,494	1,666	205	14·4
,, 1936 ..	12,048	390	9,715	1,943	277	16·1
,, 1937 ..	12,114	353	9,634	2,127	184	17·6
Percentage at 31st March, 1937	100	2·9	79·5	17·6	..	..

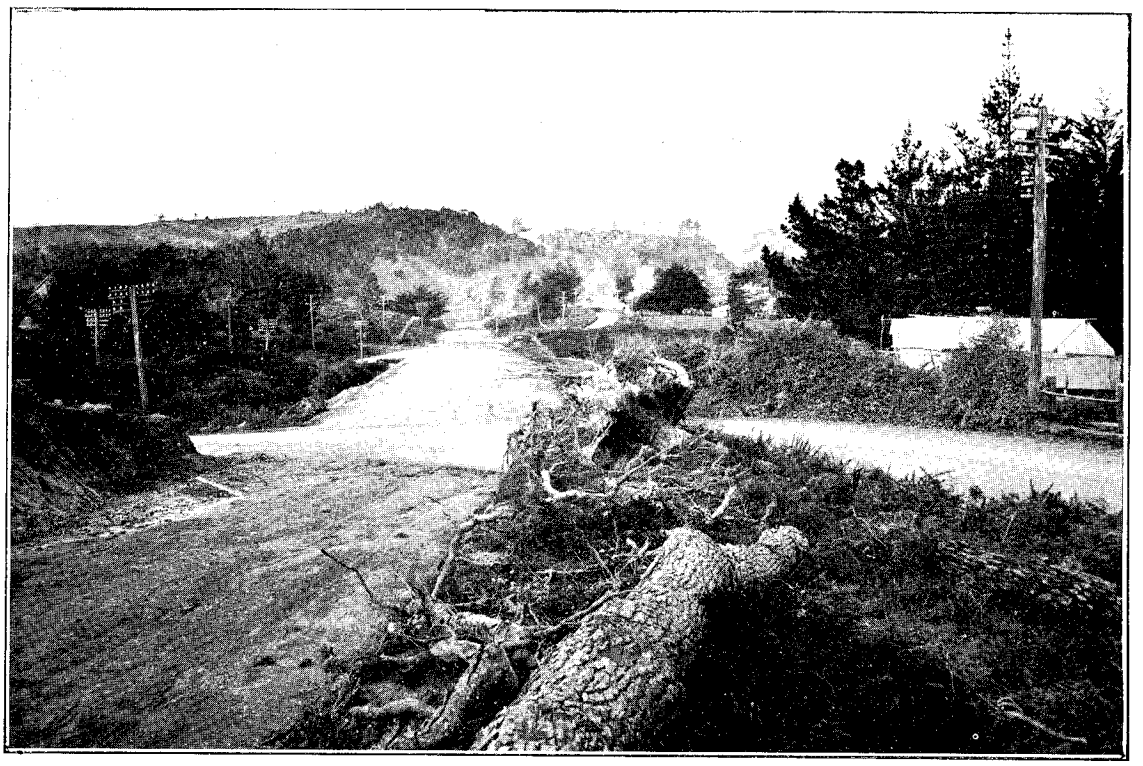
TABLE 5.—MAINTENANCE OF MAIN HIGHWAYS (INCLUDING BRIDGES).

Number and Name of Highway District.	Length Maintained.	Expenditure.			Average per Mile per Annum.								
		Board.	Local Authorities.	Total.	1936–37.	1935–36.	1934–35.	1933–34.	1932–33.	1931–32.	1930–31.	1929–30.	1928–29.	1927–28.
	M. ch.	£	£	£	£	£	£	£	£	£	£	£	£	£
1. Auckland North ..	985 50	76,585	15,157	91,742	93·2	110·1	97·9	71·6	61·2	79·2	83·4	115·7	90·3	103·6
2. Auckland South ..	1,290 76	119,141	34,875	154,016	119·3	181·4	141·1	124·6	106·9	145·3	175·8	214·3	183·0	203·3
3. Tauranga ..	724 54	55,186	5,881	61,067	84·3	153·1	87·1	72·9	61·9	70·7	80·4	90·7	74·5	80·3
4. Gisborne ..	379 33	56,841	12,563	69,404	182·9	178·1	164·9	106·4	96·3	117·3	163·5	189·5	124·9	104·3
5. Napier	737 47	48,456	12,297	60,753	82·4	138·9	117·7	81·4	79·3	75·9	121·2	146·7	120·3	170·0
6. King-country ..	599 40	60,846	8,976	69,822	116·5	89·2	99·7	70·8	57·1	70·0	85·8	115·7	61·4	56·2
7. Taranaki ..	473 20	39,793	9,449	49,242	104·1	123·4	102·5	83·8	84·5	125·2	136·0	172·8	155·9	195·7
8. Wanganui ..	530 25	52,899	8,598	61,497	115·9	122·0	87·5	80·8	66·0	101·0	126·7	176·1	88·5	145·3
9. Wellington West ..	499 38	49,472	11,417	60,889	121·9	164·1	124·7	106·0	110·8	149·8	179·0	224·3	185·6	228·9
10. Wellington East ..	504 19	42,663	11,810	54,473	108·0	175·3	181·3	114·9	91·4	128·6	141·6	159·0	138·4	138·8
Totals, North Island	6,725 2	601,882	131,023	732,905	109·0	143·2	118·3	91·3	81·0	104·5	124·8	155·8	119·9	141·2
11. Nelson	672 45	45,383	8,618	54,001	80·3	116·8	101·1	74·1	66·6	103·6	82·0	112·8	88·7	102·1
12. West Coast ..	540 31	70,037	6,626	76,663	141·8	214·5	142·6	110·8	104·1	136·7	122·4	166·8	144·9	118·3
13. Canterbury North	333 64	17,677	3,783	21,460	64·3	62·8	55·7	58·3	50·0	55·4	72·6	99·7	81·1	90·1
14. Canterbury Central	750 24	31,674	9,324	40,998	54·6	81·1	55·2	50·9	50·2	76·5	75·2	77·3	68·8	87·3
15. Canterbury South	821 25	35,863	8,519	44,382	54·0	96·7	66·9	59·3	67·0	78·7	88·0	89·6	66·3	105·0
16. Otago Central ..	840 39	33,258	8,404	41,662	49·5	70·1	75·1	50·3	46·4	52·8	36·4	73·9	47·7	77·2
17. Otago South ..	522 64	23,277	9,535	32,812	62·8	97·8	84·6	73·8	72·8	99·5	90·8	108·1	77·1	90·5
18. Southland ..	907 42	41,680	10,191	51,871	57·2	57·1	53·9	44·4	41·6	43·2	58·7	57·9	49·9	63·4
Totals, South Island	5,389 14	298,849	65,000	363,849	67·5	96·2	77·6	62·7	60·3	77·4	75·8	94·1	75·0	91·4
Totals, Dominion ..	12,114 16	900,731	196,023	1,096,754	90·5	122·4	100·3	78·5	70·7	92·5	103·1	128·6	100·1	119·9

TABLE 6.—TESTS OF STONE COMPLETED DURING THE YEAR ENDED 31ST MARCH, 1937.

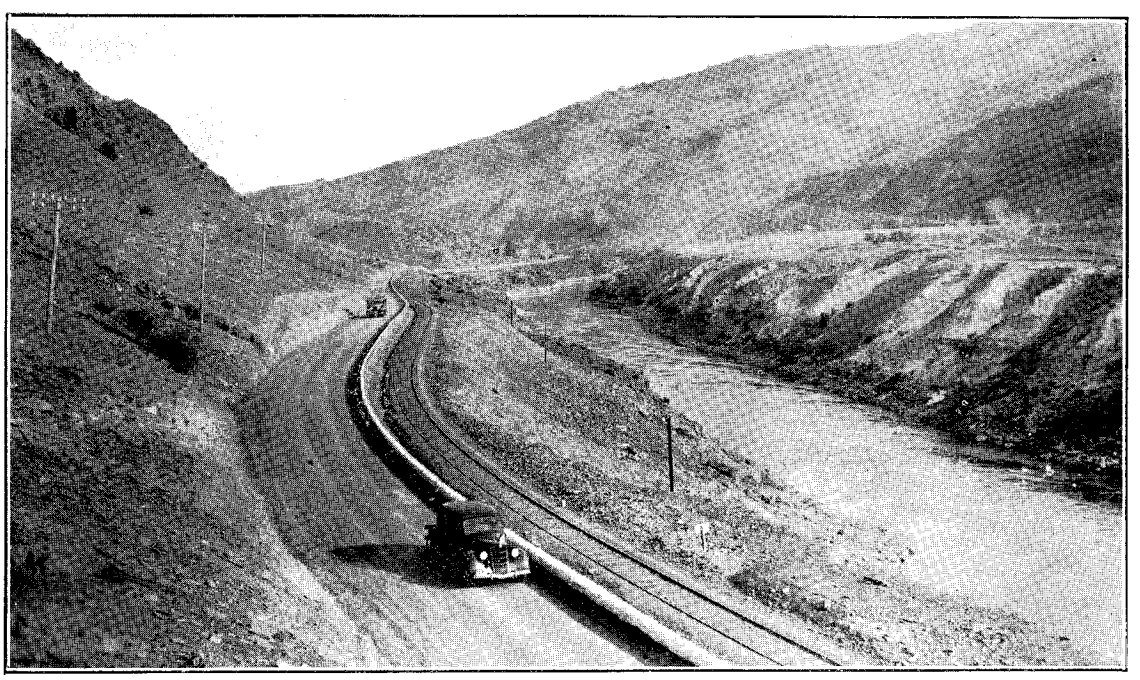
No.	Locality.	Weight in Pounds per Cubic Foot.	Absorption of Water in Pounds per Cubic Foot.	Abrasion.		Hardness.	Toughness.	Geological Classification.
				Percentage of Wear.	French Co-efficient.			
296	Quarry Reserve 235, Opaheke, Franklin County	180·5	0·14	3·98	10·0	18·32	22·5	Basalt.
297	H. Bleasel, Mapiu, Ohura County	164·6	2·35	14·40	2·8	12·36	7·5	Glauconitic limestone.
298	Block XI, Mapara Survey District, Waitomo County	163·7	1·14	7·34	5·4	14·72	18·0	Shell limestone.
299	McMann, Mangaiti Road, Mapara, Waitomo County	159·3	3·05	7·58	5·3	13·60	9·5	Polyzoal limestone.
300	Ongaroto, Tokoroa, Matamata County	179·0	1·70	3·26	12·3	18·29	16·5	Basalt.
301	Section 1, Block IX, Waipu Survey District, Whangarei County	172·1	0·30	1·28	31·2	19·27	35·5	Greywacke.
302	Whakapapaiti River, National Park – Taupo Main Highway	162·1	1·05	2·30	17·4	18·94	15·5	Andesite.
303	Whakapapanui River, National Park – Taupo Main Highway	169·3	1·00	4·40	9·0	19·25	18·5	Hypersthene andesite.
304	Whakapapanui River, National Park – Taupo Main Highway	171·7	1·40	3·00	13·3	18·67	15·5	Andesitic basalt.
305	From a lahar deposit, Bruce Highway	161·5	0·33	1·00	4·0	18·30	14·0	Andesite.
306	No. 2, Block X, Pihanga Survey District, Taupo County	169·2	0·45	19·40	2·1	18·60	6·0	Andesite.
307	Mottram's Quarry, Section 249 Block XV, Whakatane Survey District	163·0	0·40	3·64	10·9	18·30	21·0	Greywacke.
308	Porirua, Wellington	166·6	0·30	3·10	12·7	18·68	22·0	Greywacke.

Other tests were made by abrasion with steel shot, sieve analysis, gravitation, microscopic examination, &c. as required by the nature of the samples submitted.



