

SESSION II.
1906.
NEW ZEALAND.

POLICE PROVIDENT FUND:

ACTUARIAL EXAMINATION FOR THE PERIOD ENDED ON 31st MARCH, 1906.

Laid before Parliament in pursuance of Section 29 of "The Police Provident Fund Act, 1899."

REPORT by the ACTUARY appointed by His Excellency the Governor to make the Actuarial Examination of the Police Provident Fund for the Triennial Period ending the 31st March, 1906, as provided by Section 26 of "The Police Provident Fund Act, 1899."

Wellington, 29th September, 1906.

1. I HAVE made an actuarial examination of the Police Provident Fund as on the 31st March, 1906, in accordance with the provisions of "The Police Provident Fund Act, 1899," which states that the result of such examination shall be so prepared as to show—

- (1.) The state of the fund at the close of the period; and
- (2.) Its expectant state at the close of the next ensuing triennial period, having reference to the prospective receipts and charges during such period.

2. The somewhat complicated benefits provided by the Act, together with the contributions, will be found in Table I of the Appendix hereto. It will be seen that three-fourths of the contributions are returned to members voluntarily resigning "after ten *and not exceeding twenty-five* years' service." Thus, a member who entered the Force at age 35 will after ten years' service receive back three-fourths of his contributions to the Fund on retirement at any time before attainment of the pension age, whereas another member entering at age 25 will receive nothing whatever should he retire between ages 50 and 60. This anomaly probably arose from an oversight when the Bill was framed. It would be set right by repealing the words "and not exceeding twenty-five," and I think this should be done.

3. The details of the experience of past and present members were supplied by the Police Department on cards prepared for the purpose. I have arranged these statistics, to show the progress of the Fund from the commencement, in the following Tables, which appear in the Appendix:—

Table II, Statement of Progress of Active Membership, showing the number, salaries, and contributions of new members, increases by promotion, decreases by discontinuance, and total in force for each year.

Table III, Particulars of Discontinuance of Active Membership, showing the number retiring each year from different causes, together with the benefits granted each year.

Table IV, Statement of Progress of Pensions, showing the number and amount of pensions granted, discontinued, and remaining in force each year, under the various sections of the Act.

Table V, Present Annual Pay and Contributions, with Prospective Pensions to Officers now in the Service, showing these particulars separately for each year of age attained.

Table VI, Classification of Pensions granted, showing the ages at which pensions have been granted under the various sections of the Act since the initiation of the Fund.

From this table it may be ascertained that the average age at retirement of the ordinary pensioners (section 13) was 64·1; of pensioners medically unfit (section 12, (3)) and injured on duty (section 14), 51·8; and of all classes of pensioners combined, 57·4.

4. The number of pensioners on the Fund at the 31st March, 1906, was fifty-seven, and the number of contributors at the same date 651.

5. The progress of the Fund itself is best illustrated by the following Consolidated Revenue Account, showing the summaries of *actual* income and outgo for (1) the first period, ending the 31st March, 1903, and (2) the second period, ending the 31st March, 1906, together with (3) a summary of the *estimated* income and outgo for the current triennium ending the 31st March, 1909.

CONSOLIDATED REVENUE ACCOUNT.

	Income.				Outgo.		
	Actual.		Estimated.		Actual.		Estimated.
	1900-3.	1903-6.	1906-9.		1900-3.	1903-6.	1906-9.
Fund at beginning of period	£ 3,257	£ 18,418	£ 27,121	Pensions and other allowances	£ 5,322	£ 13,273	£ 21,800
Contributions ...	19,272	19,341	20,080	Commission ...	105	101	105
Miscellaneous ...	109	169	240	Fund at end of period	18,418	27,121	29,420
Interest ...	1,207	2,567	3,884				
	<u>23,845</u>	<u>40,495</u>	<u>51,325</u>		<u>23,845</u>	<u>40,495</u>	<u>51,325</u>

THE VALUATION.

