each match in such a way that each club plays either two matches at home or two away in succession, but this occurs not more than once for any club in the whole competition.

Table III., indicating the result for eight clubs, and Table IV., indicating the general result, the number of clubs being $2n$, will help to make this clear.

TABLE III.

SCHEME of Matches between Eight Competitors.

First Round.	Second Round.	Third Round.	Fourth Round.	Fifth Round.	Sixth Round.	Seventh Round.
$1_h\ 8_a$	$8_h\ 2_a$	$3_h\ 8_a$	$8_h\ 4_a$	$5_h\ 8_a$	$8_h\ 6_a$	$7_h\ 8_a$
$2_a\ 7_h$	$3_a\ 1_h$	$4_a\ 2_h$	$5_a\ 3_h$	$6_a\ 4_h$	$7_a\ 5_h$	$1_a\ 6_h$
$3_h\ 6_a$	$4_h\ 7_a$	$5_h\ 1_a$	$6_h\ 2_a$	$7_h\ 3_a$	$1_h\ 4_a$	$2_h\ 5_a$
$4_a\ 5_h$	$5_a\ 6_h$	$6_a\ 7_h$	$7_a\ 1_h$	$1_a\ 2_h$	$2_a\ 3_h$	$3_a\ 4_h$

TABLE IV.

SCHEME of Matches between $2n$ Competitors.

First Round.	Second Round.	Third Round	Fourth Round.	—	$(2n-1)$th Round.
$1_h\ 2n_a$	$2n_h\ 2_a$	$3_h\ 2n_a$	$2n_h\ 4_a$	..	$(2n-1)_h\ 2n_a$
$2_a\ (2n-1)_h$	$3_a\ 1_h$	$4_a\ 2_h$	$5_a\ 3_h$	..	$1_a\ (2n-2)_h$
$3_h\ (2n-2)_a$	$4_h\ (2n-1)_a$	$5_h\ 1_a$	$6_h\ 2_a$	..	$2_h\ (2n-3)_a$
$4_a\ (2n-3)_h$	$5_a\ (2n-2)_h$	$6_a\ (2n-1)_h$	$7_a\ 1_h$	..	$3_a\ (2n-4)_h$
$n\ (n+1)$	$(n+1)(n+2)$	$(n+2)(n+3)$	$(n+3)(n+4)$	..	$(n-1)\ n$

ART. L.—*A Comparison of the Age-distribution of the Populations of the Four Chief Provincial Districts of New Zealand.*

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THE census returns of New Zealand give the distribution of the populations of the several provincial districts into the usual quinquennial age-periods. But the numbers only in each age-period are given. For the purpose of comparing the age-distributions of the populations of the provincial districts these numbers are directly of little service. It is first neces-

sary to convert them into percentages. This I have done, and the result is exhibited in Table I., which gives, for each of the four chief provincial districts and for each age-period, the percentage of the whole population of the district included in the several age-periods. The like results for the whole colony are also added.

TABLE I.

PERCENTAGES of Population of New Zealand and Four Chief Provinces in Quinquennial Age-periods.

Ages.	Percentages.				
	Auckland.	Wellington.	New Zealand.	Canterbury.	Otago.
0–5	11·64	11·67	11·28	10 54	10·44
5–10	11·03	11·26	11·15	10·88	10 88
10–15	10·90	10 64	11·09	11·39	10 98
15–20	10·58	10·56	11 01	11·76	11·31
20–25	10 35	11·34	10 81	10·87	10·84
25–30	9·02	9 39	8 89	8·58	8 78
30–35	7·53	7 86	7·38	7·08	7·30
35–40	6·02	6·51	5 88	5·67	5·51
40–45	5·21	5·31	5 00	4 95	4·78
45–50	4 29	4·38	4·24	4 34	4·29
50–55	3·49	3·44	3·50	3·71	3 62
55–60	3·06	2·59	3 04	3·24	3·33
60–65	2 59	2·06	2 68	2·91	3 11
65–70	2·09	1·42	2 09	2·08	2 46
70–75	1·14	0·76	1·11	1·15	1·30
75–80	0·57	0 39	0·51	0·51	0·56
80 and over	0·39	0·25	0·34	0·33	0·37

This table is illustrated graphically in Plate XLII.

While the age-distribution in the provincial districts resemble one another and that for the colony far more nearly than they resemble that of most other countries, still they have differences which are of interest.

