1940.
NEW ZEALAND.

GOVERNMENT RAILWAYS SUPERANNUATION FUND.

ACTUARIAL EXAMINATION AS AT 31ST MARCH, 1939.

Laid before Parliament in pursuance of Section 25 of the Finance Act (No. 2), 1935.

REPORT.

BY THE ACTUARY APPOINTED BY HIS EXCELLENCY THE GOVERNOR-GENERAL TO MAKE THE ACTUARIAL EXAMINATION OF THE GOVERNMENT RAILWAYS SUPERANNUATION FUND.

Wellington, 8th November, 1940.

1. I have the honour to submit the following report on the Government Railways Superannuation Fund as at 31st March, 1939, in accordance with the requirements of section 25 of the Finance Act (No. 2), 1935, as amended by section 47 of the Finance Act (No. 2), 1939.

2. The Fund came into operation on 1st January, 1903. Since that date modifications of the original scheme as to benefits, contributions, &c., have been introduced. The present position is defined in the Government Railways Act, 1926, and its amendments.

All contributors to the Fund are employed by the New Zealand Government Railways Department or by associations of employees thereof, and all persons entering on permanent employment with the Department must become contributors.

At the valuation date there were 15,646 contributors, whose annual contributions amounted to £199,205; 2,388 retired contributors attracting retiring-allowances amounting to £442,802 per annum; and 662 widows and 353 children attracting annuities amounting to £29,700 per annum.

Details of the membership are given in Tables I and II of the Appendix.

3. The contributions and benefits specified in the Act are set out in Table III of the Appendix. Contributors' contributions are percentages of salaries, the percentages varying with the ages at which the first contributions became payable. The principal benefit is an annual retiring-allowance the amount of which is determined by reference to salary and service. Service with the Department prior to the inception of the scheme ranks at full rates for pension purposes.

The contributions payable by contributors are, on the average, insufficient to support the benefits granted, and consequently financial assistance is required from the State in its capacity as employer.

4. The revenue and expenditure of the Fund during the quinquennium elapsed since the last valuation are summarized in the following account:—

CONSOLIDATED REVENUE ACCOUNT, 1ST APRIL, 1934, TO 31ST MARCH, 1939.

Revenue.	£	s.	d.	*Expenditure.*	£	s.	d.
Fund at 1st April, 1934	1,240,830	15	8	Members' retiring-allowances	2,120,471	6	11
Members' contributions	869,223	11	3	Widows' and children's annuities	144,732	9	6
Subsidies—				Refunds of contributions	112,012	17	5
New Zealand Government	1,252,408	0	5	Transfers to reserve for bad and doubtful debts	14,010	16	10
Other employers	338	8	10	Expenses	16,188	14	7
Interest	327,068	11	2	Transfers to other funds	2,476	3	0
Premiums on securities converted	1,347	16	1	Fund at 31st March, 1939	1,282,354	0	2
Fines, &c.	1,029	5	0				
	£3,692,246	8	5		£3,692,246	8	5

The item "Subsidies from other employers" represents amounts received from associations of employees of the Department in respect of employees of the associations who are contributors to the Fund.

5. The effective rates of interest credited to the Fund in each year of the quinquennium were as follows:—

Year ended 31st March.	Effective Rate of Interest. £ s. d.
1935	5 5 5 per cent.
1936	5 5 0 ,,
1937	5 0 5 ,,
1938	4 19 11 ,,
1939	4 2 8 ,,

Investment losses and profits and the provision made for bad and doubtful debts have been taken into account in calculating the above rates. In the last year of the quinquennium a sum of £8,610 was transferred to the reserve for bad and doubtful debts. This accounts in a large measure for the marked decrease in the effective rate of interest from £4 19s. 11d. per cent. for the year ended 31st March, 1938, to £4 2s. 8d. per cent. for the following year.

