

CORRESPONDENCE

(To the Editors of the Journal of the Institute of Actuaries)

(J.I.A. Vol. LXXIII, p. 423)

DEAR SIRs,

In his *Note on the Gompertz Table*, Mr Fraser regrets not being able to explain in a brief and simple way why the 'abacus' could be used to calculate the coefficients $A_0, A_1, A_2, \dots$

The following explanation I found when I put to myself the question: 'How did Mr Fraser get the inspiration to try and "alternate" the "abacus"?'

I began by systematically writing down l_x and its first derivatives, so that the terms with the same powers of μ_x came into the same column.

	1	2	3
$l_x = l_x$			
$Dl_x =$	$-l_x \mu_x$		
$D^2 l_x =$	$-l_x \mu_x (\lambda c)$	$+ l_x \mu_x^2$	
$D^3 l_x =$	$-l_x \mu_x (\lambda c)^2$	$+ 3l_x \mu_x^2 (\lambda c)$	$-l_x \mu_x^3$
$D^4 l_x =$			

For one familiar with the 'abacus' the resemblance is not difficult to spot. To explain it we must bear in mind that:

- (1) Applying the operator D to l_x is the same as multiplying l_x by $-\mu_x$; in the scheme above this means that the term is transferred to the next row and the next column.
- (2) Applying the operator D to μ_x is the same as multiplying μ_x by λc ; this means that the term is transferred to the next row but stays in the same column.
- (3) The number of the column is the same as the power of μ_x ; applying the operator D to the power of μ_x gives this number as an extra factor.

Let us call the term in the m th row and the n th column $T_{m,n}$.

It is clear that

$$T_{m+1,n} = -\mu_x T_{m,n-1} + n\lambda c T_{m,n}.$$

If we put

$$T_{m,n} = C_{m,n} l_x \mu_x^n (\lambda c)^{m-1},$$

we find that

$$C_{m+1,n} = -C_{m,n-1} + nC_{m,n},$$

which is the law of formation of the 'alternating abacus'.

Yours faithfully,

E. STELLER

Hoflaan 35
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July 1948

(To the Editors of the Journal of the Institute of Actuaries)

DEAR SIRs,

Mortality of Indian assured lives

For some years the Prudential Assurance Company, Limited of London and the National Insurance Company, Limited of Calcutta have been associated in a combined investigation into the mortality of Indian assured lives and an appreciable volume of data has now been collected.

We feel that the results of the investigation may be of value to, and should be made available for the use of, other actuaries. Accordingly, we have prepared, and enclose for publication in the *Journal*, tables summarizing the mortality experience for the years 1934-45. The tables show the exposed to risk and actual deaths, the expected deaths on various appropriate standard tables, and the ratio of actual to expected deaths in quinary age-groups. The period of twelve years has been subdivided into three periods of four years each to show the secular trend of the mortality. The effect of selection is shown by the separation of the durations 0 to 4.

For the guidance of actuaries who may wish to make use of the data, a few notes on the methods of construction employed are appended.

- (1) The data relate to first-class Indian male assured lives. (European lives have been excluded.)
- (2) Joint life assurances, pure endowments with return of premiums, children's deferred assurances prior to vesting, and all policies converted to paid-up assurances have been excluded.
- (3) The investigation is based on policies.
- (4) The duration is the curtate duration from entry.
- (5) Deaths which were directly attributable to war causes have been excluded from the 'actual deaths'.
- (6) The 'Census' method, used for the Continuous Mortality Investigation, was adopted in compiling the exposed to risk and actual deaths. The ages at each 31 December for the in-force, and the ages at the date of death, were calculated by rules which produced on the average the nearest ages at those dates. The exposed to risk, which may be assumed to relate to the year of age $x - \frac{1}{2}$ to $x + \frac{1}{2}$, was derived as follows: if $P(x, T)$ = number of policies in force at nearest age x at 31 December of the calendar year T , and $\theta(x, T)$ = actual deaths at nearest age x in the calendar year T , then exposed to risk of death in the year of age $x - \frac{1}{2}$ to $x + \frac{1}{2}$ in respect of the calendar year T is

$$E(x - \frac{1}{2}, T) = \frac{1}{2} \{P(x, T-1) + P(x, T) + \theta(x, T)\}.$$

The ages shown in the table are the ages at the beginning of the year of exposure, i.e. $x - \frac{1}{2}$ above.