In some ways these differences are more clearly exhibited by considering the excess or defect, as compared with the whole colony, of the percentages in the several age-periods for the several provincial districts. These excesses and defects are exhibited in Table II. in the form of percentages. The table gives, for each district and each age-period, the percentage of excess or defect of the number of people actually included in the age-period, over or below what the number would be if the same total population of the district had the same age-distribution as the colony as a whole.

TABLE II.

PERCENTAGES of Proportional Excess, relative to the Whole Colony, of the Population of the Four Chief Provinces of New Zealand in the Quinquennial Age-periods.

Ages.	Percentages.			
	Auckland.	Wellington.	Canterbury.	Otago.
0–5	+ 3·2	+ 3·5	− 6·6	− 7·4
5–10	− 1·1	+ 1 0	− 2·4	− 2 4
10–15	− 1·7	− 4·1	+ 2·7	− 1·0
15–20	− 3·9	− 4·1	+ 6 8	+ 2·7
20–25	− 4·3	+ 4·9	+ 0·6	+ 0·3
25–30	+ 1·5	+ 5 6	− 3 5	− 1·2
30–35	+ 2 0	+ 6 5	− 4·1	− 1·1
35–40	+ 2·4	+ 10 7	− 3 6	− 6·3
40–45	+ 4 2	+ 6 2	− 1 0	− 4·4
45–50	+ 1·2	+ 3·3	+ 2 4	+ 1·2
50–55	0·0	− 1·7	+ 6 0	+ 3·4
55–60	+ 0·1	− 14·8	+ 6·6	+ 9·5
60–65	− 3·4	− 23 1	+ 8·6	+ 16·0
65–70	0·0	− 32·1	0 0	+ 17 7
70–75	+ 2·7	− 31 5	+ 3·6	+ 17·1
75–80	+ 11·8	− 23·5	0 0	+ 9·8
80 and over	+ 14·7	− 26·5	− 3·0	+ 8·8

The first noteworthy feature is the excess of young children, or those in the age-period 0–5, in the northern districts, and the defect of the same in the southern districts. The percentage of excess in Auckland is 3·2, and in Wellington 3·5, while in Canterbury the deficiency is 6·6, and in Otago 7·4.

Wellington alone has an excess in the age-period 5–10, but there is not nearly so great a difference between the several districts in this age-period as in the previous one.

Both the northern districts are deficient in both the age-periods 10–15 and 15–20, more particularly Wellington, which has a deficiency of 4·1 per cent. in both periods, while Canterbury has a considerable excess in the age-period 15–20, amounting to 6·8 per cent.

The southern districts have but a slight excess in the next age-period, 20–25, while that of Wellington amounts to 4·9 per cent., Auckland having a deficiency of 4·3 per cent.

For the next five age-periods, including the ages 25–50, both the northern districts have an excess, which is specially marked in the case of Wellington, amounting to no less than 10·7 per cent. for the age-period 35–40, and over 6 per cent.

for each of the periods 30–35 and 40–45. The southern districts, on the other hand, have both a deficiency in each of the first four of these age-periods, amounting to as much as 6·3 per cent. in the case of Otago for the age-period 35–40. In the fifth age-period the southern districts have, however, each an excess, as well as the northern, indicating a deficiency in the smaller provincial districts which are not considered in this paper.

From the age-period 50–55 and onwards the excesses in the southern districts are most marked, but especially in the case of Otago, amounting in this latter case to as much as 16 per cent. for the age-period 60–65, and over 17 per cent. for both the periods 65–70 and 70–75. The deficiency in the case of Wellington is even more marked, amounting to 23·1 per cent. for the age-period 60–65, 32·1 per cent. for the age-period 65–70, 31·5 per cent. for the age-period 70–75, 23·5 per cent. for the age-period 75–80, and 26·5 per cent. for the period 80 and over. This deficiency in the aged in Wellington is one of the most noteworthy features that these tables exhibit, and the contrast with Otago is certainly remarkable. But Wellington is the more recently settled district, and we may expect the same rule to hold with respect to a district as with respect to a colony as a whole—that the more recent is the settlement the smaller is the proportion of the aged.