6. Ordinary accounting methods do not present a complete picture of the financial position of any institution having contingent liabilities and assets. The Revenue Account reveals the amount of funds in hand, but the question which immediately arises is, are these funds, together with the contributions existing members will pay in future, sufficient to assure that existing members will receive the benefits to which they are or will become entitled? Obviously neither the amount of the payments which will be made both by and to members nor the dates on which they will be made can be known with certainty: but where, as in the Railways Fund, the membership is considerable, reliable estimates of the present value of these payments can be made by the application of averages deduced from the past experience of the Fund and suitably corrected to allow for future trends where evidence of such exists.

Such averages—*i.e.*, rates of mortality, withdrawal from the service, retiral, salary increase, &c.—have been deduced from the experience of members during the intervaluation period, and have been compared with similar factors deduced at various valuations. In some cases this comparison has indicated that changes are occurring to which effect must be given in the valuation. The annual rate of interest realized on the funds, for example, has fallen from £5 5s. 5d. to £4 2s. 8d. per cent. per annum. Obviously it is no longer reasonable to assume that $4\frac{1}{2}$ per cent., the rate assumed in the last valuation, will be realized on the funds in future, and for this reason 4 per cent. has been adopted for this valuation.

7. The results of the valuation are given in Table IV of the Appendix. Summarized they are as follows, all amounts being to the nearest thousand pounds:

	£(000)	£(000)
Capital value of benefits, both existing and prospective, in respect of existing members		16,246
Capital value of future expenses in respect of existing members		65
		16,311
Capital value of existing contributors' future contributions	2,614	
Capital value of future subsidies from other employers	1	
Funds as per Revenue Account	1,282	
		3,897
Balance		£12,414

8. The above balance is the amount by which the accumulated funds are insufficient to assure present members the benefits to which they are or will become entitled, after allowing for the contributions which they will pay. It is therefore the capital value of future subsidies which the State must pay in respect of existing members. Omitting the capital value of future expenses in respect of existing members, the resulting amount, £12,349,000, is comparable with the corresponding figure given in the previous valuation report—viz., £9,100,000, an increase of £3,249,000.

Various factors have operated to bring about this large increase, the most important being as follows:—

(i) As the State's liability is found at any given date by discounting amounts payable in future, it follows that the capital liability increases thereafter at interest unless the subsidies actually paid are greater than the interest attracted. During the quinquennium under review subsidies paid by the State fell short of interest accruing on the State's liability, the net effect being an increase of approximately £872,000 in the State's liability.

(ii) Each new entrant's contributions are insufficient on the average to support the benefits he attracts, and therefore the State's liability is increased by the admission of new entrants. Contributors admitted during the quinquennium introduce an increase of approximately £569,000 in the State's liability.

(iii) As stated in paragraph 6, it is obvious that future income from interest will be at a lower rate than has been realized in the past. If the rate of income from one source is decreased, then the rate of income from other sources must be increased if benefits are not to be decreased. The Fund has three sources of income—contributors' contributions, interest, and State subsidies. The rates at which members contribute are fixed, the rate of interest earned on the funds has fallen, and therefore a greater liability must fall on the State than would have been the case if the funds had continued to yield over $4\frac{1}{2}$ per cent. per annum. The capital value of the additional burden which thus falls on the State in respect of existing members is approximately £1,632,000.

These three items together account for £3,073,000 of the increase; the balance arises from the aggregation of a number of small items.

9. There are two legislative enactments dealing with payment of the State's subsidy. Section 114 of the Act increased widows' annuities from £18 per annum to £31 per annum and children's annuities from £13 per annum to £26 per annum, and provides for payment to the Fund each year from the Working Railways Account of an amount sufficient to meet these increases. Under this heading the Fund has received about £13,000 per annum during the last five years.

Section 119 of the Act is as follows:

"In the event of the Fund at any time being unable to meet the charges upon it, and as aften as such occurs, the following special provisions shall apply:—

"(*a*) The Board shall forthwith report the fact to the Minister of Finance, setting forth the amount of deficiency and the causes thereof.

"(*b*) If the Minister of Finance is satisfied that the deficiency exists and that provision should be made therefor there shall, without further appropriation than this section, be paid into the Fund out of the Working Railways Account a sum sufficient to meet the deficiency."