We wish to record our indebtedness to Mr H. L. Humphreys, A.I.A., late actuary of the National Insurance Company, Limited, and to members of the staffs of both Companies for their collaboration in the preparation of the data.

Yours faithfully,

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September 1948

Table 1. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)
Duration 0

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E} \%$) by various mortality tables							
			OM		Oriental 1925-35 select		A 1924-29 + 10 years select		OM ⁽¹⁾ + 5 years	
			E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$
Period I			1934-37							
-23½	7,033	33	30.0	110	23.2	142	11.8	280	49.7	66
24½-28½	11,148½	46	57.2	80	38.1	121	22.4	205	86.1	53
29½-33½	10,129½	24	63.7	38	38.1	63	26.6	90	88.2	27
34½-38½	7,140	45	55.6	81	33.3	135	25.1	179	73.4	61
39½-43½	2,963	27	28.5	95	19.5	138	14.8	182	37.4	72
44½-48½	870	5	10.4	48	8.7	57	6.4	78	14.1	35
49½-53½	115	2	1.8	111	1.7	118	1.4	143	2.4	83
54½-58½	5½	—	.1	—	.1	—	.1	—	.1	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	39,404½	182	247.3	74	162.7	112	108.6	168	351.4	52
Period II			1938-41							
-23½	6,316	25	26.8	93	20.8	120	10.6	236	44.5	56
24½-28½	8,592	30	43.9	68	29.4	102	17.3	173	66.1	45
29½-33½	7,602½	25	47.9	52	28.7	87	20.1	124	66.2	38
34½-38½	5,193	21	40.5	52	24.4	86	18.2	115	53.5	39
39½-43½	2,668½	22	25.8	85	17.6	125	13.3	165	33.9	65
44½-48½	993	12	12.0	100	10.0	120	7.6	158	16.3	74
49½-53½	139	3	2.1	143	2.0	150	1.6	188	2.9	103
54½-58½	2	—	.0	—	.0	—	.0	—	.1	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	31,511	138	199.0	69	132.9	104	88.7	156	283.5	49
Period III			1942-45							
-23½	10,221½	31	43.3	72	33.5	93	17.1	181	71.9	43
24½-28½	10,762	19	55.0	35	36.7	52	21.6	88	82.8	23
29½-33½	8,866½	33	55.9	59	33.4	99	23.5	140	77.4	43
34½-38½	6,077	22	47.5	46	28.4	77	21.4	103	62.6	35
39½-43½	3,348	23	32.3	71	22.2	104	16.9	136	42.6	54
44½-48½	1,356½	11	16.5	67	13.9	79	10.4	106	22.3	49
49½-53½	345½	4	5.5	73	5.4	74	4.2	95	7.6	53
54½-58½	23½	1	.5	200	.5	200	.4	250	.6	167
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	41,000½	144	256.5	56	174.0	83	115.5	125	367.8	39
All periods combined			1934-45							
-23½	23,570½	89	100.1	89	77.5	115	39.5	225	166.1	54
24½-28½	30,502½	95	156.1	61	104.2	91	61.3	155	235.0	40
29½-33½	26,598½	82	167.5	49	100.2	82	70.2	117	231.8	35
34½-38½	18,415	88	143.6	61	86.1	102	64.7	136	180.5	46
39½-43½	8,979½	72	86.6	83	59.3	121	45.0	160	113.9	63
44½-48½	3,219½	28	38.9	72	32.6	86	24.4	115	52.7	53
49½-53½	599½	9	9.4	96	9.1	99	7.2	125	12.9	70
54½-58½	31	1	.6	167	.6	167	.5	200	.8	125
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	111,916	464	702.8	66	469.6	99	312.8	148	1,002.7	46