6. The foregoing Consolidated Revenue Account shows that the Fund possesses a balance in hand, or accumulated fund, of £27,121; but in order to ascertain the state of the Fund by an actuarial examination as demanded by the Act it is necessary to make a valuation of the assets and liabilities. This valuation is required to determine whether the accumulated fund of £27,121 is sufficient, together with the future receipts from interest and from members' contributions, to discharge the various claims as they arise, so far as existing members are concerned.

7. The net results of the valuation are summarised in the following valuation balance-sheet, which contains—

- (1.) On the left-hand side, the discounted liabilities—viz., the sums expected to be paid, less interest for the time it is estimated they will be deferred;
- (2.) On the right-hand side, the discounted contributions—viz., the amounts expected to be received, less interest for the time until they fall due.

Valuation Balance-sheet as at 31st March, 1906.

Liabilities.		£	Assets.		£
Value of 57 pensions already granted, for £5,087 per annum		50,120	Accumulated funds at 31st March, 1906		27,121
Value of 651 prospective pensions, for £73,548 per annum, to officers in the service (including thirty-three over age 60, who are entitled at any time to pensions already accrued, amounting to £3,115 per annum)		256,227	Value of future contributions		87,868
Value of return of contributions at death		22,810	Deficiency		214,168
		<u>£329,157</u>			<u>£329,157</u>

8. The balance-sheet reveals that the accumulated funds should amount to £241,289 to be sufficient for the purpose explained in paragraph 6, thus showing a deficiency of £214,168.

9. Nothing very definite can be reported about the Fund in reference to "its expectant state at the close of the next ensuing triennial period, having reference to the prospective receipts and charges during such period," quoting from the Act. The utmost I can do is to make an estimate of the income and outgo for the current triennium, and this is given in the Account shown in paragraph 5. Therefrom it will be seen, as might be expected, that the income from contributions increases very slowly while the outgo for pensions and allowances increases very rapidly. The following table shows the past yearly increases in the fund, and the estimated increases during the next three years:—

Year ending.	Funds at End of Year.	Yearly Increase in Funds.	Percentage of Increase on Funds of Previous Year.	
31st March, 1900	£ 3,257	£ ...	Per Cent. ...	} Actual.
" 1901	9,186	5,929	182.0	
" 1902	14,579	5,393	58.7	
" 1903	18,418	3,839	26.3	
" 1904	21,794	3,376	18.3	
" 1905	24,876	3,082	14.1	
" 1906	27,121	2,245	9.0	
" 1907	28,726	1,605	5.9	} Estimated.
" 1908	29,470	744	2.6	
" 1909	29,420	- 50	Decrease	

10. Estimates like these, dealing with such a small portion of the future lifetime of members as the next three years, are necessarily subject to great fluctuation because, to take only one possible cause of disturbance, a single death more or less in the short period would make a material difference to such a small fund. They must therefore be looked upon merely as furnishing a rough approximation to the actual results, and the only definite statements I am prepared to base upon them are that—

- (1.) The accumulated funds will still continue to increase slowly for two or three years longer, they will then attain their maximum, and afterwards will diminish year by year, in an increasing ratio, until they cease to exist.
- (2.) The actuarial deficiency will certainly be found to have increased when the next valuation comes to be made three years hence.

11. I do not think it can be said that I have erred on the side of severity in making the foregoing valuation. Farr's Healthy English Mortality Table has been used, and $3\frac{1}{2}$ per cent. is the rate of interest upon which I have based the calculations. Although the Board has recently been authorised to invest the funds on mortgage of freehold security, thus materially improving the yield from interest, in my opinion a higher rate would not have been justified for valuation purposes, because, in the first place, there is, apart from temporary fluctuations, a general tendency for the rate of interest to fall, and the bulk of these pensions will continue as outstanding liabilities into the distant future; and, secondly, it is quite possible that a portion of any surplus revenue from interest may be required to make up for the admittedly low mortality of people living in New Zealand. In fact, as an illustration of the leniency with which I have treated the question, I may point out that £50,120 has been taken as the liability on account of the fifty-seven existing pensioners on the Fund, drawing £5,037 per annum; but it would require a payment of between £51,000 and £52,000 to reinsure these pensions with either the Australian Mutual Provident Society or the Government Insurance Department.

