

SESSION II.
1906.
NEW ZEALAND.

ACTUARY'S REPORT
ON THE VALUATION OF
THE GOVERNMENT INSURANCE DEPARTMENT
As at 31st December, 1905.

Presented to both Houses of the General Assembly pursuant to Section 45 of "The Government Insurance and Annuities Act, 1874," and Section 8 of "The Government Life Insurance Acts Amendment Act, 1890."

Wellington, 31st May, 1906.
In accordance with instructions received I have made a valuation, as at the 31st December, 1905, of the liabilities of the Department, with the object of ascertaining the amount of surplus available for distribution amongst the policyholders, and I have now the pleasure of submitting the results of the investigation.
The progress of the Department during the triennium, when compared with the previous triennium, in respect of new business and total business in force, is shown by the following:—

Triennium.	New Business of Triennium.			In Force at End of Triennium.		
	Number of Policies.	Sums assured.	Annual Premiums.	Number of Policies.	Sums assured.	Annual Premiums.
1899-1902	9,919	£ 1,973,578	£ 67,403	42,406	£ 9,896,572	£ 300,256
1902-1905	9,526	2,112,927	70,428	45,137	10,468,816	319,221

From this it will be seen that, while there has been a slight decrease in the *number* of new policies issued during the triennium, there has been a substantial increase in the *sum assured*, and also in the annual premiums payable thereon, thus showing a considerable increase in the average new policy. The increase in the amount of assurance transacted during the later period is principally characterized by a remarkable increase in double-endowment assurances.
The Consolidated Revenue Account, given below, shows the total income and expenditure for the past three years, and also the growth of the funds of the Department during the triennium; for purposes of comparison the Consolidated Revenue Account for the preceding triennium is also given.

CONSOLIDATED REVENUE ACCOUNT.

Triennium ending 31st December, 1905.		Previous Triennium.	Triennium ending 31st December, 1905.		Previous Triennium.
	£	£		£	£
Funds at beginning of triennium	3,382,817	2,997,681	Death claims	379,214	337,146
Tontine Savings Fund No. 1	..	16,753	Matured claims	239,495	190,223
Renewal premiums ..	855,085	799,447	Annuities paid	38,293	34,840
New premiums	70,522	66,759	Surrenders	124,820	156,236
Consideration for annuities	29,686	25,913	Bonuses paid in cash ..	17,442	28,915
Interest	479,702	426,890	Commission	50,084	43,388
Fees	25	39	Taxes	29,269	28,695
			Expenses	109,690	108,439
			Investment reserves ..	6,953	22,783
			Funds at end of triennium..	3,822,577	3,382,817
Total	£4,817,837	£4,333,482	Total	£4,817,837	£4,333,482

In commenting on the foregoing comparative statement of income and expenditure, it may be noted in the first place that the funds have been increased by £439,760 during the period under review.
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Premiums.—The premium income shows a satisfactory increase of £59,404 over that of the previous triennium. There was also a considerable increase in the money received for the purchase of annuities.

Interest.—The interest income of £479,702 exceeded by £52,812 the corresponding item of the previous three years. The average rate of interest realised each year for the past six years will be seen from the following :—

	£	s.	d.		£	s.	d.
1900	4	9	3	1903	4	8	5
1901	4	8	5	1904	4	8	2
1902	4	8	6	1905	4	10	4

These figures, which are obtained by finding the rate yielded each year on the mean of the funds at the beginning and end of the year, show that the rate of interest has been more than maintained, and it is evident that a continuance of these favourable conditions will tend to materially augment future profits.

Claims.—The death claims have increased, as might be expected in consideration of the growth of the business, but the rate of mortality experienced has again been extremely favourable, and the surplus has, as usual, derived a considerable accretion from this source. The amount paid on policies which have become claims by survival to maturity has also increased in a perfectly natural manner, the increase being fully provided for in the reserves held by the Department.

Surrenders.—The amount paid under this heading was £124,820, representing a decrease of £31,416, notwithstanding the fact that the extension of the interim bonus principle to surrenders and lapses has increased the amount paid as prospective bonus from £8,674 to £10,873. For the surrender of reversionary bonuses £17,442 was paid in cash, against £28,915 for the previous three years, being a smaller amount than has ever been disbursed under this head since 1890, after which year triennial valuations became the rule. These results are extremely satisfactory in view of the growing amount of business in force and the increasing pressure at which life insurance is now acquired.