Table 2. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)

Duration 1

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E} \%$) by various mortality tables							
			OM		Oriental 1925-35 ultimate		A 24-29 + 10 years select		OM ⁽⁶⁾ + 5 years	
			E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$
Period I			1934-37							
-23½	3,464½	15	15.0	100	14.6	103	7.2	208	24.6	61
24½-28½	7,980½	39	41.1	95	35.0	111	20.6	189	61.7	63
29½-33½	8,462	40	53.5	75	41.1	97	29.3	137	73.8	54
34½-38½	6,459	43	50.5	85	38.7	111	30.2	142	66.5	65
39½-43½	3,237½	31	31.2	99	27.3	114	21.8	142	40.0	76
44½-48½	1,018½	11	12.2	90	13.0	85	10.3	107	16.4	67
49½-53½	157½	10	2.5	400	3.1	323	2.6	385	3.4	294
54½-58½	11½	—	.3	—	.3	—	.3	—	.3	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	30,791	189	206.3	92	173.1	109	122.3	155	287.6	66
Period II			1938-41							
-23½	3,347	8	14.5	55	14.2	56	7.1	113	23.8	34
24½-28½	6,701	20	34.5	58	29.5	68	17.3	116	51.7	39
29½-33½	6,681½	21	42.3	50	32.4	65	23.0	91	58.4	36
34½-38½	5,019½	31	39.2	79	30.1	103	23.3	133	51.9	60
39½-43½	2,768½	23	26.7	86	23.5	98	18.7	123	35.1	66
44½-48½	1,056½	12	12.8	94	13.8	87	10.0	110	17.4	69
49½-53½	227	5	3.5	143	4.3	116	3.7	135	4.8	104
54½-58½	6	—	.2	—	.2	—	.2	—	.2	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	25,807	120	173.7	69	148.0	81	104.2	115	243.3	49
Period III			1942-45							
-23½	4,361	14	18.8	74	18.3	77	9.2	152	30.9	45
24½-28½	6,676	32	34.4	93	29.3	109	17.2	186	51.6	62
29½-33½	5,902½	22	37.3	59	28.6	77	20.4	108	51.5	43
34½-38½	4,218	21	33.0	64	25.4	83	19.7	107	43.4	48
39½-43½	2,516½	18	24.5	73	21.5	84	17.2	105	32.0	56
44½-48½	1,064	10	13.1	76	13.9	72	11.2	89	17.5	57
49½-53½	263	5	4.2	119	5.2	96	4.2	119	5.7	88
54½-58½	18	—	.4	—	.5	—	.5	—	.5	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	25,019	122	165.7	74	142.7	85	99.6	122	233.1	52
All periods combined			1934-45							
-23½	11,172½	37	48.3	77	47.1	79	23.5	157	79.3	47
24½-28½	21,357½	91	110.0	83	93.8	97	55.1	165	165.0	55
29½-33½	21,046	83	133.1	62	102.1	81	72.7	114	183.7	45
34½-38½	15,696½	95	122.7	77	94.2	101	73.2	130	161.8	59
39½-43½	8,522½	72	82.4	87	72.3	100	57.7	125	108.0	67
44½-48½	3,139	33	38.1	87	40.7	81	32.4	102	51.3	64
49½-53½	647½	20	10.2	196	12.6	159	10.5	190	13.9	144
54½-58½	35½	—	.9	—	1.0	—	1.0	—	1.0	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	81,617	431	545.7	79	463.8	93	326.1	132	764.0	56