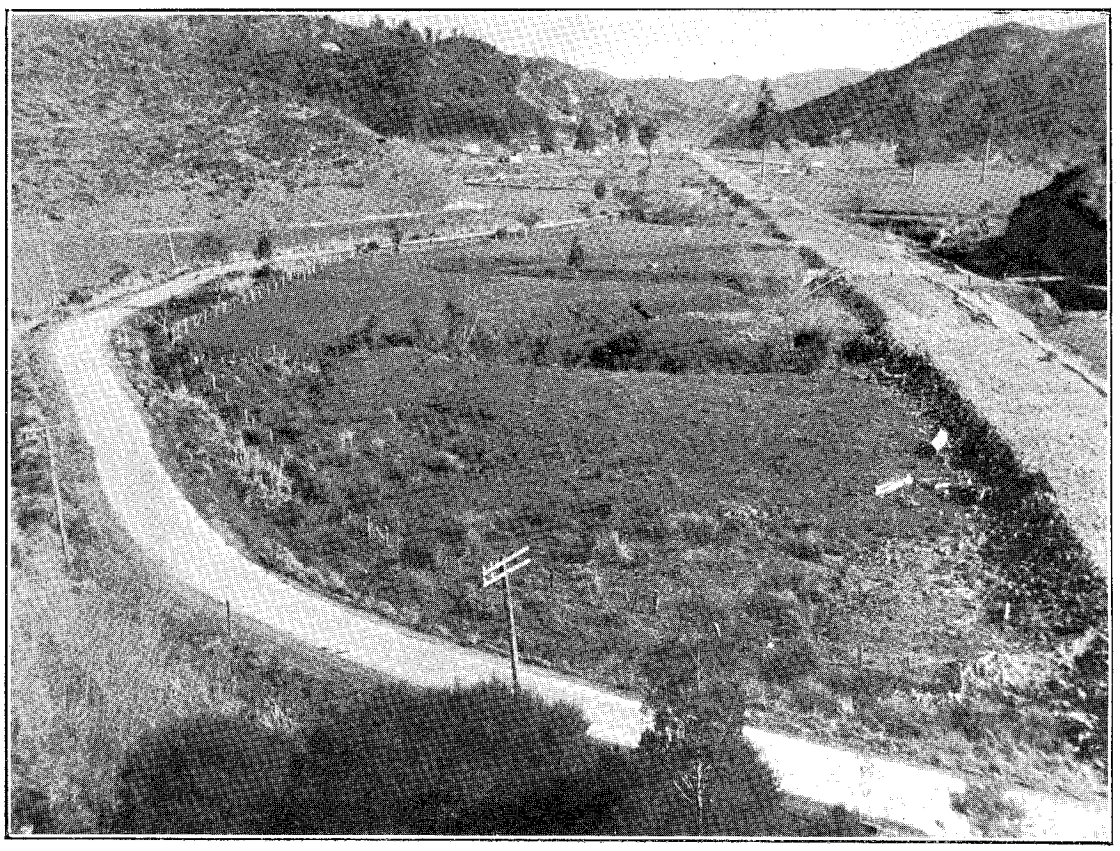
Alignment Improvements, Albany Hill.

BIRKENHEAD–MAUNGATUROTO STATE HIGHWAY.



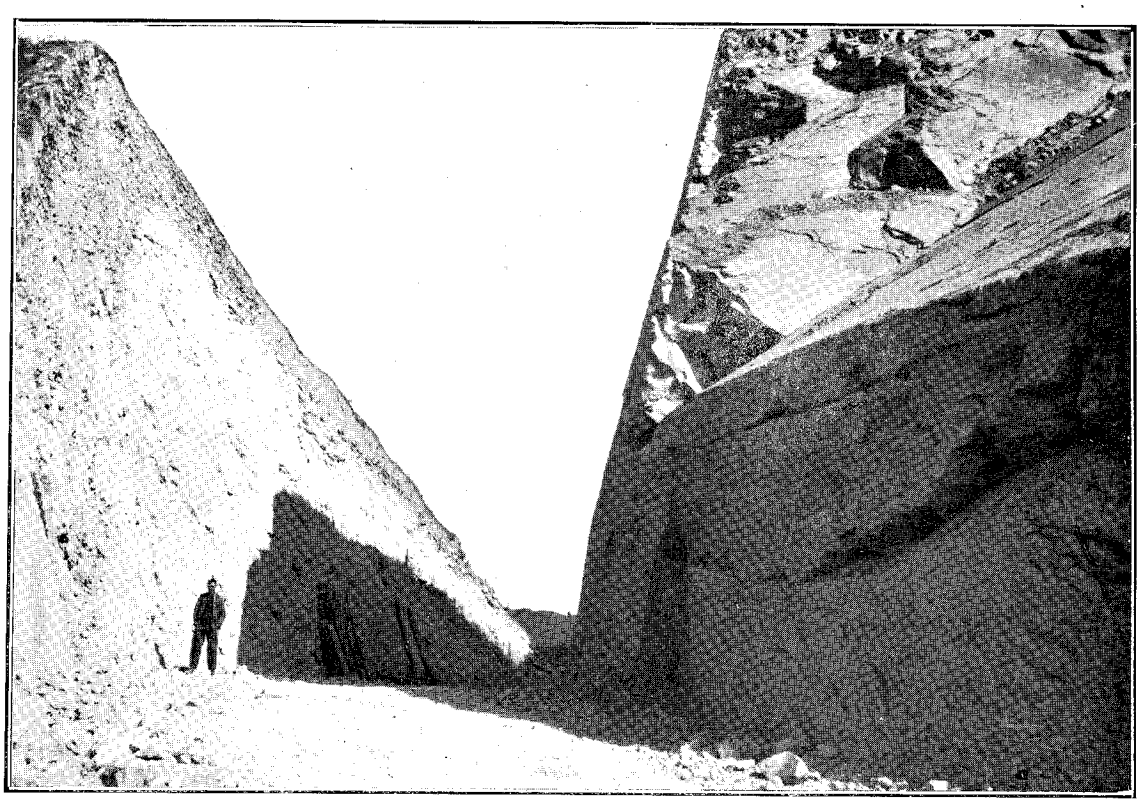
Reconstruction of Highway; Section ready for Sealing.

CLYDE–CROMWELL SECTION, MILTON–QUEENSTOWN STATE HIGHWAY.



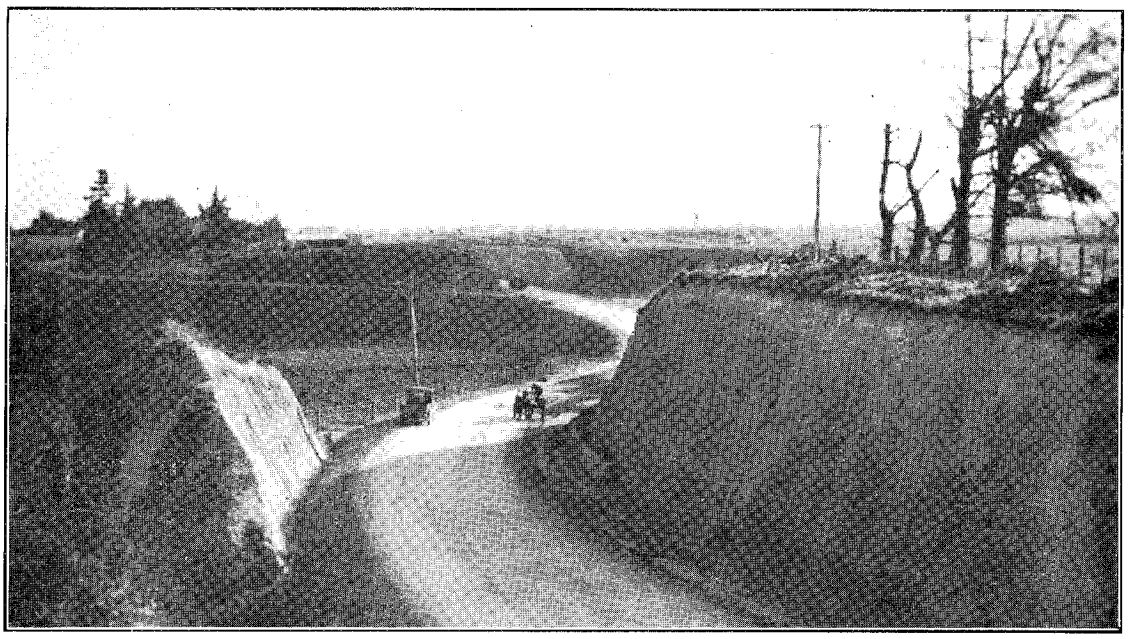
Improvements to Alignment in Mimi Valley.

TE KUITI–NEW PLYMOUTH STATE HIGHWAY.

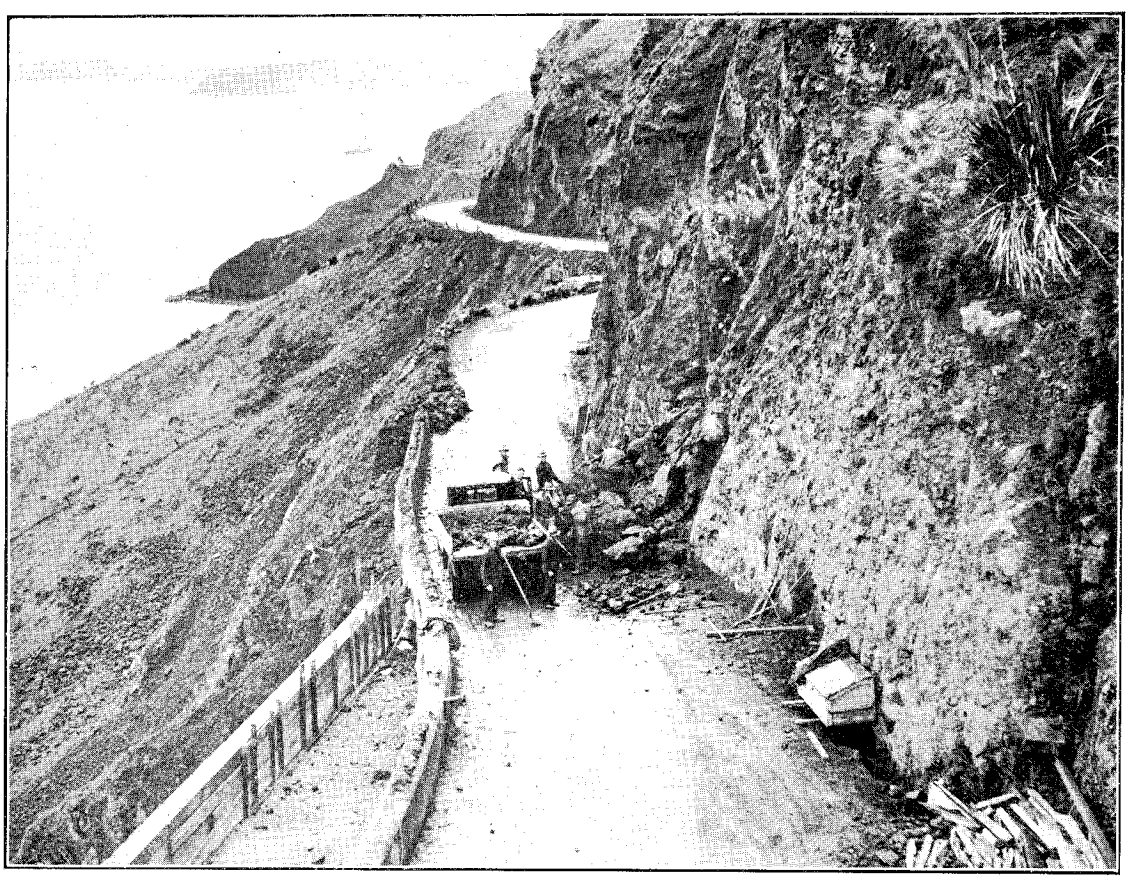


Reconstruction Mangaweka–Utiku Section. Heavy Cut in Papa Rock.

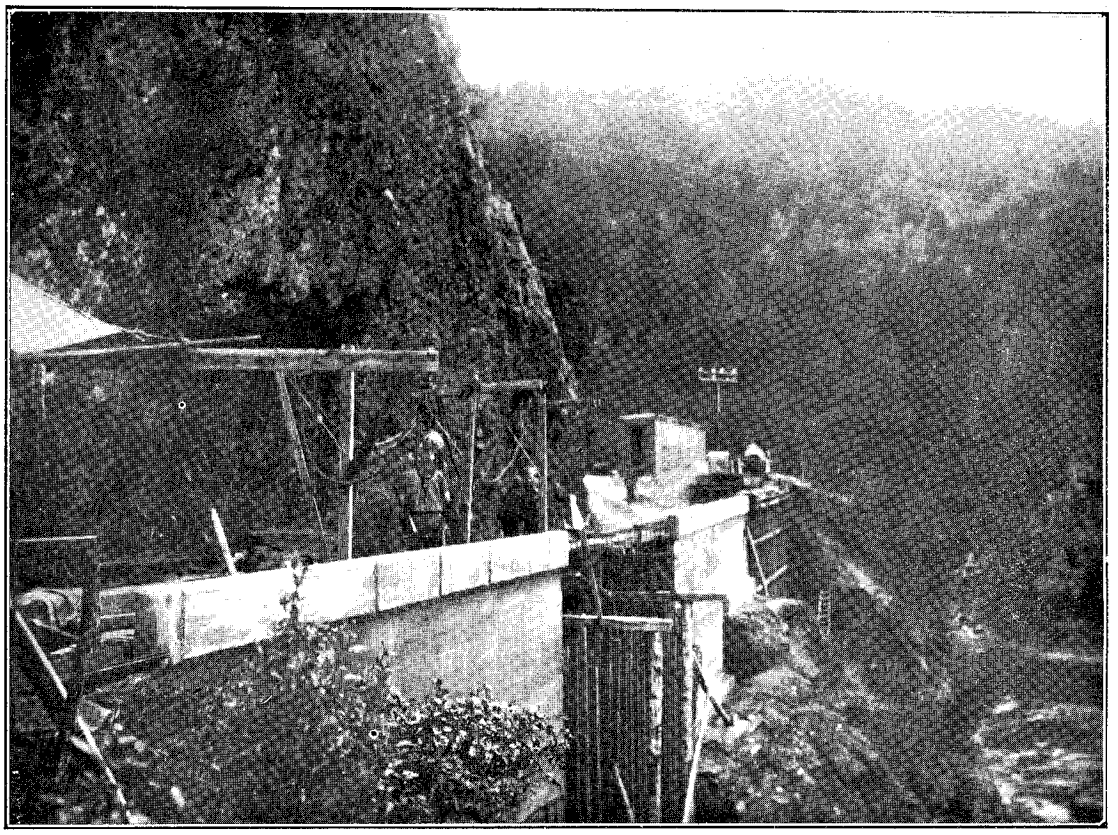
HOROPITO–BULLS VIA TAIHAPE STATE HIGHWAY.