12. The benefits have been valued as if the pensions were payable at the age of 63—viz., three years after members have the right to retire. Although it is optional for members of the Force to retire at 60, it is compulsory for them to do so not later than 65, and I am satisfied that it would understate the liability to assume that they will, on the average, remain in the service later than age 63.

13. The necessary allowances have been made for the usual increases in salaries, as well as for the return of contributions up to the date of death as provided by the Act.

14. I have not made a special reserve for any additional liabilities which may result from future premature retirements through medical unfitness, as I think practical justice will be done by setting against them the profit which will arise from members voluntarily resigning before attainment of the pension age and leaving all, or part of, their contributions in the Fund, and which will greatly diminish, if it does not entirely obliterate, this liability.

15. Finally, I have to draw attention to the fact that the Government has saved, since the passing of the Police Provident Fund Act, the retiring-allowances which they were formerly in the habit of paying. According to the last annual report on the Police Force the relief so avoided, and which has therefore fallen upon the Fund, amounted to £14,933, and if this were recouped the liability would of course be correspondingly reduced.

16. Having concluded a rather unpalatable task I may be permitted to say that I have no fault whatever to find with the form of the Provident Fund itself, which I look upon as suitable and satisfactory in every way, and very similar to what is provided for in many other bodies of employees in other parts of the world. It is, however, seldom possible for the employees themselves to pay the whole of the heavy contributions necessary to purchase the benefits provided by such funds. That the contributions in this particular case are insufficient for the purpose is plainly evident from the fact that the whole of the accrued funds are not nearly enough to meet the well-understood liability connected with the few pensioners who have already come upon the Fund. In connection with schemes where the Government pays the benefits as they arise from year to year without building up a fund from contributions, thus assuming the whole of the liability, it is not customary to periodically estimate the capital value of that liability. As examples there may be taken the English Civil Service Superannuation, the yearly payments for which by the Government were £1,600,000 in 1888-9 and had increased to £2,035,000 in 1902-3, and the New Zealand old-age pensions, the annual outgo in support of which was £254,000 for 1905-6. In neither of these cases is it considered necessary to make an actuarial valuation in order to assess the present capital value of these (increasing) yearly payments, although that might easily be done. Where, however, the members of a Fund contribute towards its support, and a periodical actuarial investigation is required by law, it can only be supposed that the object sought to be attained by such investigation is to ascertain whether the contributions of the members will prove sufficient in themselves to liquidate the liabilities which accrue. This can only be done by reporting the excess of, or deficiency in, the funds which have accumulated in consequence of the contributions, whether too high or too low, being more than sufficient to meet the comparatively few claims falling in during the early years of the Fund. Unfortunately I have been compelled to report a deficiency in the accumulated funds, thus showing that the contributions are not in themselves sufficient, and that assistance will be required from the Government at some future date. But the assistance that will then be necessary, besides being deferred, will not of course be nearly so great as would have been the case had no contributions been payable by the members.

Respectfully submitted.

MORRIS FOX,
Actuary to the Government Insurance Department.

APPENDIX.

TABLE I

THE BENEFITS AND CONTRIBUTIONS PROVIDED FOR BY THE ACT.