Table 3. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)
Duration 2

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E}$ %) by various mortality tables							
			O.M.		Oriental 1925-35 ultimate		A 1924-29 + 10 years select		O.M. ⁽⁶⁾ + 5 years	
			E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %
Period I										
1934-37										
-23½	2,062½	13	8.9	146	8.6	151	4.9	265	14.7	88
24½-28½	6,530	29	33.9	86	28.5	102	19.2	151	50.5	57
29½-33½	7,975	46	50.6	91	38.8	119	31.4	146	69.8	66
34½-38½	6,237	37	48.8	76	37.6	98	33.5	110	64.4	57
39½-43½	3,620½	31	35.0	89	30.8	101	28.4	109	45.9	68
44½-48½	1,290	31	15.7	197	16.6	187	15.4	201	21.0	148
49½-53½	193	7	3.0	233	3.9	179	3.7	189	4.2	167
54½-58½	22	—	.5	—	.6	—	.6	—	.6	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	27,930	194	196.4	99	165.4	117	137.1	142	271.1	72
Period II										
1938-41										
-23½	2,172½	13	9.5	137	9.2	141	5.4	241	15.5	84
24½-28½	5,880½	22	30.4	72	25.8	85	17.2	128	45.6	48
29½-33½	6,810	33	43.2	76	33.0	100	26.9	123	59.6	55
34½-38½	5,287½	23	41.4	56	31.9	72	28.4	81	54.6	42
39½-43½	3,134	28	30.3	92	26.7	105	24.0	114	39.9	70
44½-48½	1,208	20	14.8	135	15.8	127	14.8	135	19.9	101
49½-53½	309	5	4.9	102	6.1	82	6.0	83	6.7	75
54½-58½	13	—	.3	—	.4	—	.4	—	.4	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	24,814½	144	174.8	82	148.9	97	123.7	116	242.2	59
Period III										
1942-45										
-23½	2,141½	9	9.3	97	9.0	100	5.2	173	15.3	59
24½-28½	4,895½	19	25.2	75	21.5	88	14.5	131	37.8	50
29½-33½	4,917½	20	31.1	64	23.8	84	19.3	104	43.0	47
34½-38½	3,709½	18	29.1	62	22.3	81	20.0	90	38.3	47
39½-43½	2,258	8	22.0	36	19.4	41	17.9	45	28.8	28
44½-48½	1,014	8	12.4	65	13.2	61	12.5	64	16.7	48
49½-53½	233	3	3.6	83	4.6	65	4.5	67	5.1	59
54½-58½	11	—	.1	—	.3	—	.4	—	.3	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	19,180	85	132.8	64	114.1	74	94.3	90	185.3	46
All periods combined										
1934-45										
-23½	6,376½	35	27.7	126	26.8	131	15.5	226	45.5	77
24½-28½	17,306	70	89.5	78	75.8	92	50.9	138	133.9	52
29½-33½	19,702½	99	124.9	79	95.6	104	77.6	128	172.4	57
34½-38½	15,234	78	110.3	65	91.8	85	81.9	95	157.3	50
39½-43½	9,012½	67	87.3	77	76.9	87	70.9	94	114.6	58
44½-48½	3,512	59	42.9	138	45.6	129	42.7	138	57.6	102
49½-53½	735	15	11.5	130	14.6	103	14.2	106	16.0	94
54½-58½	46	—	.9	—	1.3	—	1.4	—	1.3	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½-	—	—	—	—	—	—	—	—	—	—
Total	71,924½	423	504.0	84	428.4	99	355.1	119	698.6	61