MAKERUA HILL DEVIATION. IMPROVEMENT TO ALIGNMENT.
LEVIN–PALMERSTON NORTH MAIN HIGHWAY.

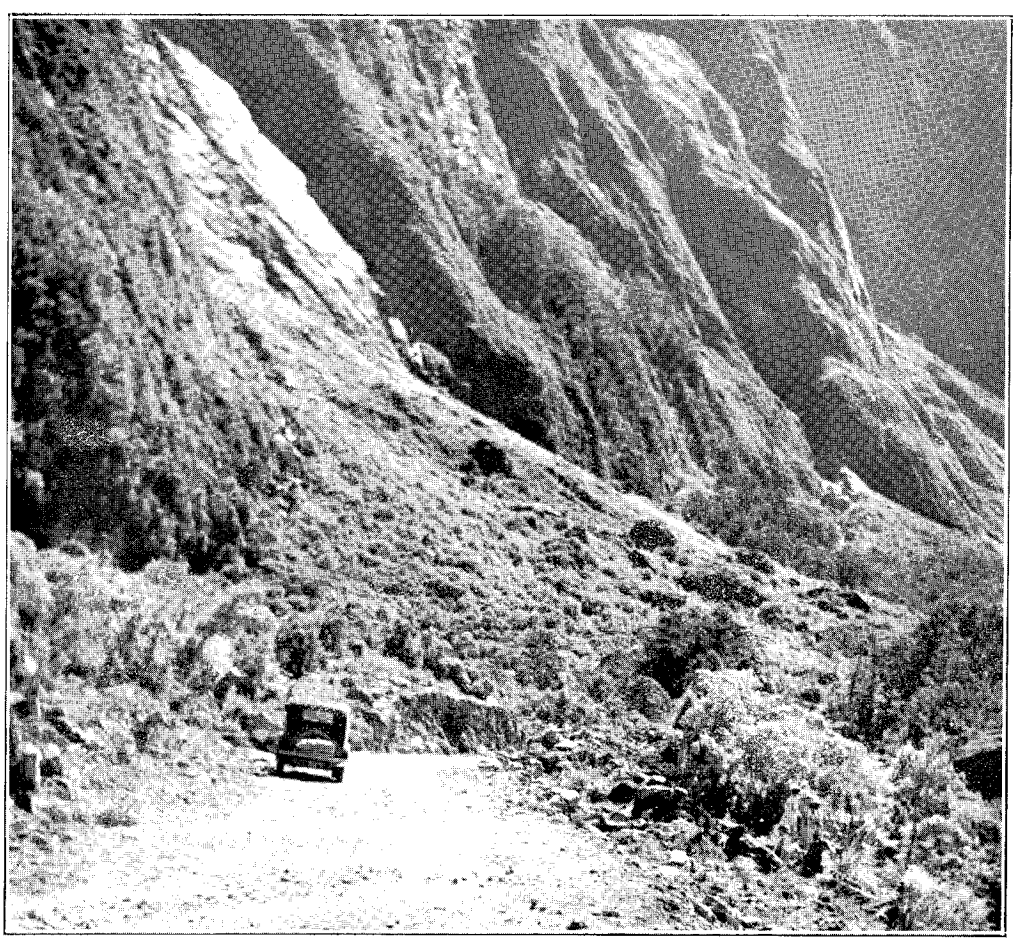


WIDENING BETWEEN EVANS PASS AND LYTTELTON.
CHRISTCHURCH–MOTUKARARA MAIN HIGHWAY.



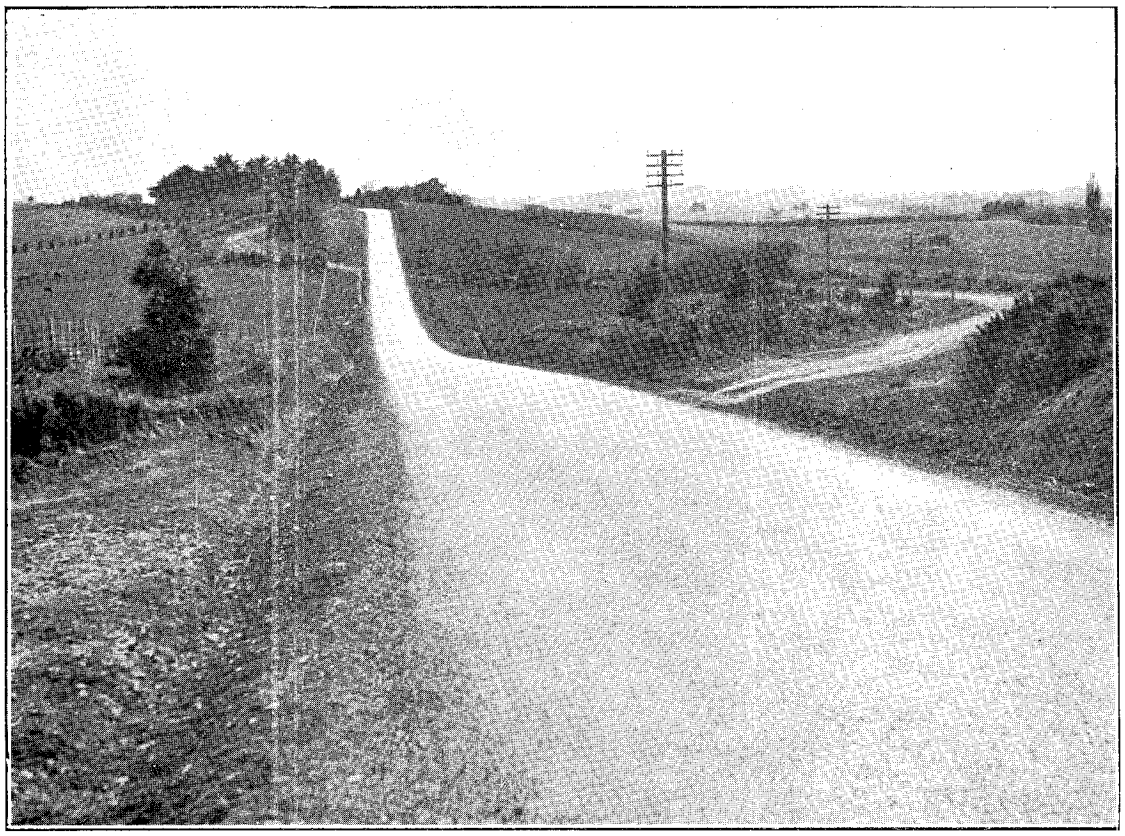
Retaining-wall on Narrow Section of Highway in Buller Gorge.

WESTPORT–INANGAHUA STATE HIGHWAY.



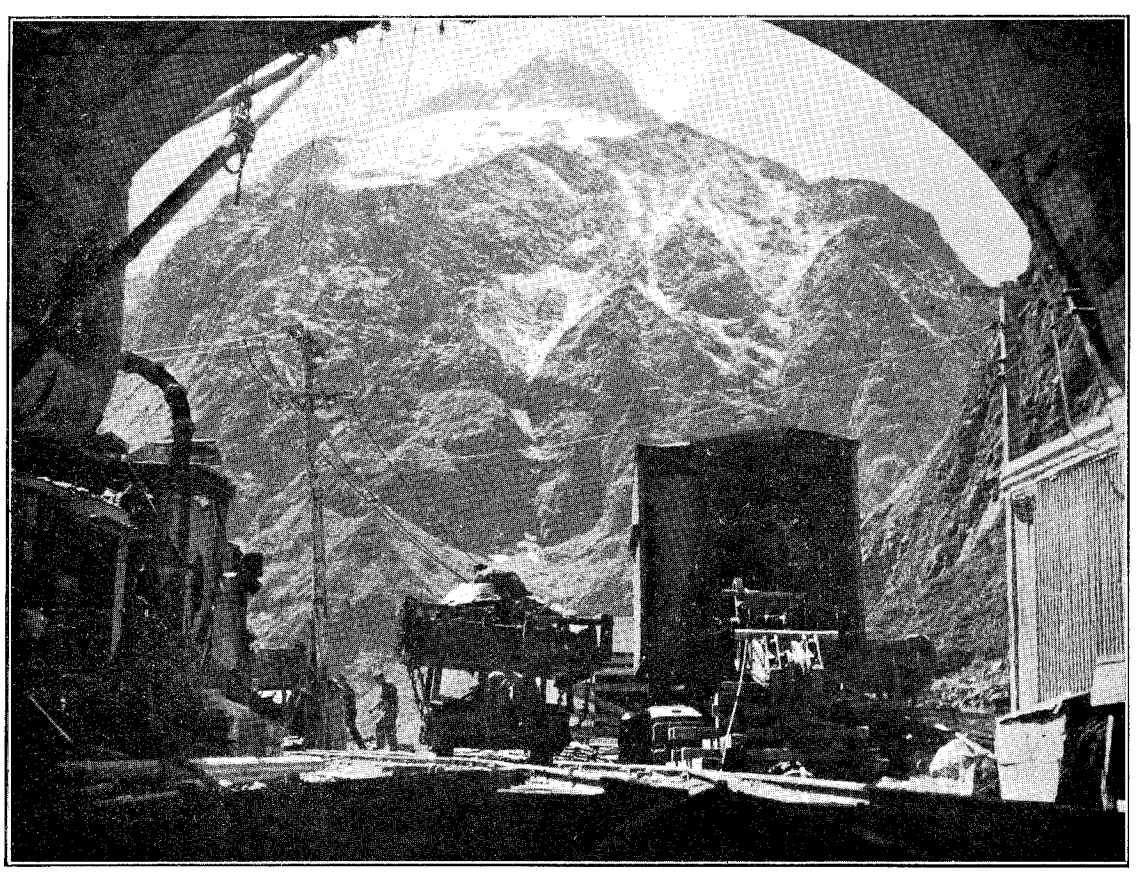
Camera Flat. Highway skirts the foot of Cliffs, 5,000 ft. in Height.

TE ANAU–MILFORD SOUND MAIN HIGHWAY.



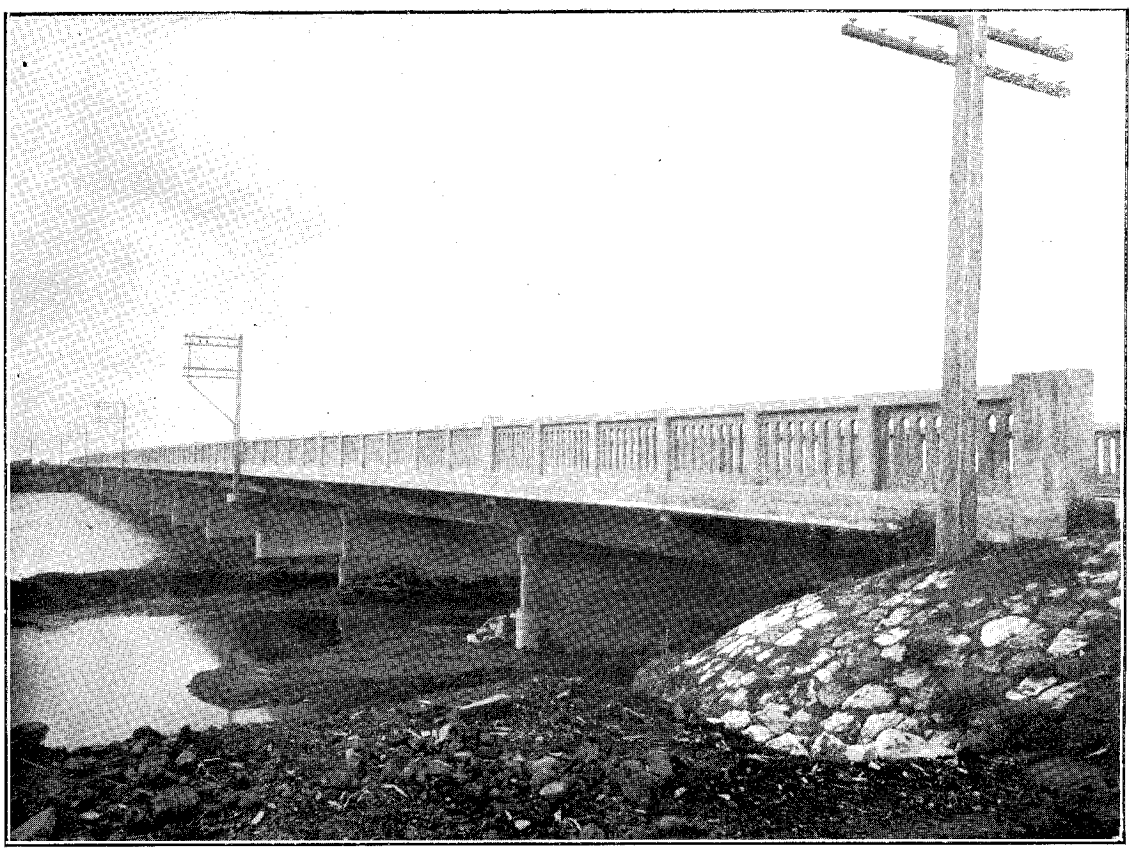
Improvement to Alignment near Te Awamutu.