In these later age-periods Auckland approximates fairly closely on the whole to the average for the whole colony, except in the last two periods of all—namely, those of 75–80 years and 80 years and over; and in these periods that district has a greater excess than any of the other districts, amounting to 11·8 per cent. for the first of the periods and 14·7 per cent. for the other, as against Otago's 9·8 per cent. and 8·8 per cent. respectively, which are the only other excesses in these age-periods, but are themselves considerable.

Considering the provincial districts separately, we may say that the chief features of interest with respect to Auckland are the deficiency of population of the ages 5–25, the excess of the ages 25–50, and the great excess of the very aged of 75 and over. In the case of Wellington the most noteworthy features consist of the considerable excess of population of the ages 20–50 and the great deficiency in population of 50 and over. Canterbury's population has less conspicuous features, the main ones being the considerable deficiency in children of the ages 0–10 and the excess of population of later middle age. Otago shares with Canterbury both of these features, but in addition has a considerable excess of old people of all ages.

Of all these features the most important economically is the preponderance of population of the most vigorous ages of

manhood in the northern districts and the deficiency of the same in the southern. In economic power the population of Wellington, we may remark in particular, is far more nearly equal to that of her sister provinces than mere numbers of population would indicate, and offers a great contrast to Otago especially, with her deficiency both in children and population of early and middle manhood. The same contrast exists to a marked, though not to an equal, extent between the populations of the two northern districts together as compared with those of the southern districts : the population of the north excels that of the south beyond the point its mere excess in numbers might indicate, not only in present economic power, but in capacity for future increase.

I have on other occasions pointed out that statistics of many kinds, applying to different countries or to one country at different times, cannot be properly compared unless the differences in age-distribution of the populations be taken into account. The same applies to the case of these provincial districts. It would be absurd, *e.g.*, to draw any inference from a comparison of the death-rates of Wellington and Otago Districts without first taking into account the great excess of the aged in the one district and the still greater deficiency of the other. Similarly, birth-rates and statistics of health all must be specially prepared with a view to allowing for differences in age-distribution before most comparisons are anything better than worthless. Thus far we have not taken the sexes separately into account

The Tables III. and IV. give results corresponding exactly to those of I. and II , but for the male population only.

TABLE III.

PERCENTAGES of Male Population of New Zealand and Four Chief Provinces in Quinquennial Age-periods.

Ages	Percentages				
	Auckland	Wellington.	New Zealand	Canterbury	Otago.
0–5	11·13	11·42	11·00	10·56	10·22
5–10	10·63	10 80	10·74	10·88	10·43
10–15	10·44	10·12	10·69	11·44	10·55
15–20	9·97	9·99	10·55	11·40	10·98
20–25	9·83	10·90	10·22	10·03	10 22
25–30	8·99 ·	9·19	8·73	8·14	8·54
30–35	7·66	7·94	7·32	6·82	6·98
35–40	6·18	6·80	5·96	5·50	5·50

TABLE III.—*continued.*

PERCENTAGES of Male Population, &c.—*continued.*

Ages	Percentages.				
	Auckland.	Wellington.	New Zealand.	Canterbury.	.Otago.
40–45	5·66	5·71	5·25	5·10	4·92
45–50	4·65	4·90	4·63	4·72	4·75
50–55	3·69	3·70	3·71	3·99	3·92
55–60	3·31	2·85	3·34	3·49	3·67
60–65	3·00	2·36	3·12	3·32	3·60
65–70	2·41	1·61	2·50	2·40	2·98
70–75	1·32	0·82	1·32	1·29	1·61
75–80	0·59	0·40	0·57	0·54	0·64
80 and over	0·39	0·29	0·35	0·34	0·38

This table is illustrated graphically in Plate XLIII.

TABLE IV.

PERCENTAGES of Proportional Excess, relative to the Whole Colony, of the Male Population of the Four Chief Provinces of New Zealand in the Quinquennial Age-periods.