Table 4. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)
Duration 3

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E}$ %) by various mortality tables							
			O ^M		Oriental 1925-35 ultimate		A 1924-29 + 10 years ultimate		O ^M (1) + 5 years	
			E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %	E	$\frac{A}{E}$ %
Period I										
1934-37										
-23½	1,262	5	5.5	91	5.2	96	3.3	152	9.0	56
24½-28½	5,546½	31	28.8	108	24.4	127	17.8	174	43.1	72
29½-33½	7,418½	41	47.1	87	36.1	114	31.8	129	65.1	63
34½-38½	6,219½	49	49.0	100	37.6	130	36.4	135	64.5	76
39½-43½	3,901	38	37.9	100	33.6	113	33.6	113	49.9	76
44½-48½	1,545½	13	18.9	69	20.3	64	20.8	63	25.6	51
49½-53½	228	2	3.7	54	4.7	43	5.0	40	5.1	39
54½-58½	33	1	0.7	143	1.0	100	1.2	83	1.0	100
59½-63½	4	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	26,158	180	191.7	94	163.1	110	150.1	120	263.5	68
Period II										
1938-41										
-23½	1,361	6	6.0	100	5.7	105	3.6	167	9.8	61
24½-28½	5,380	17	28.0	61	23.7	72	17.2	99	41.8	41
29½-33½	7,127	30	45.3	66	34.7	86	30.6	98	62.4	48
34½-38½	5,994½	26	47.2	55	36.3	72	35.2	74	62.0	42
39½-43½	3,674½	27	35.6	76	31.6	85	31.5	86	47.0	57
44½-48½	1,485½	19	18.2	104	19.5	97	20.0	95	24.5	78
49½-53½	387	8	6.1	131	7.8	103	8.2	98	8.6	93
54½-58½	17½	1	0.4	250	0.6	167	0.6	167	0.6	167
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	25,427	134	186.8	72	159.9	84	146.9	91	256.7	52
Period III										
1942-45										
-23½	1,289½	6	5.7	105	5.4	111	3.4	176	9.2	65
24½-28½	4,371	23	22.7	101	19.3	119	14.0	164	33.8	68
29½-33½	5,196	22	33.0	67	25.3	87	22.2	99	45.5	48
34½-38½	4,305½	24	33.8	71	26.0	92	25.3	95	44.6	54
39½-43½	2,676	21	26.1	80	23.0	91	23.0	91	34.2	61
44½-48½	1,328	13	16.2	80	17.4	75	17.9	73	21.9	59
49½-53½	346½	9	5.4	167	7.2	125	7.5	120	7.7	117
54½-58½	16½	—	—	—	—	—	—	—	—	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	19,529	118	143.3	82	124.1	95	113.9	104	197.4	60
All periods combined										
1934-45										
-23½	3,912½	17	17.2	99	16.3	104	10.3	165	28.0	61
24½-28½	15,297½	71	79.5	89	67.4	105	49.0	145	118.7	60
29½-33½	19,741½	93	125.4	74	96.1	97	84.6	110	173.0	54
34½-38½	16,519½	99	130.0	76	99.9	99	96.9	102	171.1	58
39½-43½	10,251½	86	99.6	86	88.2	98	88.1	98	131.1	66
44½-48½	4,359	45	53.3	84	57.2	79	58.7	77	72.0	63
49½-53½	961½	19	15.2	125	19.7	96	20.7	92	21.4	89
54½-58½	67	2	1.5	133	2.1	95	2.4	83	2.1	95
59½-63½	4	—	—	—	—	—	—	—	—	—
64½—	—	—	—	—	—	—	—	—	—	—
Total	71,114	432	521.8	83	447.1	97	410.9	105	717.6	60

Table 5. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)