HAMILTON–TE KUITI STATE HIGHWAY.



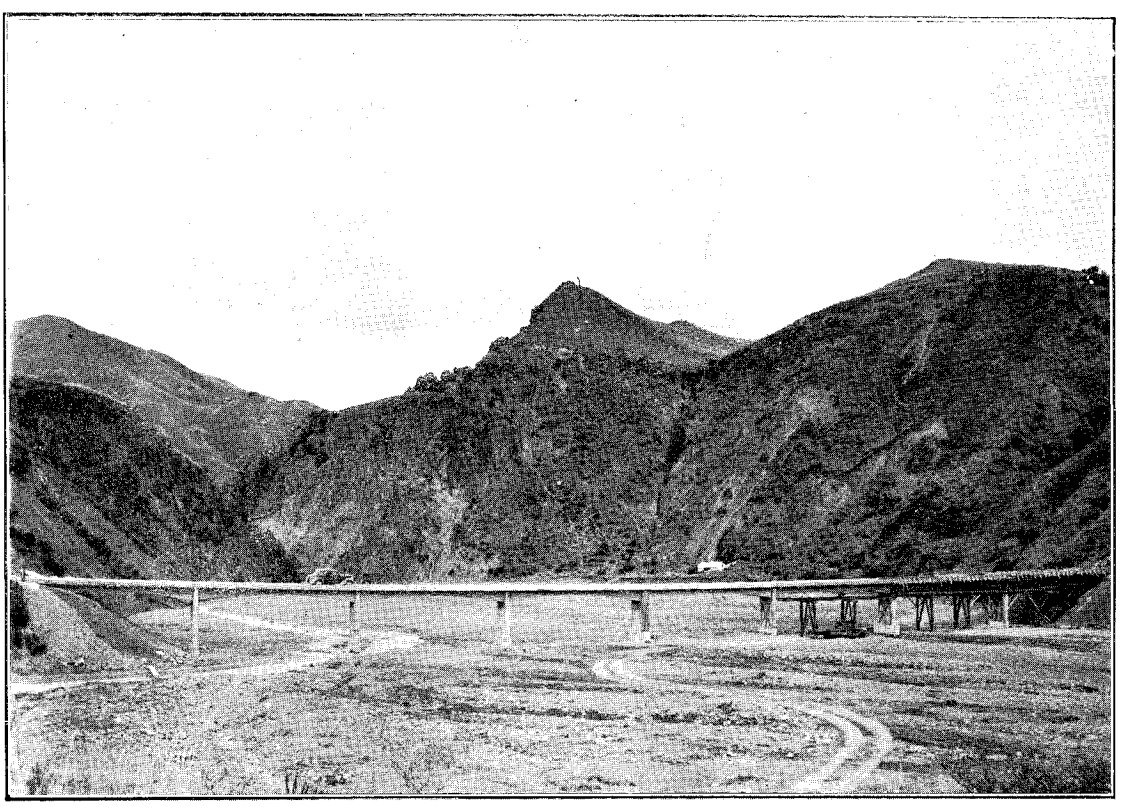
View from Portal, Homer Tunnel.

TE ANAU–MILFORD SOUND MAIN HIGHWAY.



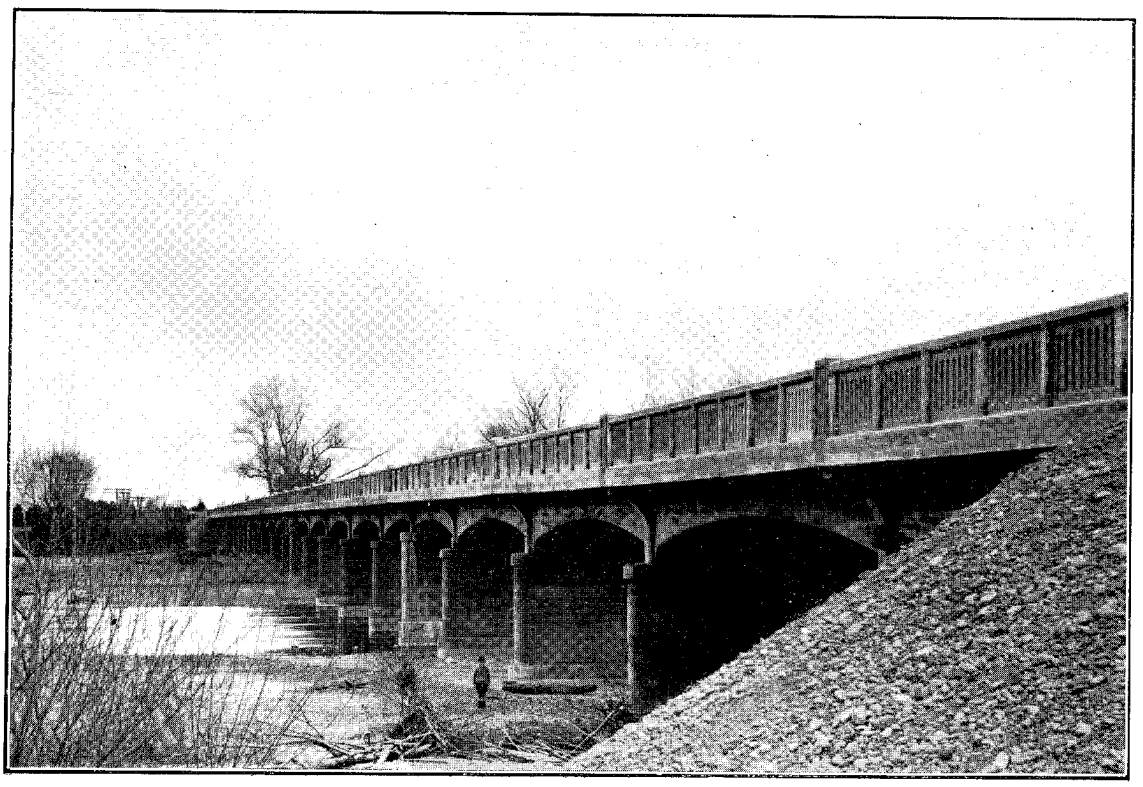
Waitangi Bridge. Fifteen 40 ft. Reinforced Concrete Spans. 24 ft. Roadway.

NAPIER–PALMERSTON NORTH STATE HIGHWAY.



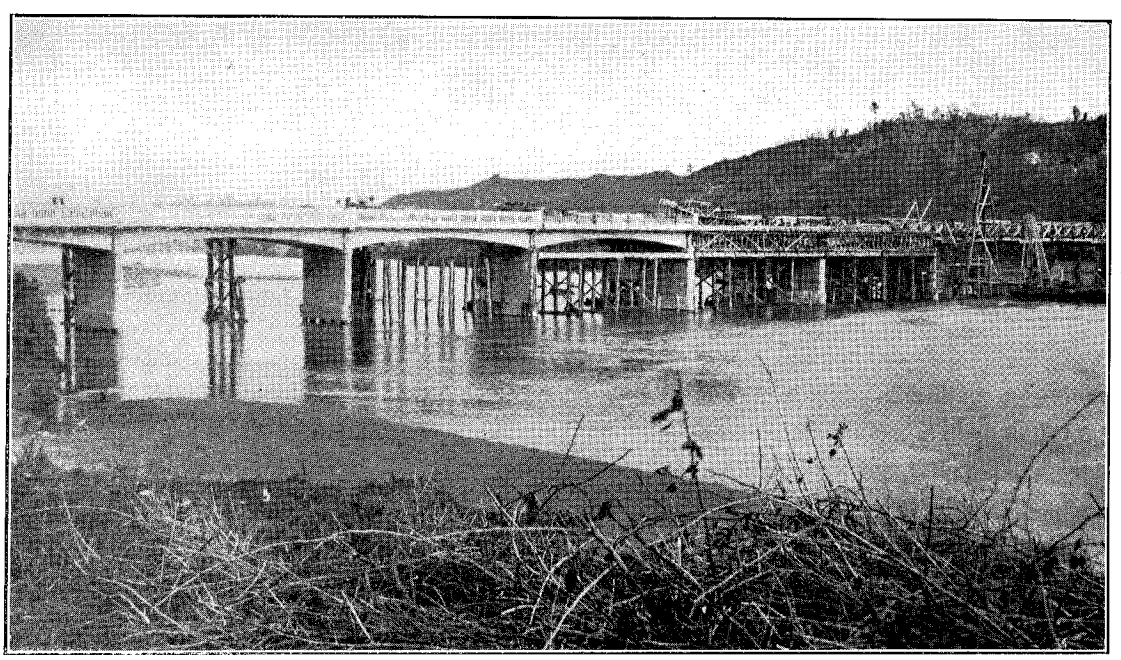
Conway River Bridge. Built on Vertical Curve. Construction approaching Completion; Handrail still to be placed.

WAIPARA–KAIKOURA VIA CULVERDEN MAIN HIGHWAY.



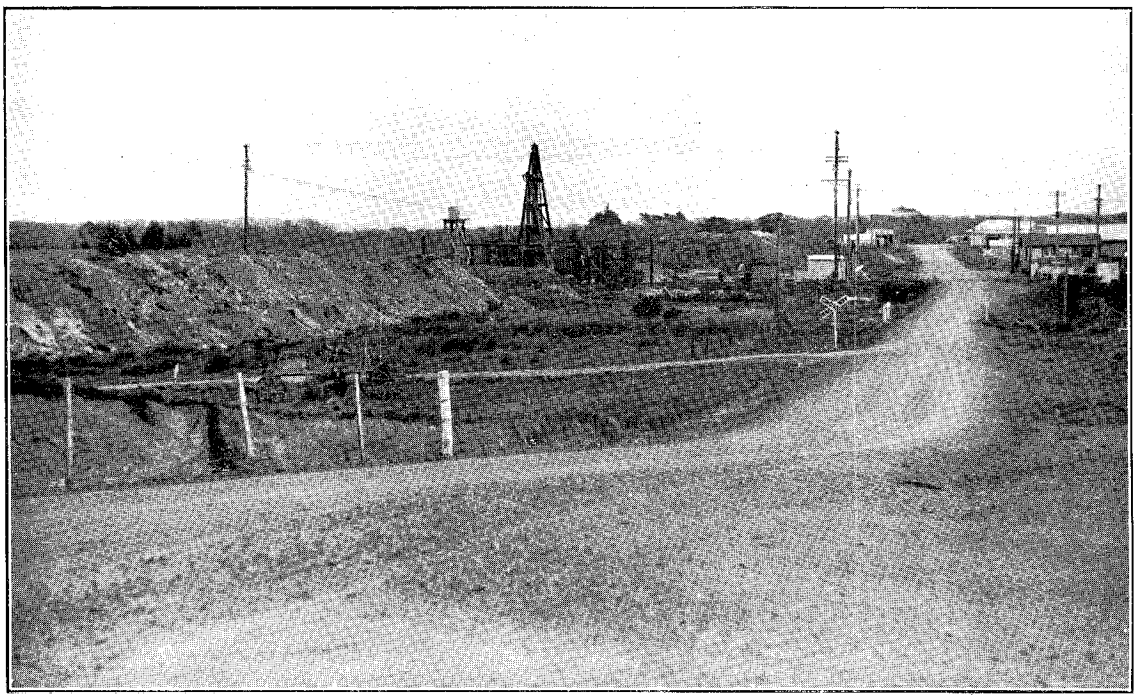
Ashley River Bridge. Ten 41 ft. and Fifteen 52 ft. Continuous Girder Spans in Reinforced Concrete. 22 ft. Roadway.