Commission and Expenses of Management.—The commission paid during the triennium increased by £6,697, this being partly due to the greater amount of both new and renewal business and partly to the growing difficulty of obtaining new business, already referred to. The expenses of management have shown great steadiness for many years, the amounts involved for the last three triennial periods being £107,724 (1896–99), £108,439 (1899–1902), and £109,690 (1902–5). It must not be inferred from the increase in commission and expenses taken together, however, that the business is now conducted at greater expense than formerly, the exact opposite being the case, as the following table will disclose :—

RATIO OF COMMISSION AND EXPENSES (excluding Taxation).

Year	To Total Income.	To Premium Income.
1890	14·4 per cent.	20·2 per cent.
1893	13·4 "	19·0 "
1896	12·0 "	17·5 "
1899	11·9 "	17·5 "
1902	11·3 "	16·8 "
1905	11·0 "	16·7 "

From this it will be seen that the expense-ratios have consistently diminished since the introduction of triennial valuations, and that they are now materially lower than they were fifteen years ago.

The taxation, not included in the above, has now increased to 3·1 per cent. of the premium income of the Department.

THE VALUATION.

The business to be valued consisted of 45,137 policies, assuring £11,423,067 inclusive of bonus additions, and £49,305 immediate and deferred annuities per annum, the ordinary annual premiums thereon amounting to £316,284. The Department also receives £2,936 per annum, representing additions to the tabular premiums imposed when assurances are effected on lives which are estimated to fall below the requisite standard for any reason. These extra premiums are held to cover the current extra risk, and are not brought into the valuation as an asset.

Basis of Valuation.—Since the last valuation the results of an investigation of the mortality experience of sixty British offices for thirty years, from 1863 to 1893, have been published in the British Life Tables. These new mortality tables doubtless form the most reliable exponent of the mortality of assured lives in Great Britain, and they are being adopted by nearly all British offices. It does not follow, however, that the new table (O^m) must necessarily supersede the old table (H^m) in the case of a New Zealand life office. Indeed, in my opinion the labour and expense involved in a change would not at present be warranted, in the case of this Department, by any compensating advantages, as each of the tables referred to is based on quite a different mortality from that experienced by assured lives in this country, and the additional reserve resulting from the use of the new experience would be barely $\frac{1}{4}$ of 1 per cent. of the H^m liabilities.

A really scientific mortality basis for life assurance purposes on this side of the world can only be secured by an organized investigation of the combined mortality experience of New Zealand and Australian offices; and when it is realized that this combined Australasian experience is now many times larger than that of the old British H^m , and in the near future will approach within reasonable distance the extent of the new (O^m) experience, it may be thought probable that the investigation referred to will not be delayed much longer. It is by no means clear whether the resulting table of mortality would necessitate larger or smaller reserves than the British tables at present in use, but the many advantages accruing from such an investigation would far outweigh the cost to the offices concerned.

The valuation has therefore been made on the same basis as on the last occasion, the mortality table employed being the H^m Table of the Institute of Actuaries, and the future rate of interest being assumed at $3\frac{1}{2}$ per cent. The valuation has been made, as formerly, on a strict net premium basis, whereby the *whole* margin of loading has been reserved as a provision for future expenses and profits.

The annuities were valued by the 1883 English Government Annuitants' Experience, using $3\frac{1}{2}$ per cent. for the older annuities granted prior to June, 1896, and 3 per cent. for those granted subsequently.

The results of the valuation on this basis show that—

		£
The value of the total liability under the several contracts is	...	6,706,456
Deduct the value of the future net premiums		3,079,761
Leaving an immediate net liability of		3,626,695
The accumulated funds (after making further provision of £6,953 towards the Investment Reserve Fund) are		3,822,576
Difference, being surplus at 31st December, 1905	...	195,881
Add interim bonuses paid during the triennium		10,873
Result, being gross surplus of the triennium		<u>£206,754</u>

ALLOTMENT OF SURPLUS.

In 1902, as the result of an investigation into the working of the method of allotting surplus then in use, I recommended that the divisible surplus should in future be distributed in the form of a uniform reversionary bonus per cent. on the sum assured and existing bonuses, for each premium paid since the previous valuation. On this recommendation being submitted to the Consulting Actuaries in London, Messrs. R. P. Hardy and George King, those gentlemen gave their emphatic approval to the proposal, and in an exhaustive report showed "that by the Uniform Compound Bonus plan substantial justice is done to all interested, and that as a working system it has marked advantages over the Contribution plan because it gives more uniform results, is more easily understood by and consequently is more popular with the public, and, being much more simple to work, will therefore tend towards reduction of expenditure."

The Compound Reversionary Bonus method was accordingly adopted for the first time at the last valuation, and in a preliminary report of the 14th March last I recommended that its use should be continued on the present occasion.