Duration 4

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E}\%$) by various mortality tables							
			O.M.		Oriental 1925-35 ultimate		A 1924-29 + 10 years ultimate		O.M. ^(a) + 5 years	
			E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$
Period I			1934-37							
-23½	684	7	3.1	226	3.0	233	1.8	389	4.9	143
24½-28½	4,352½	12	22.9	52	19.2	63	14.1	85	34.0	35
29½-33½	6,801½	32	43.3	74	33.1	97	29.2	110	59.6	54
34½-38½	5,876	46	46.2	100	35.7	129	34.5	133	61.0	75
39½-43½	3,905	34	39.2	87	34.7	98	34.9	97	51.5	66
44½-48½	1,834½	28	22.7	123	24.7	113	25.2	111	30.6	92
49½-53½	347	9	5.5	164	7.1	127	7.6	118	7.8	115
54½-58½	64½	2	1.5	133	2.2	91	2.2	91	2.2	91
59½-63½	3½	—	1.1	—	1.1	—	1.1	—	1.1	—
64½	1	—	0	—	0	—	0	—	0	—
Total	23,959	170	184.5	92	159.8	106	149.6	114	251.7	68
Period II			1938-41							
-23½	770	3	3.4	88	3.2	94	2.0	150	5.5	55
24½-28½	4,459	29	23.4	124	19.7	147	14.5	200	34.8	83
29½-33½	7,356	37	46.9	79	35.9	103	31.6	117	64.7	57
34½-38½	6,439½	41	50.7	81	39.1	105	37.9	108	66.9	61
39½-43½	4,258½	42	41.5	101	36.8	114	36.7	114	54.6	77
44½-48½	1,826	16	22.4	71	24.2	66	24.8	65	30.3	53
49½-53½	422	16	6.8	235	8.6	186	9.2	174	9.4	170
54½-58½	36	1	7	143	1.2	83	1.2	83	1.2	83
59½-63½	1½	—	0	—	1.1	—	1.1	—	1.1	—
64½	1	—	0	—	0	—	0	—	0	—
Total	25,569	185	195.8	94	168.8	110	158.0	117	267.5	69
Period III			1942-45							
-23½	757	3	3.4	88	3.3	91	2.0	150	5.5	55
24½-28½	3,949	17	20.6	83	17.4	98	12.6	135	30.7	55
29½-33½	5,054	28	36.1	78	27.6	101	24.3	115	49.5	57
34½-38½	4,928½	27	38.8	70	29.9	90	28.9	93	51.1	53
39½-43½	3,321½	24	32.3	74	28.7	84	28.7	84	42.7	56
44½-48½	1,040½	20	20.1	100	21.6	93	22.4	89	27.3	73
49½-53½	529	6	8.5	71	10.9	55	11.7	51	11.8	51
54½-58½	41½	—	1.0	—	1.3	—	1.3	—	1.3	—
59½-63½	—	—	—	—	—	—	—	—	—	—
64½	—	—	—	—	—	—	—	—	—	—
Total	20,821	125	160.8	78	140.7	89	131.9	95	219.9	57
All periods combined			1934-45							
-23½	2,211	13	9.9	131	9.5	137	5.8	224	15.9	82
24½-28½	12,760½	58	66.9	87	56.3	103	41.2	141	99.5	58
29½-33½	19,811½	97	126.3	77	96.6	100	85.1	114	173.8	56
34½-38½	17,244	114	135.7	84	104.7	109	101.3	113	179.0	64
39½-43½	11,575	100	113.0	88	100.2	100	100.3	100	148.8	67
44½-48½	5,301	64	65.2	98	70.5	91	72.4	88	88.2	73
49½-53½	1,208	31	20.8	149	26.6	117	28.5	109	29.0	107
54½-58½	142	3	3.2	94	4.7	64	4.7	64	4.7	64
59½-63½	5	—	1	—	2	—	2	—	2	—
64½	1	—	—	—	—	—	—	—	—	—
Total	70,349	480	541.1	89	469.3	102	439.5	109	739.1	65

Table 6. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)