PICTON–CHRISTCHURCH STATE HIGHWAY.



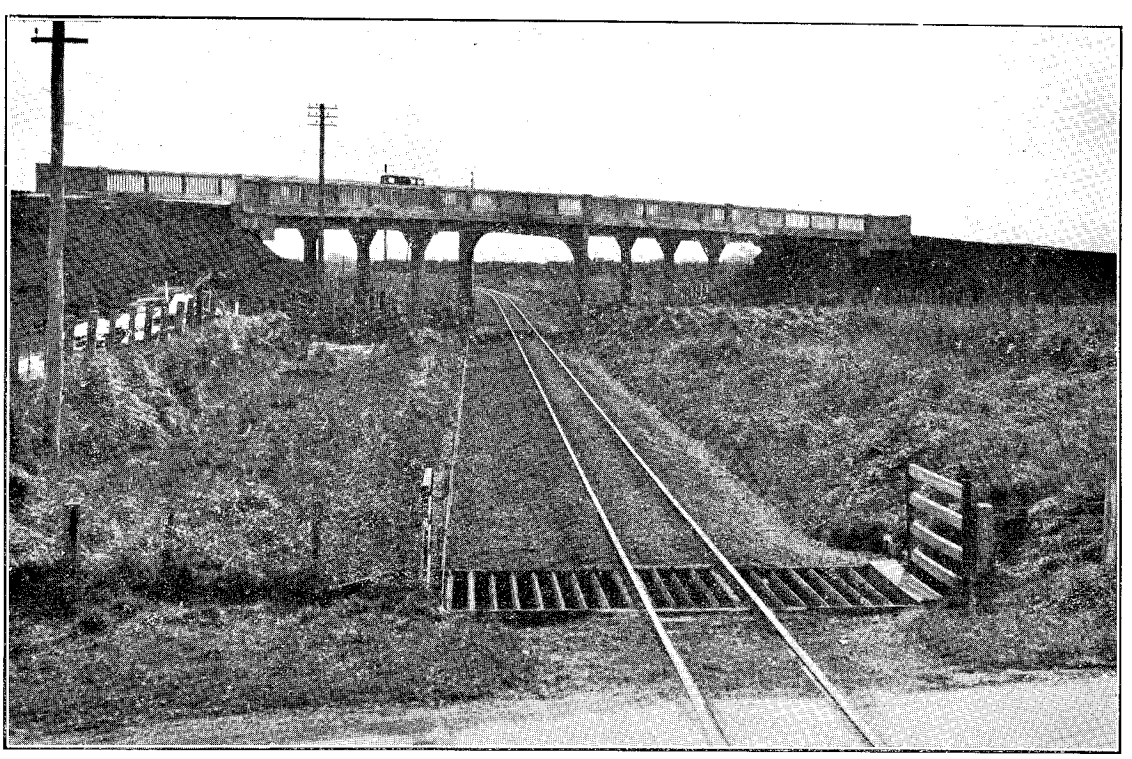
Hokitika River Bridge at Kanieri. Thirteen 62 ft. Continuous Girder Spans in Reinforced Concrete. 22 ft. Roadway.

GREYMOUTH–WEHEKA STATE HIGHWAY.



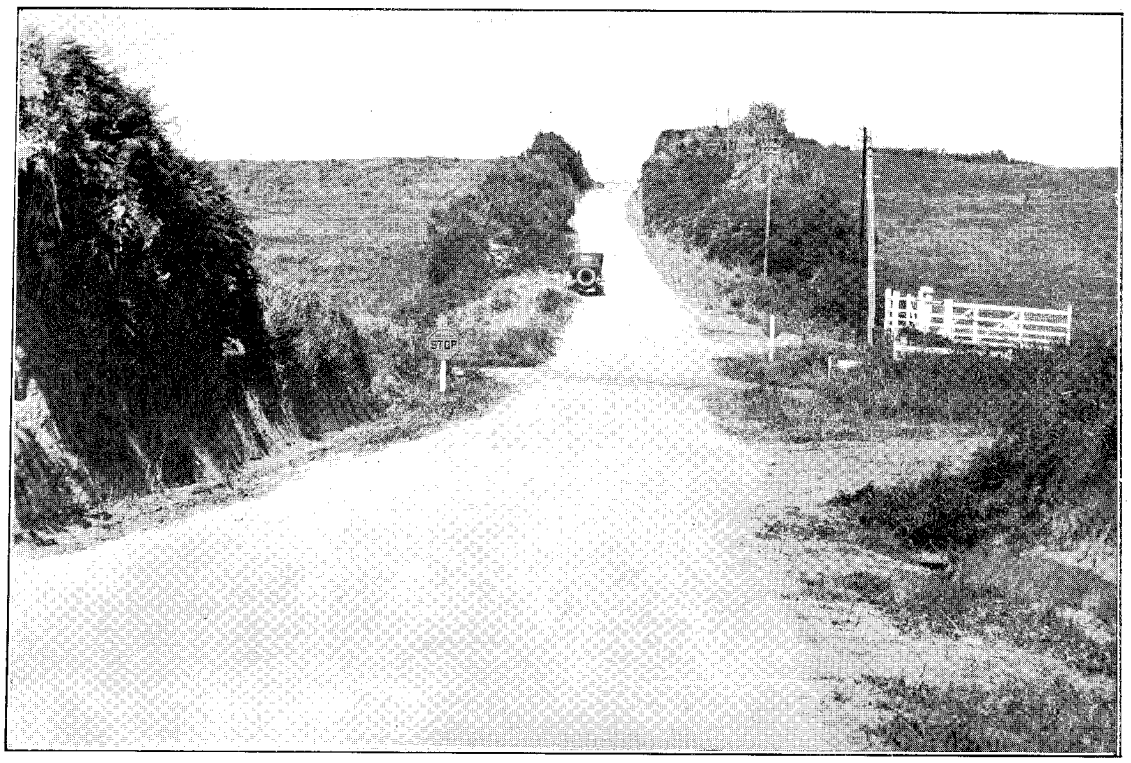
Ohinewai Overbridge over Main Trunk Lines.

TAHUNA–OHINEWAI MAIN HIGHWAY.



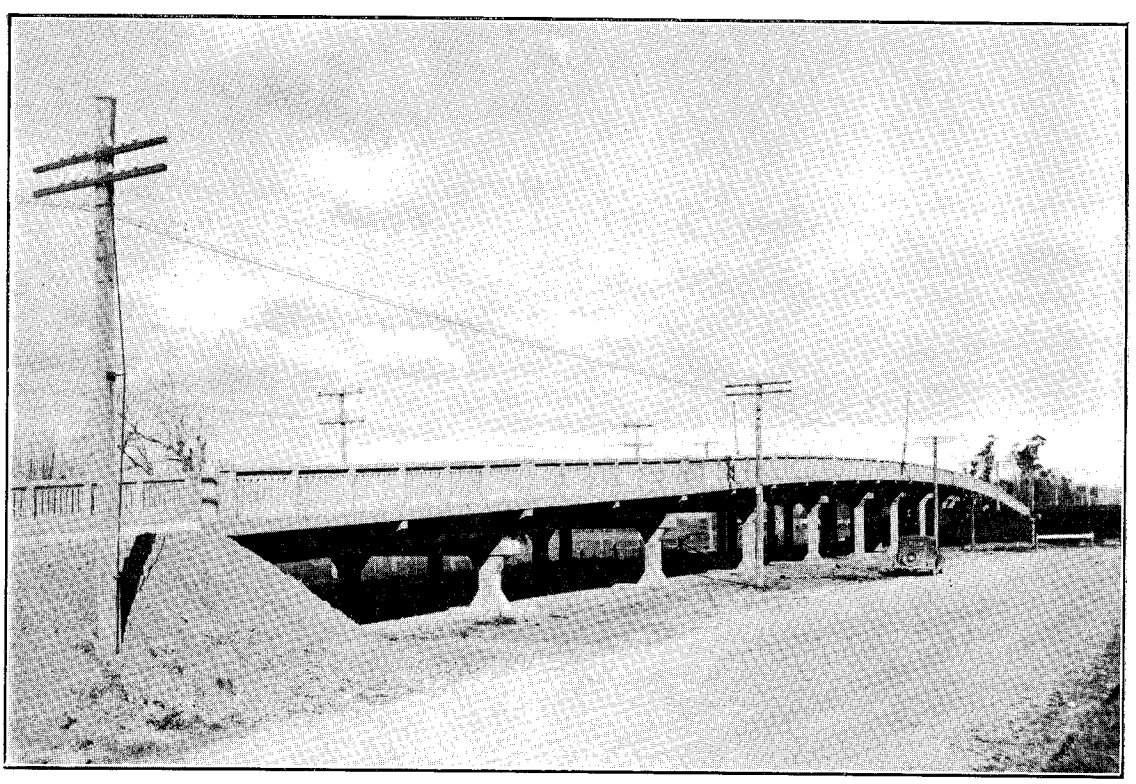
Level-crossing Elimination. Normanby Overbridge in Reinforced Concrete, showing Special Step-over Pier necessary on account of Extreme Skew.

NEW PLYMOUTH–HAWERA STATE HIGHWAY.



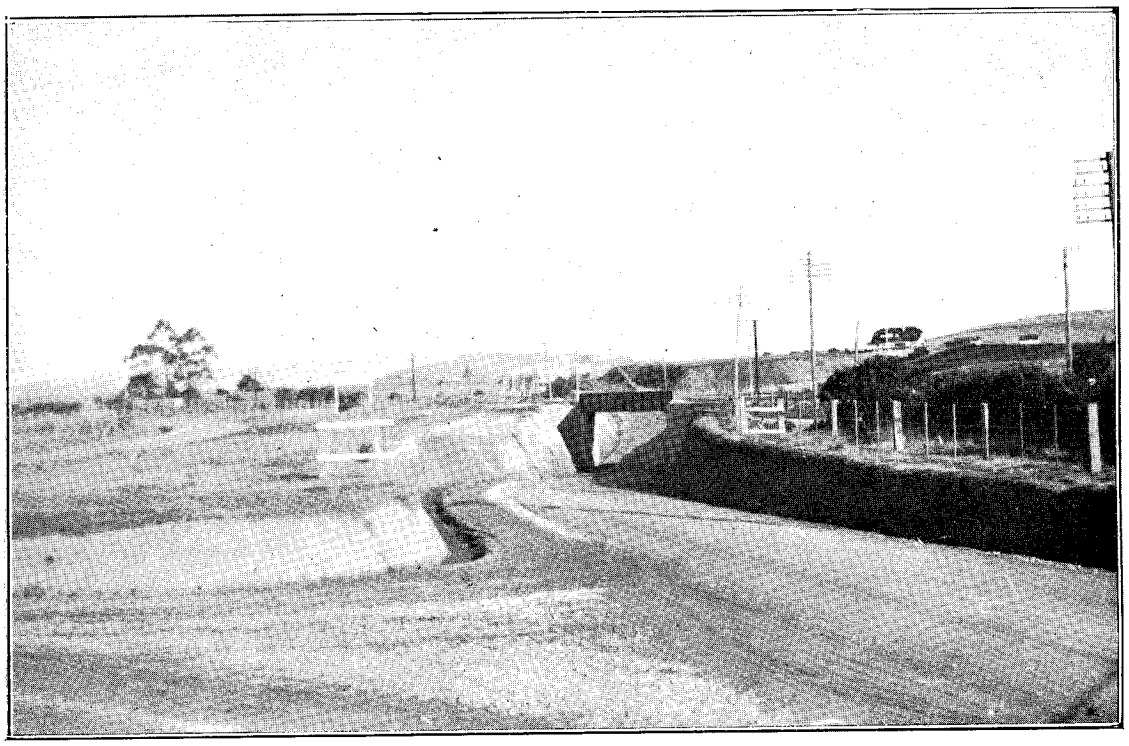
View showing Dangerous Level-crossing to be eliminated by Overbridge.

BALL HIGHWAY, PATEA COUNTY.