Contributions	The contributions vary according to the age at the time when the first contribution becomes payable, and are as follows:—			
	Age 30 and under	...	...	5 per cent. of pay.
	Over 30 and not exceeding 40	...	...	6½ "
	Over 40 and not exceeding 50	...	...	8 "
	Over age 50	...	...	10 "

Benefits	I. <i>On Attainment of Pension, Age 60.</i>			
	1. To members who have served for twenty-five years, pensions of one-sixtieth of yearly salary for each year's service, with a limit of thirty-six sixtieths (three-fifths) of salary. (Section 13.)			
	2. Or, in lieu thereof, the option of a return of total contributions. (Section 19, (2).)			
	II. <i>On Retirement before Pension Age (on the grounds of being medically unfit for future duty).</i>			
	1. With less than five years' service, a refund of contributions. (Section 12, (1).)			
	2. Between five and fifteen years' service, one month's pay for every full year's service, not exceeding twelve months' pay. (Section 12, (2).)			
	3. After fifteen years' service, a pension of one-sixtieth of annual salary for each year's service, with a limit of three-fifths of salary. (Section 12, (3).)			
	4. In any case where the unfitness for duty is caused by injuries received on duty a pension may be granted, with a limit of three-fifths of salary. (Section 14.)			
	III. <i>On Retirement before Pension Age (on other grounds than medical unfitness).</i>			
	1. On dismissal for any cause, the return of not exceeding one-half of total contributions. (Section 17.)			
	2. On voluntary resignation, after ten and not exceeding twenty-five years' service, the return of three-fourths of total contributions. (Section 18)			
	IV. <i>At Death.</i>			
	1. At death before pension entered upon, the return of an amount not exceeding total contributions. (Section 16.)			
	2. At death after pension entered upon, the return of the difference between pension received from and contributions paid to the Fund. (Section 19, (3).)			
	3. In the case of a member dying from injuries received on duty, the Board may grant pensions as follows:—			
(a.) £18 per annum to widow during widowhood.				
(b.) £13 " to each child until attainment of age 14.				

NOTE.—The contributions and pensions are payable monthly, and the pensions are computed on the salary at retirement, unless there has been promotion within five years, when the average salary for the last seven years is taken as the basis.

TABLE II.
STATEMENT OF PROGRESS OF ACTIVE MEMBERSHIP.

Year.	New Members.			Increase by Promotion.		Discontinued.			Total in Force at End of Year.		
	Number.	Salaries.	Annual Contributions.	Salaries.	Annual Contributions.	Number.	Salaries.	Annual Contributions.	Number.	Salaries.	Annual Contributions.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1899-1900 ..	575	£ 88,213	£ 6,595	£ ..	£ ..	9	£ 1,596	£ 131	566	£ 86,617	£ 6,464
1900-1 ..	44	5,632	285	530	38	28	4,463	354	582	88,316	6,433
1901-2 ..	24	3,099	163	734	55	23	3,715	303	583	88,433	6,348
1902-3 ..	49	6,272	321	1,430	102	38	6,113	476	594	90,023	6,295
1903-4 ..	45	5,833	300	881	61	25	3,851	292	614	92,886	6,364
1904-5 ..	50	6,400	326	1,530	103	28	4,011	260	636	96,805	6,538
1905-6 ..	76	9,728	496	2,383	166	61	8,749	575	651	100,167	6,625
Totals ..	863	125,177	8,486	7,488	530	212	32,498	2,391	651	100,167	6,625

TABLE III.
PARTICULARS OF DISCONTINUANCE OF ACTUAL MEMBERSHIP.

Year.	By Death (Sec. 16), (All Contributions returned.)		By Dismissal (Sec. 17), (Half Contributions returned.)		By Voluntary Retirement (Sec. 18), (Three-quarters Contributions returned.)		By Retirement, Medical Unit (Secs. 12 and 13, (2)).		By Resignation (No Return of Contributions).	By Pension—(1) Ordinary (Sec. 13), (2) Medically Unfit (Secs. 12, (3), and 14).		By Death (Sec. 15), (From Injury on Duty), (Family Pensions.)		Total Discontinued.		
	Number.	Contributions returned.	Number.	Contributions returned.	Number.	Contributions returned.	Number.	Contributions returned.		Number.	Pensions entered on.	Number.	Pensions to Widows and Children.	Number.	Contributions returned.	Pensions entered on.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1899-1900 ..	2	£ ..	..	£ ..	..	£ ..	..	£ ..	5	2	£ 295	..	£ ..	9	£ ..	£ 295
1900-1 ..	3	30	3	9	1	6	..	..	11	10	990	..	..	23	45	990
1901-2 ..	2	46	..	..	1	14	..	..	7	12	999	1	57	23	60	1,056
1902-3 ..	4	133	4	43	1	40	2	149	15	12	1,330	..	..	38	365	1,330
1903-4 ..	3	107	4	56	1	34	1	146	6	9	715	1	31	25	343	746
1904-5 ..	1	62	9	95	..	..	2	175	11	5	559	..	..	28	332	559
1905-6 ..	5	399	24	252	..	..	1	134	18	13	1,073	..	..	61	785	1,073
Totals ..	20	777	44	455	4	94	6	604	73	63	5,961	2	88	212	1,930	6,049