From the report of the Consulting Actuaries to which I have already alluded the following statement is extracted, as it has an important bearing upon the division of profits: "The Uniform Compound Bonus plan of distributing the surplus having been adopted, we must add that, at future divisions, caution must be exercised when the rate of bonus to be declared comes to be decided. If the rate of bonus is to be maintained from triennium to triennium, care must be observed not to give too high a rate on any one occasion. The plan presupposes strong reserves, and a valuation on a basis which will leave an ample margin in the rate of interest. With such premiums as are charged by the Department the valuation rate of interest should be nearly 20s. per cent. lower than the effective rate actually realised over all the funds if the rate of bonus is not to fall below £1 per cent. per annum. As the effective rate has a tendency slowly to diminish, steps should be taken gradually to bring down the valuation rate from $3\frac{1}{2}$ per cent., at which it now stands, to $3\frac{1}{4}$ per cent. in the not very distant future." In order to give effect to this sound advice I also recommended that the rate of bonus in the General Section should be £1 per cent. per annum (compound) as before, with the corresponding rate for the Temperance Section, for which purpose £178,994 of the total surplus was necessary. This left a sum of £16,887 to be carried forward against future contingencies, which virtually reduced the valuation rate of interest from £3 10s. per cent. to £3 9s. per cent., thus giving practical effect to the advice of Messrs. Hardy and King contained in the foregoing extract.

These recommendations having received the statutory approval of the Governor in Council I was instructed to give effect thereto, and I have accordingly apportioned the divisible surplus among the participating policyholders, distinguishing between General and Temperance policyholders in regard to profit from favourable mortality in the manner provided for by "The Government Life Insurance Acts Amendment Act, 1890." The result is that policies in the General and Temperance Sections respectively will on this occasion receive compound bonuses of 20s. per cent. and 18s. per cent. upon the sum assured and existing bonuses for each year's premiums paid since the last valuation, the total reversionary bonus so allotted

amounting to £302,910 as against £290,074, the total bonus allotted three years ago. The following comparison of the 1902 and 1905 bonus allotments will be of interest :—

				1902.	1905.
				£	£
Divisible surplus	..	..	..	167,933	178,994
Interim bonuses	..	..	..	9,300	10,873
Carried forward	..	..	..	476	16,887
Total surplus	..	..	..	£177,709	£206,754

Section.				Cash divided.	Reversionary Bonuses.	Cash divided.	Reversionary Bonuses.
				£	£	£	£
General	..	..	..	149,237	256,949	159,540	269,850
Temperance	..	..	..	18,696	33,125	19,454	33,060
Total	..	..	..	£167,933	£290,074	£178,994	£302,910

The compound bonus of £1 per cent. in the General Section is equivalent to a simple bonus commencing at £1 per cent. per annum to new policies and increasing with the duration of the policies to £1 8s. per cent. per annum in the case of the older policies. When it is considered that the extremely low premiums are in many cases little higher than the usual non-profit rates, and generally much lower than those charged elsewhere, the results cannot be other than highly gratifying to the policyholders, and I see no reason why, with the continuance of a cautious and prudent policy, the bonuses of policyholders in the General Section should not still further improve in the future.

Temperance Section.—Although, as will be seen from the above table, the amount of cash surplus divided among the policyholders in the Temperance Section was greater than at the previous distribution, it was insufficient to keep up the rate of bonus, which worked out at 18s. per cent. per annum, as against 19s. per cent. at last valuation. Since the Act of 1890 was passed, providing for the mortality profit of the two Sections being kept separate, there has been a tendency for the bonuses of Temperance policyholders to decrease. Once only, twelve years ago, has the Temperance Section received the higher rate of bonus; the two Sections have twice received equal bonuses; while the General Section has had the advantage in 1896, 1902, and 1905. These results do not necessarily arise from a higher death-rate; the explanation is that the Temperance Section is too small to avoid fluctuations and contains a large proportion of endowment assurances, from which class of business there accrues less mortality profit than from whole-life policies, of which the General Section is more largely composed. On a matter of so much importance to a large and valued section of the Department's policyholders it was considered desirable to have an independent report, and Messrs. Hardy and King were invited to specially consider the question of dividing profits between the two Sections. In the course of an exhaustive inquiry these gentlemen found that the mortality profit from endowment assurances is less than that from whole-life policies, and decreases with the age of the policies in a greater ratio. As endowment assurances constitute the bulk of the Temperance Section it naturally follows, therefore, that the mortality profit is less, and also that any check in the new entrants will still further diminish this profit. It may be pointed out that there has been such a check, and that the Temperance Section has contracted in size during the past triennium.