10. The word deficiency when applied to pension or other funds having liabilities contingent upon life or death has a special significance. A deficiency is disclosed if the present value of the contingent assets and the accumulated funds are together less than the present value of the contingent liabilities—*i.e.*, if the contingent assets and the accumulated funds are insufficient to assure that existing members will get the benefits to which they are or will become entitled, then the funds are deficient. It is evident that this interpretation of deficiency has not been applied to the Railways Fund in the past, for, if it had, a large part of the State liability disclosed in paragraph 7 would have been met by payments from the Working Railways Account when the results of previous valuations were disclosed.

Whatever the real meaning of the legislation may be, it is evident that in the last analysis when the funds had vanished and the annual income was less than the annual outgo the Fund would be unable to meet the charges on it, and in terms of the legislation it would be necessary to pay sufficient sums from the Working Railways Account to enable benefits to be paid. It can be accepted, therefore, that the State undertakes to meet such of the liabilities of the Fund as cannot be met by the contributions paid by the contributors, but that there is no definite arrangement as to when the State will meet these liabilities.

11. A system commonly adopted by private employers who subsidize pension funds established for their employees is to make annual payments which bear some defined relation to the contributions paid by the employees. If, for example, employees' contributions meet one-half of the cost of their prospective benefits, then the employer subsidizes the employees' contributions £1 for £1. This system has the great advantage that, by the time an employee retires, the whole of the cost of his pension has been provided for by systematic payments into the fund during his working years.

A different arrangement is incorporated in the Public Service and Teachers' Superannuation Funds. Here the State has undertaken to meet such portion of contributors' retiring-allowances as the contributors' own contributions will not provide, but no payments are to be made until the retiring-allowances are actually entered on. This is the latest point of time to which payment of the subsidy can reasonably be postponed, as can readily be seen by considering a group of contributors all of whom enter the Railways Fund at about the same time. The contributions paid by such a group of contributors are applied (i) to meet expenses of administration incurred in respect of these members, (ii) to pay widows' annuities at £18 per annum and children's annuities at £13 per annum to the widows and children of such of these contributors who die, and (iii) to pay all other subsidiary benefits attracted by contributors in the group who, ceasing to be employed by the Department, are not granted retiring-allowances. The balance of the contributions accumulated at interest forms the Fund from which the retiring-allowances of the remainder of these members are paid. This fund is not sufficient, however, to meet the whole of these retiring-allowances, and in consequence payments are required from the State each year to meet such part of the retiring-allowances as cannot be met from the fund. If the State does not make the required payment in any year, then the full retiring-allowances can be paid only by using the funds which are being accumulated from the contributions of a younger group of contributors.

13. The middle column of Table IV shows the position of the Fund on this basis, all groups of members being brought together. A summary is as follows, all amounts being to the nearest thousand pounds:—

		£(000)
Capital value of benefits, existing and prospective, in respect of existing members, provided by members' contributions		7,872
Capital value of future expenses in respect of existing members		65
		7,937
	£(000)	
Capital value of existing contributors' future contributions	2,614	
Capital value of future subsidies from other employers	1	
Funds as per Revenue Account	1,282	
		3,897
Deficiency		£4,040

14. The above deficiency is a measure of the extent to which the accumulated funds of existing contributors have been used to pay the full retiring-allowances to contributors who have already retired. The subsidies paid into the Fund have never been sufficient to meet the part of the retiring-allowances actually paid which was not provided by the contributions of the contributors who received the retiring-allowances, and in order to pay the full retiring-allowances each year it has been necessary to use more and more of the accumulated contributions of existing contributors. As shown above, the accumulated contributions so used, together with the interest they would have earned had they remained in the Fund, amounted at the valuation date to £4,040,000.

This sum represents an amount loaned by existing contributors to the State, and consequently it will attract interest in future and will increase in magnitude unless the State pays interest as it accrues. As it has been assumed in making this valuation that the accumulated funds will yield interest at 4 per cent. per annum, the minimum annual subsidy which should be paid by the State under this heading is £162,000. If the annual subsidies actually paid are less than this amount, then the capital sum owing to the Fund will increase through the operation of interest alone.