Durations 5 and over

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E}\%$) by various mortality tables							
			OM		Oriental 1925-35 ultimate		A 1924-29 + 10 years ultimate		OM(s) + 5 years	
			E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$	E	$\frac{A}{E}\%$
Period I			1934-37							
-23½	261½	2	1·2	167	1·1	182	·6	333	1·8	111
24½-28½	7,318½	37	38·6	96	32·3	115	23·9	155	57·2	65
29½-33½	22,127½	112	142·0	79	108·2	104	95·8	117	195·0	57
34½-38½	30,184½	108	238·3	83	183·4	108	178·1	111	313·9	63
39½-43½	28,190½	266	275·7	96	245·0	109	245·2	108	303·1	73
44½-48½	20,185½	293	249·5	117	269·4	109	276·0	106	337·1	87
49½-53½	9,705½	228	158·2	144	204·2	112	217·9	105	220·9	103
54½-58½	2,878½	91	63·7	143	91·7	99	103·5	88	91·2	100
59½-63½	849	33	26·5	125	30·1	84	50·2	66	38·9	85
64½-	322	26	15·9	164	22·3	117	32·8	79	23·8	109
Total	122,083	1,286	1,209·6	106	1,196·7	107	1,224·0	105	1,642·9	78
Period II			1938-41							
-23½	306	—	1·4	—	1·3	—	·8	—	2·3	—
24½-28½	9,005	43	47·5	91	39·9	108	29·4	146	70·6	61
29½-33½	30,454	128	196·0	65	149·3	86	132·6	97	269·0	48
34½-38½	44,825½	245	354·0	69	272·7	90	264·6	93	466·3	53
39½-43½	42,781	351	418·4	84	372·0	94	372·3	94	551·0	64
44½-48½	29,914½	387	370·0	105	409·3	97	410·2	94	500·3	77
49½-53½	14,822	316	239·3	132	308·0	103	328·7	96	334·0	95
54½-58½	3,772	124	82·8	150	119·4	104	134·4	92	118·9	104
59½-63½	954	45	30·1	150	44·4	101	57·3	79	44·3	102
64½-	363½	21	18·9	111	25·9	81	38·7	54	28·1	75
Total	177,197½	1,660	1,758·4	94	1,733·2	96	1,769·0	94	2,384·8	70
Period III			1942-45							
-23½	302½	—	1·3	—	1·2	—	·8	—	2·1	—
24½-28½	9,230½	40	48·8	82	40·9	98	30·2	132	72·3	55
29½-33½	30,222	142	194·8	73	148·3	96	131·7	108	267·2	53
34½-38½	51,141	306	405·3	75	312·6	98	303·5	101	533·7	57
39½-43½	53,350½	403	522·5	77	465·2	87	465·7	87	688·3	59
44½-48½	39,518½	462	489·1	94	529·1	87	542·5	85	661·3	70
49½-53½	20,624½	399	334·2	119	431·3	93	460·2	87	466·7	85
54½-58½	5,750½	180	125·6	143	180·9	100	203·1	89	180·3	100
59½-63½	1,060½	47	33·1	142	48·8	96	62·7	75	48·6	97
64½-	401½	31	21·5	144	29·3	106	44·2	70	32·1	97
Total	211,611	2,010	2,176·2	92	2,187·6	92	2,244·6	90	2,952·6	68
All periods combined			1934-45							
-23½	870	2	3·9	51	3·6	56	2·2	91	6·2	32
24½-28½	25,554	120	134·9	89	113·1	106	83·5	144	200·1	60
29½-33½	82,863½	382	532·8	72	405·8	94	360·1	106	731·2	52
34½-38½	126,151	749	997·6	75	768·7	97	746·2	100	1,313·9	57
39½-43½	124,322	1,020	1,216·6	84	1,082·2	94	1,083·2	94	1,602·4	64
44½-48½	89,618½	1,142	1,108·6	103	1,198·8	95	1,228·7	93	1,498·7	76
49½-53½	45,212	943	731·7	129	943·5	100	1,006·8	94	1,021·6	92
54½-58½	12,410	395	272·1	145	392·0	101	441·0	90	390·4	101
59½-63½	2,863½	125	89·7	139	132·3	94	170·2	73	131·8	95
64½-	1,087	78	56·3	139	77·5	101	115·7	67	84·0	93
Total	510,891½	4,956	5,144·2	96	5,117·5	97	5,237·6	95	6,980·3	71

Table 7. The Prudential Assurance Company, Ltd., of London and the National Insurance Company, Ltd., of Calcutta

Combined mortality experience of Indian Assured Lives, 1934-45 (male first-class lives)
All durations combined