The result of their inquiry was that Messrs. Hardy and King strongly recommended that the two Sections should be amalgamated, as they "think that there is every reason to anticipate that in the future, as in the past, there will be very little difference between the bonuses of the two Sections in the event of their being kept apart. The advantages of separate Sections are small, if not problematical, the disadvantages are considerable and clearly visible. Appreciable additional expense is involved by the extra labour thrown on the Department, and there is a constant agitation due to the unexpectedly small difference in the bonuses of the Sections." This recommendation has my entire support, and in my opinion should be given effect to during the current triennium, as I realise that its adoption would greatly benefit the policyholders in both Sections by effecting a considerable economy in the general administration of the Department.

A complete Valuation Statement, prepared in accordance with the Government Insurance and Annuities Act of 1874, is appended.

In conclusion, I may draw attention to the chief aspects of the Department's operations during the three years. The new business returns have improved, the interest income has increased both in amount and percentage, and the mortality experience has been favourable throughout. Moreover, the surrenders have diminished in a marked manner, and the ratio of expenditure to income has continued to decline. Finally, although increased bonuses have been allotted to the main body of policyholders, the Department has at the same time been able to make a substantial reserve which will still further strengthen its financial position.

Respectfully submitted,

MORRIS Fox,
Actuary.

The Government Insurance Commissioner.

SUMMARY and VALUATION of the POLICIES of the NEW ZEALAND GOVERNMENT LIFE INSURANCE DEPARTMENT, as at 31st December, 1905.

DESCRIPTION OF TRANSACTIONS.	PARTICULARS OF POLICIES FOR VALUATION.					VALUES. For Assurances: Institute of Actuaries' H ^m Table, 3½% interest. For Immediate English Government Annuity Tables, 1883. Issued prior to June, 1896, 3½% interest; issued subsequently, 3% interest.		
	Net Premiums.					Office Yearly Premiums.		
	Number of Policies.	Sums Assured, and Bonuses.	Office Yearly Premiums.	Net Premiums.	Sums Assured, and Bonuses.	Office Yearly Premiums.	Net Premiums.	Net Liability.
ASSURANCES.								
I.—With Participation in Profits.								
Whole-life Assurances—Uniform Premiums	13,304	4,312,226	96,149	82,559	2,435,379	1,154,594	974,905	1,460,474
Whole-life Assurances—Limited, Single, and Commuted Premiums	790	423,434	2,007	1,674	270,845	11,054	9,157	261,688
Endowment Assurances	25,227	5,442,488	178,489	149,497	3,274,381	2,024,469	1,671,201	1,603,180
Double Endowment Assurances	128	38,616	666	526	22,169	8,156	6,439	15,730
Joint Life Assurances	3,950	1,011,404	29,973	25,978	453,119	400,565	344,142	108,977
Survivorship Assurances	9	3,691	107	137	2,299	1,756	1,431	868
.. .. .	1	202	6	4	64	69	50	14
Annuity Assurances	688	{ 98,883 } and 35,305 per ann. at 60	5,144	4,779	103,447	86,275	80,246	23,201
Reserve for extra Premiums	..	..	..	..	1,935	..	..	1,035
Additional Reserve of Loading	..	..	..	..	..	..	3,087,571	3,475,167
Total Assurances with Profits	44,997	11,330,944	312,601	265,154	6,562,738	3,686,938	3,079,476	3,483,262
II.—Without Participation in Profits.								
Whole-life Assurances (transferred from Temperance to Non-profit Section)	6	1,190	29	25	690	338	285	405
Industrial Assurances	4	71	2	..	27	..	..	27
Temporary Assurances	10	2,750	46	..	18	..	..	18
Total Assurances without Profits	20	4,011	77	25	735	338	285	450
Total Assurances	44,117	11,334,955	312,678	265,179	6,563,473	3,687,276	3,079,761	3,483,712
ENDOWMENTS.								
Simple Endowments—with return of premiums	533	68,731	2,541	..	22,154	..	..	22,154
Simple Endowments—without return of premiums	2	200	13	..	21	..	..	21
Endowments—Premiums cease at death of purchaser	148	18,850	743	..	2,051	..	..	2,051
Investments	9	331	10	..	325	..	..	325
Total Endowments	692	88,112	3,307	..	24,551	..	..	24,551
ANNUITIES.								
Immediate	321	(per annum) 13,54	..	..	116,568	..	..	116,568
Deferred	7	192	77	..	1,864	..	..	1,864
Total Annuities	328	13,740	77	..	118,432	..	..	118,432
Total of the Results	45,137	11,423,067 and 49,305 per annum.	316,062 and 2,996 extra premium (not valued)	265,179	6,706,456	3,687,276	3,079,761	3,626,695

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