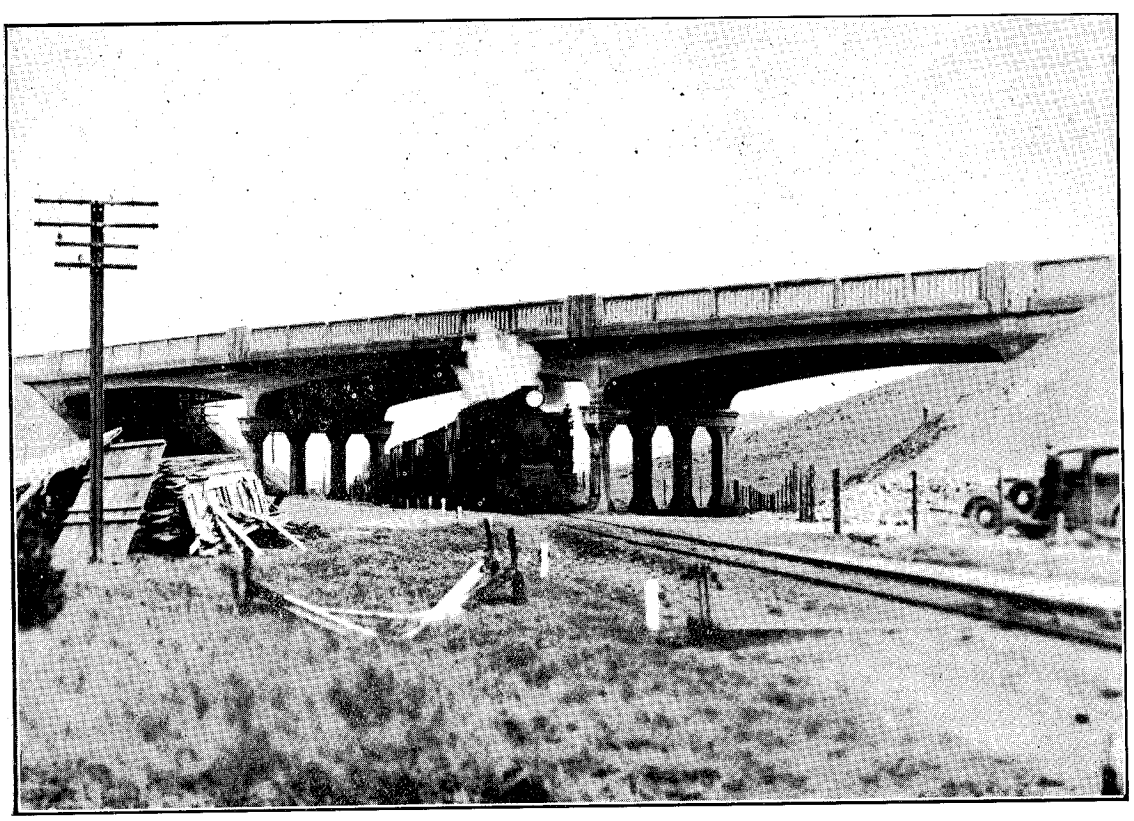
Styx Overbridge. Level-crossing Elimination.

PICTON–CHRISTCHURCH STATE HIGHWAY.



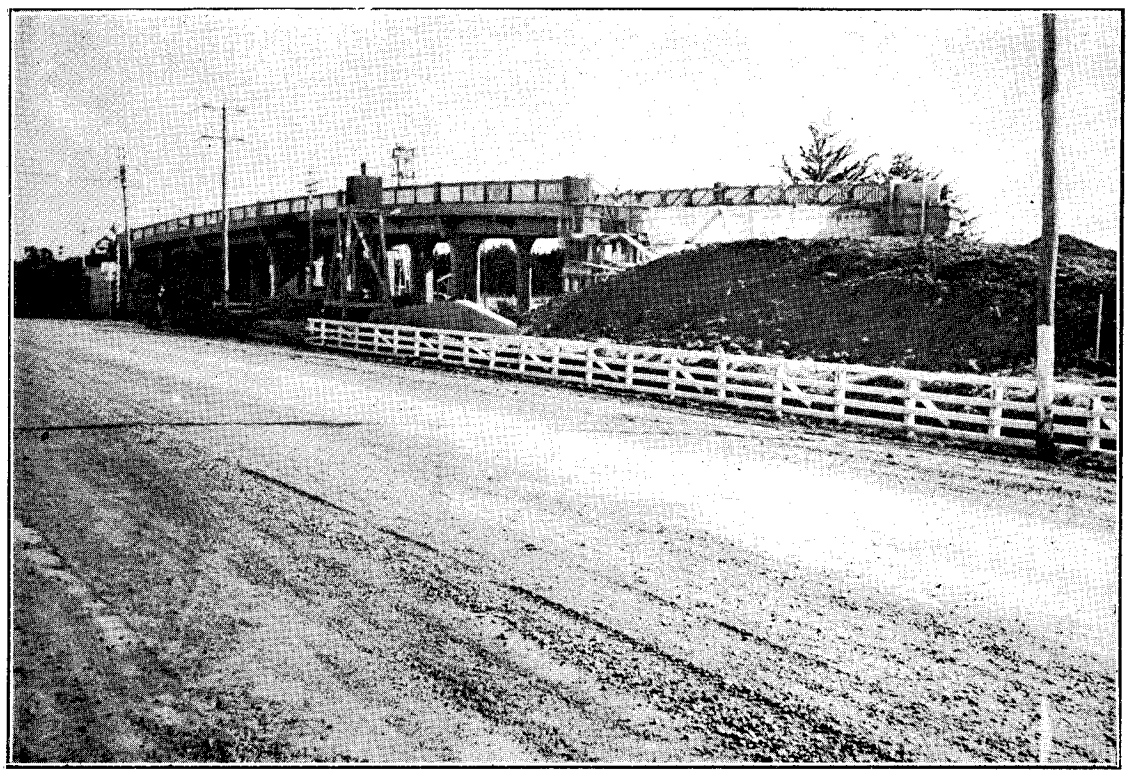
Subway eliminating a Level-crossing at Deborah.

TIMARU–DUNEDIN STATE HIGHWAY.



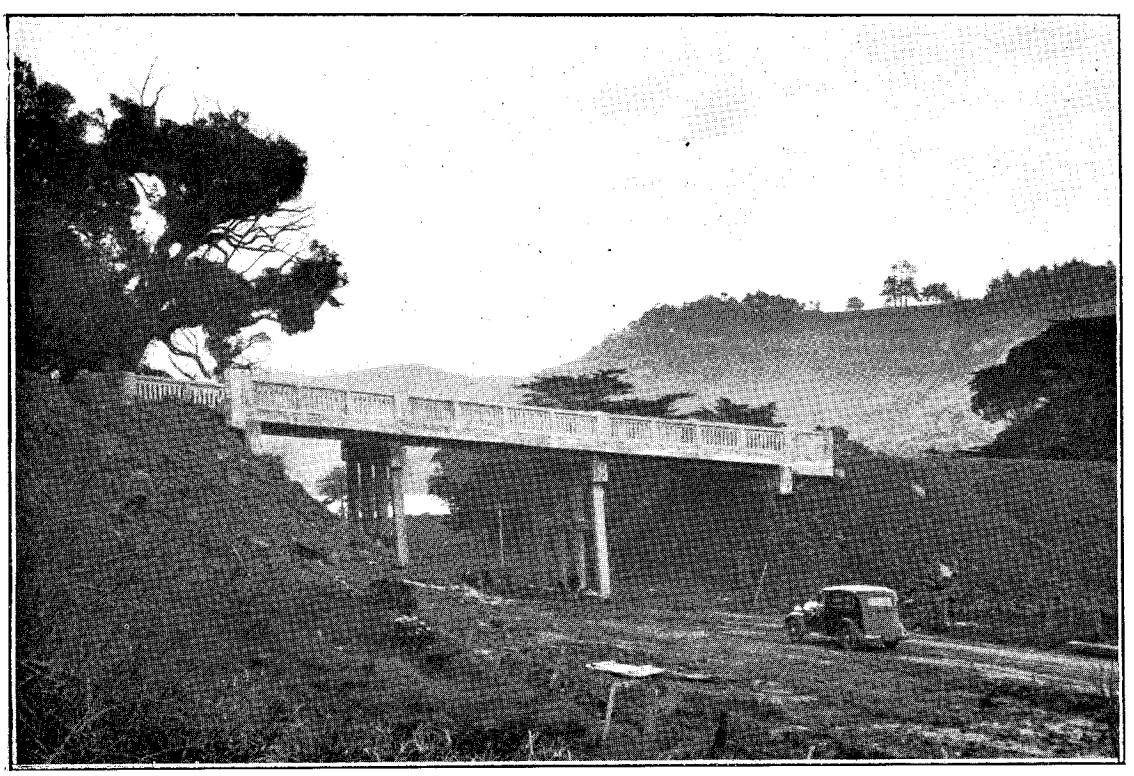
Kartigi Overbridge.

TIMARU–DUNEDIN STATE HIGHWAY.



Lorneville Overbridge, which will Eliminate a Heavily-trafficked Level-crossing.

LORNE–TUATAPERE MAIN HIGHWAY.



Improvements to Alignment, Waiwera Hill. Road Overbridge.

BIRKENHEAD–MAUNGATUROTO STATE HIGHWAY.

APPENDIX F.

SUPPLY OF RADIO SETS TO PUBLIC WORKS WORKMEN.

MEMORANDUM OF AGREEMENT BETWEEN THE NATIONAL COUNCIL OF THE YOUNG MEN'S CHRISTIAN ASSOCIATIONS OF NEW ZEALAND AND THE MINISTER OF PUBLIC WORKS.

AN agreement made this twentieth day of August, 1937, between the National Council of the Young Men's Christian Associations of New Zealand a body incorporated under the Religious Charitable and Educational Trusts Act, 1908, and having its registered office at number 114 The Terrace, Wellington (hereinafter called the Council) of the one part and His Majesty the King acting by and through the Minister of Public Works (hereinafter with his successors in office referred to as the "Minister") of the other part:

Whereas in an endeavour to improve the conditions of life for workmen employed by the Minister on isolated works the parties hereto with the assistance of representatives of those engaged in the trade or business of selling radio receiving apparatus have for the purpose of facilitating the purchasing of radio receiving apparatus by such workmen devised a scheme under which the Government will provide the finance and the Council will provide the selling organisation:

Now therefore in consideration of the loan by the Minister of the sum hereinafter referred to (the receipt whereof is hereby acknowledged by the Council) it is agreed between and by the parties hereto as follows that is to say:

1. The Minister shall lend to the Council for the period hereinafter provided the sum of one thousand pounds (£1,000) to provide a fund for the purchase of radio receiving apparatus in accordance with this Agreement.

2. The term of the said loan shall be three years or until such time as a period of two months shall have elapsed without any fresh application for the purchase of radio receiving apparatus being received by the Council, whichever is the shorter.

3. Separate account shall be kept by the Council of all transactions arising out of the scheme and such transactions shall not be included in the accounts of the general activities of the Council.

4. The Council shall pay to the Minister on the last days of March, June, September and December in each year interest on the said sum of one thousand pounds at the rate of five per centum per annum.

5. The Council may at any time or from time to time without notice repay the whole or any part of the loan moneys and thereupon interest charges shall cease to accrue due on the sum repaid.

6. On the determination of this Agreement the Council shall pay to the credit of the Public Account the loan of £1,000, hereinbefore referred to or such part of it as after audit is found to be correct.

7. The Council will make with the Suppliers of as many different kinds of radio receiving apparatus as may be agreeable (hereinafter referred to as "Suppliers") contracts or business arrangements under which such radio receiving apparatus will be available to the Council on the terms customary in the trade at prices not exceeding the lowest wholesale price thereof, together with one fourth additional; and such contracts or arrangements shall provide for delivery to the Council at the Camp Hut or if no Hut, at the premises of the Agent of the Supplier nearest to the Public Works Camp where the workman resides:

8. As and when funds permit the Council shall entertain applications from workmen employed by the Minister for the purchase of radio receiving apparatus; provided that no application shall be entertained from any workman who already has a radio receiving set or the principal parts thereof at the time of such application or at any time between the date of execution of this Agreement and the time of such application, or who recently returned to the Supplier any set on which the Agreement of purchase was not fulfilled, unless the Minister consents to such application.

9. The Council will permit the workman to select radio receiving apparatus of any description in respect of which it may have then arranged terms of purchase with the Suppliers; provided that no radio-receiving apparatus operated from batteries shall be sold under this Agreement if the price thereof on sale to the workman assessed in accordance with this Agreement would exceed Twenty Pounds (£20) and no other radio receiving apparatus shall be so sold if such price would exceed Fifteen Pounds (£15):

10. The price to be charged by the Council for each set of radio receiving apparatus sold to a workman shall be ascertained by adding fifteen per centum (15%) to the sum payable for such set by the Council:

11. The proceeds of the additional 15 per centum referred to in the last preceding paragraph shall be credited to a separate Account (hereinafter referred to as the Stabilisation Account) which account shall be utilised by the Council for the following purposes:—

(*a*) Paying the expenses incurred by the Council in handling the radio receiving apparatus sold under this scheme.

(*b*) Meeting bad debts and trading losses and other expenses incurred by the Council under this agreement.