TABLE IV.
STATEMENT OF PROGRESS OF PENSIONS.

Year.	Attainment of Pension Age (Section 13).						Retired Medically Unfit (Sections 12, (3), and 14).					
	Granted.		Void by Death.		In Force.		Granted.		Void by Death or Expiry.		In Force.	
	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1899-1900 ..	..	£ ..	..	£ ..	..	£ ..	2	£ 295	..	£ ..	2	£ 295
1900-1 ..	6	756	..	..	6	756	4	234	1	240	5	289
1901-2 ..	5	486	..	..	11	1,242	7	513	2	114	10	688
1902-3 ..	6	840	2	194	15	1,838	6	490	2	101	14	1,077
1903-4 ..	4	403	1	71	18	2,220	5	312	1	104	18	1,285
1904-5 ..	3	342	..	..	21	2,562	2	217	..	..	20	1,502
1905-6 ..	4	389	1	93	24	2,858	9	684	1	82	28	2,104
Totals ..	28	3,216	4	358	24	2,858	35	2,745	7	641	28	2,104

Year.	Death from Injuries on Duty. (Family Pensions.) (Sec. 15.)						Total Pensions.					
	Granted.		Void by Expiry.		In Force.		Granted.		Void.		In Force.	
	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.	Number.	Pension.
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	
1899-1900 ..	..	£ ..	..	£ ..	..	£ ..	2	£ 295	..	£ ..	2	£ 295
1900-1 ..	..	..	..	..	..	..	10	990	1	240	11	1,045
1901-2 ..	4	57	..	..	4	57	16	1,056	2	114	25	1,987
1902-3 ..	..	..	..	..	4	57	12	1,380	4	295	33	3,022
1903-4 ..	2	31	1	13	5	75	11	746	3	188	41	3,580
1904-5 ..	..	..	..	..	5	75	5	559	..	..	46	4,139
1905-6 ..	..	..	..	..	5	75	13	1,073	2	175	57	5,037
Totals ..	6	88	1	13	5	75	69	6,049	12	1,012	57	5,037

TABLE V.
PRESENT ANNUAL PAY AND CONTRIBUTIONS, WITH PROSPECTIVE PENSIONS TO OFFICERS NOW IN SERVICE.