Age-group	Exposed to risk	Actual deaths (A)	Expected deaths (E) and % actual to expected ($\frac{A}{E} \%$) by various mortality tables							
			OM		Oriental 1925-35		A 1924-29 + 10 years		OM ^(a) + 5 years	
			E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$	E	$\frac{A}{E} \%$
Period I			1934-37							
-23½	14,767½	75	63.7	118	55.7	135	29.6	253	104.7	72
24½-28½	42,876½	194	222.5	87	177.5	109	118.0	164	332.6	58
29½-33½	62,914	295	400.2	74	295.4	100	244.1	121	551.5	53
34½-38½	62,116	418	488.4	86	366.3	114	337.8	124	643.7	65
39½-43½	45,907½	427	447.5	95	390.9	109	378.7	113	588.7	73
44½-48½	26,744	381	329.4	116	352.7	108	354.1	108	444.8	86
49½-53½	10,806	258	174.7	148	224.7	115	238.2	108	243.8	106
54½-58½	3,015	94	66.8	141	95.9	98	107.9	87	95.4	99
59½-63½	856½	33	26.7	124	39.4	84	50.5	65	39.2	84
64½-	322½	26	15.9	164	22.3	117	32.8	79	23.8	109
Total	270,325½	2,201	2,235.8	98	2,020.8	109	1,891.7	116	3,068.2	72
Period II			1938-41							
-23½	14,272½	55	61.6	89	54.4	101	29.5	186	101.4	54
24½-28½	40,017½	161	207.7	78	168.0	96	112.9	143	310.6	52
29½-33½	66,031	274	421.6	63	314.0	87	264.8	103	580.3	47
34½-38½	72,764½	387	573.0	68	434.5	89	407.6	95	755.2	51
39½-43½	59,285	493	578.3	85	508.2	97	497.1	99	761.5	65
44½-48½	36,483½	466	450.2	104	483.6	96	488.3	95	608.7	77
49½-53½	16,306	353	262.7	134	336.8	105	357.4	99	366.4	96
54½-58½	3,846½	126	84.4	149	121.8	103	136.8	92	121.4	104
59½-63½	955½	45	30.1	150	44.5	101	57.4	78	44.4	101
64½-	364	21	18.9	111	25.9	81	38.7	54	28.1	75
Total	310,326	2,381	2,688.5	89	2,491.7	96	2,390.5	100	3,678.0	65
Period III			1942-45							
-23½	19,073	63	81.8	77	70.7	89	37.7	167	134.9	47
24½-28½	39,884	150	206.7	73	165.1	91	110.1	136	309.0	49
29½-33½	60,758½	267	388.2	69	287.0	93	241.4	111	534.1	50
34½-38½	74,379½	418	587.5	71	444.6	94	418.8	100	773.7	54
39½-43½	67,470½	497	659.7	75	580.0	86	569.4	87	868.6	57
44½-48½	45,921½	524	567.4	92	609.1	86	616.0	85	767.0	68
49½-53½	22,341½	426	361.4	118	464.6	92	492.3	87	504.6	84
54½-58½	5,870	181	128.0	141	184.0	98	206.3	88	183.5	99
59½-63½	1,060½	47	33.1	142	48.8	96	62.7	75	48.6	97
64½-	401½	31	21.5	144	29.3	106	44.2	70	32.1	97
Total	337,160½	2,604	3,035.3	86	2,883.2	90	2,799.8	93	4,156.1	63
All periods combined			1934-45							
-23½	48,113	193	207.1	93	180.8	107	96.8	199	341.0	57
24½-28½	122,778	505	636.9	79	510.6	99	341.0	148	952.2	53
29½-33½	189,703½	836	1,210.0	69	896.4	93	750.3	111	1,665.9	50
34½-38½	209,260	1,223	1,648.9	74	1,245.4	98	1,164.2	105	2,172.6	56
39½-43½	172,663	1,417	1,685.5	84	1,479.1	96	1,445.2	98	2,218.8	64
44½-48½	109,149	1,371	1,347.0	102	1,445.4	95	1,459.3	94	1,820.5	75
49½-53½	49,453½	1,037	798.8	130	1,026.1	101	1,087.9	95	1,114.8	93
54½-58½	12,731½	401	279.2	144	401.7	100	451.0	89	400.3	100
59½-63½	2,872½	125	89.9	139	132.7	94	170.6	73	132.2	95
64½-	1,088	78	50.3	139	77.5	101	115.7	67	84.0	93
Total	917,812	7,186	7,959.6	90	7,395.7	97	7,082.0	101	10,902.3	66