(*c*) Paying interest at the rate of five per cent. on the moneys advanced by the Minister; any sums at any time standing at credit of the Stabilisation Account after due provision has been made for the foregoing payments may be utilised by the Council for the purpose of financing the sale of further radio receiving apparatus; provided that if on any interest due day the amount at credit in such Stabilisation Account shall exceed the sum of two hundred pounds (£200) the Council will unless otherwise authorised in writing by the Minister pay such excess to credit of the Public Account and will forward the Bank receipt to the Minister of Public Works; any such payment may if so agreed upon be credited in reduction of the loan of £1,000; provided further that on the determination of this Agreement the Council shall pay to credit of the Public Account as aforesaid the whole of the moneys then standing to credit of the Stabilisation Account:

12. The Council shall institute and keep to the satisfaction of the Minister a proper system of accounts in respect of the Stabilisation Account and such accounts shall be open to inspection at any time by any officer of the Public Works Department authorised in writing by the Minister to inspect the same.

13. The Council will sell radio receiving apparatus to workmen on the following terms and conditions:—

(*a*) The workman shall execute a hire-purchase agreement in the form hereto annexed with such modifications if any as may from time to time be agreed upon between the Council and the Minister.

(*b*) The workman shall execute an order on his wages in the form hereto annexed in favour of the Council.

(*c*) The workman shall pay a deposit of one-third of the selling price of the radio receiving apparatus ascertained in accordance with this Agreement.

(*d*) The workman shall pay separately any freight or other charges payable in respect of the transportation of radio receiving apparatus from the nearest agent therefor to the workman's residence at the Public Works Camp.

14. The Council shall not be required to insure radio receiving apparatus in transit or against loss or destruction and any losses on this account shall be paid out of the Stabilisation Account.

15. This Agreement shall enure for a term of three years or until such time as there shall have been no applications for the purchase of radio receiving apparatus from workmen employed by the Minister for a period of two months whichever is the earlier.

In witness whereof this Agreement has been signed the day and the year first before written.

(Signed) P. C. WEBB,
For the Minister of Public Works.

Signed by Patrick Charles Webb, for and on behalf of the Minister of Public Works, in the presence of—

Witness: (Signed) J. WOOD.
Address: Public Works Department.
Occupation: Engineer-in-Chief.

Signed by Charles Stuart Falconer, Charles Roderick Edmond, and Alexander Henderson Wallace, for and on behalf of National Council of the Y.M.C.A.s of N.Z. (Inc.)—

(Signed) CHAS. S. FALCONER.
(Signed) CHARLES R. EDMOND.
(Signed) ALEXR. H. WALLACE.

In the presence of—

Witness: (Signed) R. M. BRASTED.
Address: 114 The Terrace.
Occupation: Y.M.C.A. Secretary.

FORM OF AUTHORITY FOR DEDUCTION FROM WAGES.

Not Transferable.

Public Works Camp,

.....

....., 193 .

I, ..., hereby authorise the Council of the Young Men's Christian Associations of New Zealand to receive from the Paymaster-General out of moneys payable to me the sum of..... by eight equal fortnightly payments each of £....., and to sign on my behalf receipts totalling that amount.

Signature: .....
Address: .....
Occupation: .....

Witness:
Address:
Occupation:

Payable by Public Works Department.

FORM OF HIRE PURCHASE AGREEMENT.

AN agreement made this day of , 19 , between the National Council of the Young Men's Christian Associations of New Zealand (Incorporated) being a body incorporated under the Religious Charitable and Educational Trusts Act, 1908, and having its registered office at No. 114 The Terrace, Wellington (hereinafter called the Owner) of the one part and , of , Labourer (hereinafter with his successors and assigns called the Hirer) of the other part, whereby in consideration of the payments hereinafter reserved it is mutually agreed and declared between and by the parties hereto in manner following that is to say:—

1. In this Agreement if not inconsistent with the context—

(*a*) "The works" means the Public Work on which the Hirer is employed at the time of execution of this Agreement.

(*b*) "The Y.M.C.A. Hut" means the premises for the time being or from time to time occupied by the officer in charge of Y.M.C.A. activities on the works.

(*c*) "The Hirer's hut" means the structure in which the Hirer resides while on the works.

(*d*) "The Owner's Agent" means the Agent of the Owner at the work and in the absence of any duly authorised agent of the Owner means the officer of the Public Works Department for the time being in charge of the works.

2. Subject to the terms and conditions herein set forth, the Owner will let and the Hirer will take on hire the radio receiving set and accessories described and enumerated in the Schedule hereto (hereinafter called "the set" which term shall include the said radio receiving set and accessories collectively and every item thereof severally).

3. The Hirer has paid to the Owner on or prior to the execution of this Agreement the sum of £ (as the Owner doth hereby acknowledge and admit) as consideration for the option of purchase hereinafter contained and which sum is now the absolute property of the Owner.

4. The Hirer shall during the continuance of the hiring pay by way of rental the sum of per fortnight the first such payment to be made on the day of and thereafter continuing until eight such instalments have been paid.

5. For the better securing to the Owner of the Payments required under this Agreement to be made by the Hirer, the Hirer hereby authorizes the Paymaster-General to pay such sums to the Owner out of wages from time to time due to him as an employee of the Public Works Department and agrees with the Owner that he will on execution hereof and from time to time hereafter at his own expense prepare and execute all such orders, authorities, vouchers and other documents whether of similar or dissimilar kind that may be necessary to secure or ensure payment of such sums to the Owner.

6. Delivery of the set shall be given and taken at

7. Any moneys at any time payable by the Hirer under these presents shall be paid to the Clerk in charge of wages in the Public Works Department to be credited by him to the Public Works Trust Account for disbursement to the Owner and the official receipt of the Public Works Department shall be a sufficient discharge to the Hirer in respect of any moneys so paid.

8. If all the provisions required by these presents to be observed performed or complied with on the part of the Hirer be duly observed performed and complied with and if the Hirer shall have duly paid the periodical payments and all other payments if any which shall become payable by him under this Agreement the set shall thereupon become the sole and absolute property of the Hirer and the Owner will execute and do all such acts deeds and things as may be necessary for vesting the set in the Hirer absolutely; but otherwise the set shall remain the sole property of the Owner.

9. Until a breach by the Hirer of any provision on the part of the Hirer herein contained or the occurrence of any other event terminating this agreement and entitling the Owner to immediate possession of the plant, the Hirer shall be entitled at any time to make in one sum and in advance of the due dates aforesaid the said payments and thereupon the set shall become the property of the Hirer.

10. The Hirer may at any time terminate the hiring by delivering the set at the risk and cost of the Hirer to the Owner's Agent and paying all moneys then payable hereunder.

11. The Hirer will forthwith on taking delivery of the set remove the same to the Hirer's Hut and will not thence remove the set except with the consent in writing of the Owner.

12. The Hirer will at all times during the continuance of the hiring keep the set in his own custody and will not sell, assign, pledge, mortgage, underlet, lend or otherwise part with the possession or custody thereof without the previous written consent of the Owner.

13. It is hereby agreed and declared that the Owner gives no guarantee whatever in respect of the set, but will not knowingly do anything that would or might deprive the Hirer of the benefit of the Supplier's guarantee.

14. In the event of the set proving unsatisfactory in any respect or requiring any repairs, renewals or adjustment during the period of hire, the Hirer shall arrange through the Owner for the work to be done by the Suppliers of the set and will not do or permit to be done anything that would or might vitiate the Supplier's guarantee supplied with the set.

15. The Hirer shall during the continuance of the hiring at his own expense keep the set in good and complete working order, repair and condition with all necessary reparations and renewals and under cover and protected from the weather and will indemnify the Owner against any loss or damage to the set from whatever cause arising.

16. The Hirer shall not have or be deemed to have any authority to pledge the credit of the Owner for any repairs to the set or to create a lien thereon in respect of any such repairs or in respect of any other matter.

17. The Hirer will permit the Owner's Agent at all reasonable times to enter upon any premises where the set may for the time being be situate to inspect and examine the same and to test the condition thereof.

18. If the set or any part thereof is removed seized or taken out of the possession of the hirer, he shall within 24 hours give to the Owner's Agent written notice of such removal seizure or taking, and also the address of the place to which the same is removed.

19. In any of the following events namely—

(i) If the Hirer makes default in any of the said periodical payments upon the respective due date thereof; or

(ii) If the Hirer fails to observe and perform all the provisions of the part of the Hirer herein contained; or

(iii) If any final judgment decree or order for payment of money is given or made against the Hirer and remains unsatisfied for ten days; or

(iv) If the Hirer becomes bankrupt or goes into liquidation or if an effective resolution is passed for the winding up of the business of the Hirer; or

(v) If the Hirer shall do or cause to be done or permit or suffer any act or thing whereby the rights of the Owner in the set shall or may in the opinion of the Owner be prejudiced or jeopardized; or

(vi) If the Hirer shall leave the service of the Public Works Department—

then and in such case it shall be lawful for the Owner without the necessity of any previous notice to determine the hiring and thereupon any person authorised by the Owner may without any previous demand seize and take possession of the set and remove the same.

20. For the purpose of any seizure taking possession or removal purporting to be done or to be intended under the last preceding clause hereof the Hirer gives leave and license to the Owner and to any agent or servant of the Owner to enter or break into any premises in the occupation of the Hirer and as the act of the Hirer to enter upon any other premises where the set may be or may reasonably be expected to be and to seize and take possession of the set and remove the same without being liable for any action indictment or other proceedings by the Hirer or any person claiming under the Hirer.

21. Upon any determination of the hiring under Clause 19 hereof all moneys theretofore paid by the Hirer hereunder shall be retained by the Owner and the Hirer shall not be entitled to any credit or allowance in respect thereof.

22. Any determination of the hiring under Clause 19 hereof shall be without prejudice to the right of the Owner to recover from the Hirer all moneys theretofore accrued due and interest as aforesaid until actual payment thereof and the costs and expenses incurred in connection with the seizure and retaking of possession of the set and the removal thereof to the place where delivery thereof was taken by the Hirer on the commencement of the hiring and damages for any antecedent breach non-observance or non-performance by the Hirer of the provisions of this agreement.

23. Any time or other indulgence granted to the Hirer shall not prejudice or affect the strict rights of the Owner under this agreement.

24. It is hereby expressly declared and agreed that the delivery to the Owner of any cheque or other negotiable instrument or security for the whole or any portion of the moneys from time to time outstanding under these presents shall not until the actual payment thereof operate by way of payment in satisfaction of the amount thereof nor shall the same be deemed to vacate restrain or delay the rights of the Owner under these presents in respect of re-possession or otherwise howsoever.

SCHEDULE.

(Description of Set.)

Supplier's name:
Description:
Supplier's number:

IN witness whereof this Agreement has been executed the day and year first before written.

Hirer.

Signed by in the presence of—
Witness:
Address:
Occupation:

Owner.

Signed by for and on behalf of the Owner in the presence of—
Witness:
Address:
Occupation:

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PUBLIC WORKS
Engineer's Department
NEW ZEALAND.

J. WOOD, M.INST. C.E.
ENGINEER-IN-CHIEF.

PUBLIC WORKS MAP
SHOWING THE RAILWAYS
NORTH ISLAND
OF
NEW ZEALAND
1937

— Scale of Miles —

10 0 10 20 30 40 50 60 70 80

— REFERENCE —

GOVERNMENT RAILWAYS.

Opened
Under construction
Surveyed

PRIVATE RAILWAYS.