15. The capital sum owing to the Fund will increase also if the State does not meet such part of the retiring-allowances actually paid from the Fund in future years as is not provided by the contributions of the contributors who receive the retiring-allowances.

Table V shows estimates of the retiring-allowances and widows' and children's annuities which will be paid in each of the five years following the valuation. Thus for the year ended 31st March, 1940, the total is estimated at £479,000. Contributors' contributions are sufficient to provide £136,000 of this total, and the balance, £343,000, should be met by the State.

The subsidies required under this heading range from £343,000 to £366,000 and average over the five years approximately £352,000 per annum. The Fund should receive these subsidies in the middle of the year to which they apply *i.e.*, on the 30th September. Assuming payment in January of each year, they should be increased to £357,000.

16. From paragraphs 14 and 15 it will be seen that, on the basis that the State will not borrow indirectly any more of existing contributors' accumulated contributions, the subsidy required in each of the five years following the valuation is—

	£
On account of past shortages	162,000
On account of retiring-allowances and widows' and children's annuities payable during the five years	357,000
Total	£519,000

If in any of the five years ending 31st March, 1944, the subsidies actually paid are less than the above amount, then full retiring-allowances will be paid from the Fund only by entrenching still further on existing contributors' accumulated contributions.

S. Beckingsale,
Fellow of the Institute of Actuaries,
Government Actuary.

Government Railways Superannuation Fund Board, Wellington.

TABLE I.

Membership at Successive Valuations.

Valuation Date.	Contributors. Number.	Contributors. Annual Salaries.*	Contributors. Annual Contribution.	Retired Contributors. Number.	Retired Contributors. Annual Retiring-allowances.	Widows. Number.	Widows. Annuities.†	Children. Number.	Children. Annuities.†
		£	£		£		£		£
31st March, 1912	9,248	1,425,117	61,621	714	52,463	172	3,096	259	3,367
,, 1919	10,657	2,256,369	100,270	1,001	89,315	377	6,786	514	6,682
,, 1927	13,310	3,373,751	156,570	1,417	221,522	461	14,291	502	13,052
,, 1934	11,816	2,777,281	132,715	2,348	424,458	606	18,786	398	10,348
,, 1939	15,646	4,008,352	199,205	2,388	442,802	662	20,522	353	9,178

* These are the salaries which would be brought into account in calculating pensions. From 1927 onwards they exceed the actual salaries, in that some contributors elected to continue contributing on their former salaries when their actual salaries were reduced.

† Up to 1919 these annuities are at the following rates: Widow, £18 per annum; child, £13 per annum. After 1919 they are at £31 per annum and £26 per annum respectively.

TABLE II.

Movement in Membership during the Intervaluation Period 1st April, 1934, to 31st March, 1939.

I. *Contributors.*

Number at 1st April, 1934		11,816
New entrants admitted		5,881
		17,697
Retiring-allowances granted	555	
Deaths attracting—		
(i) Refund of contributions	79	
(ii) Widows' annuities	157	
Refunds of contributions granted	1,208	
Transferred to other funds	52	
Total exits		2,051
Number at 31st March, 1939		15,646

II. *Retired Contributors.*

Number at 1st April, 1934		2,348
Retiring-allowances granted		555
		2,903
Deaths	514	
Terminated by recovery from ill-health	1	
Total exits		515
Number at 31st March, 1939		2,388

III. *Widows and Children.*

	Widows.	Children.
Number at 1st April, 1934	606	398
Annuities granted	157	258
	763	656
Deaths	57	2
Children attaining age fourteen	..	301
Widows remarrying	44	..
Total exits	101	303
Number at 31st March, 1939	662	353

TABLE III.

THE CONTRIBUTIONS AND BENEFITS PRESCRIBED BY THE ACT.

Contributions.