Age Attained.	Number.	Present Annual Pay.	Present Annual Contributions.	Prospective Pensions at Age 63.	Age Attained.
(1)	(2)	(3)	(4)	(5)	(6)
69	1	£ 164	£ 16.4	£ 68	69
65	4	794	79.4	445	65
64	4	656	65.6	314	64
63	2	374	37.4	186	63
62	9	1,568	156.8	814	62
61	6	1,203	120.3	627	61
60	7	1,213	121.3	661	60
59	4	803	80.3	457	59
58	5	988	98.8	484	58
57	8	1,428	142.8	732	57
56	16	3,511	287.1	2,013	56
55	13	2,734	218.7	1,590	55
54	14	2,444	195.5	1,400	54
53	18	3,656	292.5	2,189	53
52	11	1,842	147.4	1,108	52
51	12	2,195	175.6	1,324	51
50	11	2,008	160.6	1,296	50
49	18	3,125	250.0	1,933	49
48	17	3,124	249.9	2,025	48
47	20	3,403	272.2	2,151	47
46	10	1,862	127.1	1,247	46
45	8	1,556	101.1	1,054	45
44	6	1,059	68.8	747	44
43	9	1,351	87.8	882	43
42	9	1,287	83.7	855	42
41	8	1,332	86.6	965	41
40	10	1,543	100.3	1,131	40
39	23	3,460	224.9	2,574	39
38	16	2,291	148.9	1,749	38
37	17	2,520	163.8	1,983	37
36	24	3,496	184.9	2,775	36
35	26	3,662	186.9	2,947	35
34	25	3,479	179.8	2,832	34
33	27	3,663	187.0	3,085	33
32	29	3,883	194.2	3,299	32
31	26	3,418	176.7	2,901	31
30	34	4,487	224.4	3,902	30
29	24	3,162	158.1	2,809	29
28	26	3,382	169.1	3,045	28
27	25	3,209	160.5	2,918	27
26	18	2,304	115.2	2,095	26
25	20	2,560	128.0	2,328	25
24	21	2,688	134.4	2,444	24
23	9	1,152	57.6	1,048	23
22	1	128	6.4	116	22
Totals	651	100,167	6,624.8	73,548	Totals.

TABLE VI.
CLASSIFICATION OF PENSIONS GRANTED (Showing the Ages at which Pensions have been granted since the Initiation of the Fund).

Age at which Pension granted. (1)	Attainment of Pension Age (Sec. 13).		Medically Unfit and Injured on Duty (Secs. 12, (3), and 14).		Widows and Children (Sec. 15).		Total.	
	Num-ber.	Amount of Pension.	Num-ber.	Amount of Pension.	Num-ber.	Amount of Pension.	Num-ber.	Amount of Pension.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
75	1	£ 240 0 0	...	£ ...	...	£ ...	1	£ 240 0 0
67	1	87 12 0	...	...	...	...	1	87 12 0
66	1	213 6 8	...	...	...	...	1	213 6 8
65	11	1,294 4 10	...	...	...	...	11	1,294 4 10
64	2	184 6 6	...	...	...	...	2	184 6 6
63	7	748 17 2	...	...	...	...	7	748 17 2
61	2	159 19 3	...	...	...	...	2	159 19 3
60	3	288 7 0	2	331 1 6	...	...	5	619 8 6
59	...	...	3	257 12 7	...	...	3	257 12 7
58	...	...	1	65 14 0	...	...	1	65 14 0
57	...	...	2	198 9 4	...	...	2	198 9 4
56	...	...	3	276 15 10	...	...	3	276 15 10
55	...	...	1	82 2 6	...	...	1	82 2 6
54	...	...	2	145 1 9	...	...	2	145 1 9
53	...	...	1	73 0 0	...	...	1	73 0 0
52	...	...	2	123 12 10	...	...	2	123 12 10
51	...	...	4	295 16 0	...	...	4	295 16 0
50	...	...	2	152 11 8	...	...	2	152 11 8
49	...	...	2	123 3 9	...	...	2	123 3 9
47	...	...	2	147 16 6	...	...	2	147 16 6
46	...	...	1	49 2 5	...	...	1	49 2 5
45	...	...	2	98 4 10	...	...	2	98 4 10
44	...	...	1	54 15 0	1	18 0 0	2	72 15 0
42	...	...	1	52 0 3	1	18 0 0	2	70 0 3
33	...	...	1	63 17 6	...	...	1	63 17 6
12	...	...	...	...	1	13 0 0	1	13 0 0
9	...	...	...	...	2	26 0 0	2	26 0 0
7	...	...	...	...	1	13 0 0	1	13 0 0
Totals	28	3,216 13 5	33	2,590 18 3	6	88 0 0	67	5,895 11 8
Returned to duty whilst receiving allowance	2	153 15 0	2	153 15 0
Total pensions granted	28	3,216 13 5	35	2,744 13 3	6	88 0 0	69	6,049 6 8

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