Opened

C.Maria van Dieman
North Cape
Motu Pia
Mangonui R.
RANGAUNU BAY
DOUBTLESS BAY
Utea
MANGONUI
AWANUI
KAITAIA
AHIPARA BAY
Reef Pt
AHIPARA
Berckino R.
Whangape
WHANGAROA HAR.
Cavalli Is
TAKOU BAY
BAY OF ISLANDS
C.Brett
RUSSELL
Waitangi
OPUA
KAWAKAWA
WHANGARURU H.
Poor Knights
OPAHI
MAROMAHU
OTONGA
HIKURANGI
KAMO
WHANGAREI
NGUNGURU H.
HOKIANGA HAR.
DONNELLY'S CROSSING
TARAWHATI
KAIHU
Mangapouri River
KIRIKOPUNI
DARGAVILLE-KIRIKOPUNI CONSTRUCTION SUSPENDED JANY 1931
DARGAVILLE
PORTLAND
OAKLEIGH
MANGAPAI
PUKEHUIA
Bream Hd
WHANGAREI HAR.
WAIOTIRA JUNC.
TAIPUHA
MAIRETU
PAPAROA
WAIPU
Bream Tail
Aiguilles Pt
BICKERSTAFF
MAUNGATUROTO
MANGAKAHIA
KAWAKAWA
LE BARRIER Id
Gt BARRIER Id
TE HANA
WELLSTOWN
GRAYSY
TAUHOA
KAIPARA FLATS
WOODBRIDGE
HOUHORA
TAHEKEROA
MAKARAU
PUKAPAKAPA
KAIPARA HAR.
HELENSVILLE
BAURAKI
GULF
C.Colville
KENNEDY B.
COROMANDEL
MERCURY B.
Rangitoto Id
Motutapu Id
Waiheke Id
AUCKLAND
Firth of Thames
WAITAKERE
ONEHUNGA
CLEVEDON
TAIRUA H.
MANUKAU HAR.
THAMES
WHANGAMATA H.
WAIUKU
MERCER
Waikato R.
L.Waikare
RANGIRIRI
L.Whangape
HUNTLY
NGARUAWAHIA
TAUHEI
MORRINSVILLE
TAURANGA HAR.
TE MAUNGA JUNC
TAURANGA
WHAKARO
TE PUKE
PAENGAROA
PONGAKAWA
MATATA
WHAKATANE
White Id
C.Runaway
BAY OF PLENTY
HICKS B.
East C.
FRANKTON JUNC.
HAMILTON
ROTOKAURI
WHAINGAROA HAR.
CAMBRIDGE
OKUROIRE TIRAU
PIRONGIA
Te Awamutu
PUTARURU
MAMAKU
ROTORUA
KAWHIA HAR.
OTOROHANGA
HANGATIKI
TE KUITI
PUKETUTU
WAIMIHA
ONGARUE
TAUMARUNUI
MOKAU
Mokau R.
NORTH TARANAKI BIGHT
KAINGAROA PLAINS
L.Taupo
TE UREWERA COUNTRY
BUCKLEY
TOLAGO B.
ORMOND
KING'S ROAD
GISBORNE
POVERTY BAY
HANGAROA R.
Waikare-Moana
WAIKOKOPU-GISBORNE CONSTRUCTION SUSPENDED JANY 1931
NEW PLYMOUTH
WAITARA
LEPPERTON JC
MOTUROA
INGLEWOOD
WHENGAROMONA
TARANAKI
Mohaka R.
Waihua R.
Wairoa R.
Mahia Peninsula
Portland Id
C.Egmont
EGMONT
KAPARUAKA
MIDPUSY
STRATFORD
MOUNTAIN HOUSE
ELTHAM
OPUNAKE
TE ROTI
HURMANBY
HAWERA
McKOIA
MANUTAHI
KAKARAMEA
WAVERLEY
Kaupokonui R.
Waingongoro R.
SOUTH TARANAKI BIGHT
Patea R.
PATEA
Waitotara
WANGANUI
Wanganui R.
ARAMOHO JUN.
MANGAONOHO
HUNTERVILLE
WANGAENU
POREWA
TURAKINA
MARTON
BIRMINGHAM
HALCOMBE
BULLS
SANSON
FEILDING
Rangitikei R.
CARNARVON
PALMERSTON
LONGBURN
Manawatu R.
FOXTON
SHANNON
OKERERU
LEVIN
GOHAU
MANAKAU
OTAKI
Kapiti I.
WAIKANAE
PAEKAKARIKI
Porirua H.
Mana I.
PLIMMERTON
KAITOKE
WOODSIDE
UPPER HUTT
LOWER HUTT
BELTON
WELLINGTON
PALLISER B.
C.Campbell
COOK STRAIT
TASMAN SEA
PACIFIC OCEAN
Waikare-Moana
Mohaka R.
Waihua R.
Wairoa R.
Mahia Peninsula
Portland Id
HAWKE BAY
NAPIER
HASTINGS
C.Kidnappers
Bare Id
TE AUTE
GWAVAS
HAMPDEN
ONGAONGA
WAIPAWA
WAIPUKURAU
YAKAPALU
PEMBERTON
Pourerere R.
Porongahau R.
C.Turnagain
DANNEVIRKE
WOODVILLE
PAHIATUA
NEWMAN
EKETAHUNA
MASTERTON
CASTERTON
GREYTOWN
FEATHERSTON
MARTINBOROUGH
L. Wairarapa
PALLISER B.
C.Palliser
Castle Point
Whareama R.
Flat Point
Tauherenikau R.
Ruamahanga R.
Tauherenikau R.
Waipoua R.
Waiohine R.
Waingawa R.
Waiohine R.
Manawatu R.
Oroua R.
Rangitikei R.
Turakina R.
Whanganui R.
Patea R.
Waitotara
Waingongoro R.
Kaupokonui R.
Punehu R.
Oaonui R.
Waitara R.
Waiwhakaiho R.
Waitara R.
Mokau R.
Awakino R.
Mangapouri River
Waipoua R.
Kaihu R.
Wairua R.
Kawakawa R.
Waitangi R.
Kerikeri R.
Waimate R.
Waihou R.
Piako R.
Waitoa R.
Waitakaruru R.
Hikutaia R.
Waihou R.
Ohinemuri R.
Waitekauri R.
Waitakaruru

D 1

PUBLIC WORKS Engineer's Department NEW ZEALAND

J. WOOD, M.INST. C.E.
ENGINEER-IN-CHIEF

PUBLIC WORKS MAP
SHOWING THE RAILWAYS
SOUTH ISLAND
OF
NEW ZEALAND
1937

— Scale of Miles —

10 20 30 40 50 60 70 80

— REFERENCE —

GOVERNMENT RAILWAYS.

Opened
Under construction
Proposed
Surveyed

PRIVATE RAILWAYS.

Opened

TASMAN SEA

PACIFIC OCEAN

FOVEAUX STRAIT

C. Farewell
GOLDEN BAY
D'Urville Id
TASMAN BAY
Karamea R.
KARAMEA BIGHT
Mokihinui R.
C. Foulwind
Buller River
Roto-iti L.
Rotorua L.
Pt Elizabeth
Abut Hd
OKARITO
L. Mapourika
L. Matheson
Mt Cook 12349ft
Mt Harper
Mt Sefton 10950ft
HERMITAGE 6705ft
WELD
Haast R.
JACKSON'S BAY
L. Wanaka
L. Hawea
OMARAMA
JAMESTOWN
L. McKerrow
Milford Sound
Ada L.
L. Wakatipu
QUEENSTOWN
L. Te Anau
Manapouri L.
Monowai L.
Hauroto L.
Waitaki R.
Clutha R.
Shag Point
The Bluff
SOLANDER Id
RUAPUKE Id
STEWART Id
Port William
East Head
S.W. Cape
Port Pegasus
Mason Bay
C. Campbell
Clarence R.
Kaikoura Peninsula
Conway R.
Waiau-ua R.
Hurunui R.
Ashley R.
PEGASUS BAY
Waimakariri R.
Banks Peninsula
Rakaia R.
Ashburton R.
Rangitata R.
CANTERBURY BIGHT
Taieri R.
Mataura R.
Oreti R.
Aparima R.
Waiau R.
Hollyford R.
Arthur's Pass
Otira R.
Teremakau R.
Grey R.
Buller R.
Motueka R.
Wairau R.
Awatere R.
Waipara R.
Kowai R.
Selwyn R.
Rakaia R.
Rangitata R.
Waitaki R.
Clutha R.
Mataura R.
Oreti R.
Aparima R.
Waiau R.
Hollyford R.

COLLINGWOOD
CLIFDEN
MOTUEKA
NELSON
STOKE
RICHMOND
HAVELOCK
PICTON
WELLINGTON
WHITE'S BAY
CLOUDY BAY
TUAMARINA
WAKEFIELD
BELGROVE
MAIAROA
TAPAWERA
WANGAPEKA
KIDNAPPERS
BLENHEIM
RIVERLANDS
RENWICK
DUMGREE
SEDDON
TAPAROA
WARD
MIRZA
FLAXBOURNE
WHARANUI
KEKERANGU
KAIKOURA
MOKIHINUI
SEDDONVILLE
KAWATIRI-MURCHISON CONSTRUCTION SUSPENDED JAN 1931
NGAKAWAU
KAMARAOA Jn
MURCHISON
TOPHOUSE
GLENHOPE
WESTPORT
OMAU
TE KUHA
GRANITY
CHARLESTON
BRIGHTON
TAWAI
CRONADUN
REEFTON
INANGAHUA Jn
INANGAHUA LANDING
LIME CREEK
BLACKBALL
TOTARA FLAT
GREY R.
STILLWATER
BRUNNER
COBDEN
GREYMOUTH
NGAHERE
AHAURA
DUNOLLIE
SEWANUI
PAROA
TARAMAKAU
KOTUKU
L. Brunner
KUMARA
JACKSON'S
OTIRA
ARTHUR'S PASS
CASTLE HILL
CRAIGIEBURN
OXFORD
SHEFFIELD
SPRINGFIELD
DARFIELD
CHRISTCHURCH
ADDINGTON
LYTTELTON
LYTTELTON BAR
ROLLESTON Jn
LINCOLN
LITTLE RIVER
SOUTHBRIDGE
L. Ellesmere
METHVEN
SPRINGBURN
MT SOMERS
RAKAIA
ASHBURTON
TIMARU
STANDREWS
STUDHOLME Jn
WAIHAO DOWNS
DUNTROON
TOKARAHI
NGAPARA
WINDSOR Jn
PUKEURI Jn
OAMARU
MAHENO
WASEBY
KYEBURN
KOKONGA
RANFURLY
WELDERBURN
OMAKAU
CROMWELL
CLYDE
ALEXANDRA
HYDE
WAIHEMO
HAMPDEN
DUNBACK
INCH VALLEY
PALMERSTON
MIDDLEMARCH
WAIKOUAITI
HINDON
PORT CHALMERS
DUNEDIN
OTAGO HBR
WINGATUI
OUTRAM
ROSCIEL
EDIEVALE
BEAUMONT
HERIOT
BIG HILL
EVANS FLAT
LAWRENCE
WESTHERSTONE
L. Waihola
MILTON
BALCLUTHA
KAITANGATA
GLENOMARU
CLINTON
GORE
WAIPAHI
MATAURA
WYNDHAM
GLENHAM
EDENDALE
HEDGEHOPE
WINTON
MAKAREWA
INVERCARGILL
RIVERTON
CREPUKI
THORNBURY
WAIKAKA
RIVERSDALE
KELSO
OTAUTAU
TUATAPERE
WAIKAWA
WAIROA
CLIFDEN
WAIRIO
HIGHCAPS
OHAI
MOSSBURN
LUMSDEN
WENDONSIDE
ATHOL
KINGSTON
TE ANAU
MANAPOURI
ROXBURGH
MILLERS FLAT
WAIMAHAKA
TOMAHUI
WAIKAWA
FORTROSE
PUKETIRO
PAPATUPU
HOUIPAPA
CATLINS
TAHAKOPA
WAIHOLA
L. Kaitangata
L. Kaihinaka
L. Kanieri
L. Paringa
L. Mahinerangi
L. Coleridge
L. Heron
L. Ohau
L. Tekapo
L. Pukaki
L. Ruataniwha
L. Aviemore
L. Waitaki
L. Benmore
L. Ohau
L. Wanaka
L. Hawea
L. Wakatipu
L. Te Anau
Manapouri L.
Monowai L.
Hauroto L.
Ada L.
Ahuriri R.
Hurunui R.
Waiau-ua R.
Conway R.
Kaikoura Peninsula
Clarence R.
Waiau R.
Hollyford R.
Arawata R.
Dart R.
Rees R.
Routeburn R.
Caples R.
Greenstone R.
Hunter R.
Lindis R.
Pomahaka R.
Waiau R.
Aparima R.
Oreti R.
Mataura R.
Waikaka R.
Waimea R.
Matau R.
Waiau R.
Hollyford R.
Arthur's Pass
Otira R.
Teremakau R.
Grey R.
Buller R.
Motueka R.
Wairau R.
Awatere R.
Waipara R.
Kowai R.
Selwyn R.
Rakaia R.
Rangitata R.
Waitaki R.
Clutha R.
Mataura R.
Oreti R.
Aparima R.
Waiau R.
Hollyford R.

DISTANCES BY RAILWAY BETWEEN PRINCIPAL PLACES.

	Miles.	Miles.
Bluff to Invercargill	17	
Invercargill to Lumsden	50	
Lumsden to Kingston	37	
Bluff to Kingston		**104**
Invercargill to Gore	39	
Gore to Balclutha	47	
Balclutha to Milton	17	
Milton to Dunedin	36	
Invercargill to Dunedin		139
Invercargill to Orawia		64
Invercargill to Tokanui		34
Balclutha to Tahakopa		43
Dunedin to Cromwell		155
Dunedin to Port Chalmers		8
Gore to Lumsden		37
Gore to Waikaka		16
Waipahi to Edievale		26
Milton to Roxburgh		61
Dunedin to Oamaru	78	
Oamaru to Timaru	53	
Timaru to Ashburton	47	
Ashburton to Rolleston	38	
Rolleston to Christchurch	14	
Dunedin to Christchurch		230
Christchurch to Lyttelton		7
Oamaru to Hakataramea		43
Timaru to Fairlie Creek		39
Christchurch to Greymouth		147
Christchurch to Little River		36
Christchurch to Waiau		82
Christchurch to Parnassus		85
Picton to Wharanui		56
Nelson to Glenhope		59
Greymouth to Reefton		47
Reefton to Inangahua		19
Greymouth to Ross		39
Westport to Mokihinui Colliery		31

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