Contributors pay contributions varying with the age at which the first contribution becomes payable, as follows:—

Age.	Contributors who joined the Fund. Before 1st January, 1908.	Thereafter.
Under 30	3 per cent. of salary	5 per cent. of salary.
30 to 34	4 "	6 "
35 to 39	5 "	7 "
40 to 44	6 "	8 "
45 to 49	7 "	9 "
50 and over	10 "	10 "

Benefits.

I. *On Retirement because of Age or Service:*—

An annual retiring-allowance of one-sixtieth of salary for each year of service, subject to a maximum of forty-sixtieths. The salary brought into account is the annual salary being received at the date of retirement, except where the contributor was promoted from an inferior grade during the three years immediately preceding retirement. In such cases the greater of the average annual salary received during these three years or the annual salary being received immediately prior to such promotion is brought into account. Entrants since 24th December, 1909, are subject to a maximum retiring-allowance of £300 per annum.

A contributor may retire—

(i) After completion of forty years' service;

(ii) On attainment of age sixty.

With the consent of the Minister of Railways, the Superannuation Board may extend the above provisions to contributors retiring after completion of thirty-five years' service.

In all cases the contributor may elect to accept a refund of contributions in lieu of a retiring-allowance.

II. *On Retirement at any Time on the Grounds of being Medically Unfit for Further Duty:*—

A retiring-allowance calculated as in I or a refund of contributions, at the option of the contributor.

III. *On Retirement before becoming entitled to a Retiring-allowance:*—

A refund of contributions.

IV. *On Death while contributing:*—

(i) Leaving no widow: A refund of contributions, less any benefits payable in respect of children.

(ii) Leaving a widow—

(*a*) An annuity of £31 per annum during her widowhood; or

(*b*) A refund of contributions, less any benefits payable in respect of children.

(iii) Leaving children: 10s. per week to each child until age fourteen.

V. *On Death while in Receipt of a Retiring-allowance:*—

A refund of contributions, less benefits already paid.

TABLE IV.

Capital Value of Benefits, Contributions, etc., as at 31st March, 1939.

Capital Value of	Due to Non-contributory Service.	Due to Contributory Service. Provided by Members' Contributions.	Due to Contributory Service. Not provided by Members Contributions.
	£(000)	£(000)	£(000)
Existing benefits—			
(i) Retiring-allowances	869	1,104	2,158
(ii) Widows' annuities	..	155	112
(iii) Children's annuities	..	18	18
Prospective benefits in respect of existing members :—			
(i) Retiring-allowances	57	5,803	5,008
(ii) Widows' annuities	..	140	101
(iii) Children's annuities	..	51	51
(iv) Refunds of contributions—			
(a) On death	..	249	..
(b) On retirement before becoming entitled to a retiring-allowance	..	352	..
Future expenses in respect of existing members	..	65	..
Total liabilities in respect of existing members	926	7,937	7,448
Future contributions payable by—			
(i) Existing contributors	..	2,614	..
(ii) Other employers	..	1	..
Accumulated funds as per Revenue Account	..	1,282	..
Liability of the State in respect of existing members	926	4,040	7,448
Total assets in respect of existing members	926	7,937	7,448

TABLE V.

Estimate of Retiring-allowances and Annuities which will be payable in each of the Five Years following the Valuation.

—	Year ending 31st March, 1940.	1941.	1942.	1943.	1944.
	£(000)	£(000)	£(000)	£(000)	£(000)
Total—					
Retiring-allowances—					
(i) Due to non-contributory service	104	99	93	88	83
(ii) Due to contributory service	345	361	376	401	428
Widows' and children's annuities	30	30	30	31	31
Total	479	490	499	520	542
Provided by contributors' contributions—					
Retiring-allowances due to contributory service	119	126	134	145	159
Widows' annuities at £18 per annum and children's annuities at £13 per annum	17	17	17	17	17
Total	136	143	151	162	176
To be provided by the State—					
Retiring-allowances—					
(i) Due to non-contributory service	104	99	93	88	83
(ii) Due to contributory service	226	235	242	256	269
Widows' and children's annuities at £13 per annum	13	13	13	14	14
Total	343	347	348	358	366

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