Ages.	Percentages			
	Auckland.	Wellington.	Canterbury.	Otago.
0–5	+ 1·2	+ 3·8	− 4 0	− 7·1
5–10	− 1·0	+ 0·6	+1·3	− 2·9
10–15	− 2·3	− 5·3	+7·0	− 1·3
15–20	− 5·5	− 5 3	+8·1	+ 4·1
20–25	− 3·8	+ 6·7	− 1·9	0·0
25–30	+ 3·0	+ 5·3	−6·8	− 2 2
30–35	+ 4·6	+ 4·6	−6 8	− 4·9
35–40	+ 3·7	+14·1	− 7·7	− 7·7
40–45	+ 7·8	+ 8·8	−2 9	− 6·3
45–50	+ 0·4	+ 5·8	+1·9	+ 2·6
50–55	− 0·5	− 0·3	+7·5	+ 5·7
55–60	− 0·9	− 14·7	+4·5	+ 9·9
60–65	− 3·8	−24·4	+6·4	+15·4
65–70	− 3·6	−35·6	−4·0	+19·2
70–75	0·0	−37·9	−2·3	+22·0
75–80	+ 3·5	−29·8	−5·3	+12 3
80 and over	+11·4	−17·2	−2·9	+ 8·6

These tables show that the same differences exist in the main between the male populations of the several districts as

between the general populations, but are, as a rule, more marked.

The excess of population of the age of young manhood and middle age in the northern districts is much greater than for the general population, as is also the corresponding deficiency in the southern districts, which increases the force of the remark made above as to the greater economic potentialities of the population of the north.

The excess in Auckland of male population of old age is much less than for both sexes combined, and the deficiency in the Wellington District is substantially greater, so that in both districts females form a greater percentage of the population of old age than of the whole.

Canterbury has a deficiency in males of 65 and over, although taking both sexes together her population approximates to the average.

In Otago the excess of old men is rather more marked than the excess of old people generally.

Tables V. and VI. deal similarly with the female population.

TABLE V.

PERCENTAGES of Female Population of New Zealand and Four Chief Provinces in Quinquennial Age periods.

Ages.	Percentages.				
	Auckland	Wellington.	New Zealand.	Canterbury.	Otago.
0–5	12·11	11 95	11·60	10·53	10·68
5–10	11·47	11·77	11·57	10·88	11·38
10–15	11·41	11·21	11·50	11·33	11·45
15–20	11·26	11·20	11 56	12·14	11·66
20–25	10·93	11·82	11·44	11·74	11·66
25–30	9·06	9·62	9·07	9·03	9·05
30–35	7·39	7·77	7·44	7·35	7·65
35–40	5·84	6·19	5·79	5·84	5·57
40–45	4·77	4·87	4·73	4·79	4·61
45–50	3·88	3·81	3·82	3 94	3·80
50–55	3 27	3·16	3·27	3·42	3·29
55–60	2 78	2·30	2·72	2·97	2·96
60–65	2·12	1·73	2·19	2·48	2·56
65–70	1·74	1·21	1·64	1·74	1·89
70–75	0·95	0·69	0·88	0·99	0·96
75–80	0·54	0·38	0·46	0·47	0·47
80 and over	0·40	0·22	0·32	0·32	0·35

This table is illustrated graphically in Plate XLIV.

TABLE VI.

PERCENTAGES of Proportional Excess, relative to the Whole Colony, of the Female Population of the Four Chief Provinces of New Zealand in the Quinquennial Age-periods.

Ages.	Percentages.			
	Auckland.	Wellington.	Canterbury.	Otago.
0–5	+ 4·4	+ 3·0	− 9 2	− 7·9
5–10	− 0·9	+ 1·7	− 1·6	− 1·6
10–15	− 0·8	− 2·5	− 1·5	− 0·5
15–20	− 2·6	− 3·1	+ 5·0	+ 0·9
20–25	− 4·5	+ 3 3	+ 2 6	+ 1·9
25–30	− 0·1	+. 6·1	− 0 4	− 0·2
30–35	− 0·7	+ 4·4	− 1·2	+ 2 8
35–40	+ 0·9	+ 6 9	+ 0 9	− 3·8
40–45	+ 0·8	+ 3·0	+ 1·3	− 2·5
45–50	+ 1·6	− 0·3	+ 3·1	− 0·5
50–55	0 0	− 3 4	+ 4·6	+ 0 6
55–60	+ 2·2	−15·4	+ 9 2	+ 8·8
60–65	− 3·2	−21 0	+13·2	+16 9
65–70	+ 6·1	−26 2	+ 6·1	+15 2
70–75	+ 8·0	−21·6	+12·5	+ 9·1
75–80	+17 4	−17·4	+ 2·2	+ 2·2
80 and over	+25 0	−31·3	0·0	+ 9 4

In the case of the female population the differences between the several districts are again, in the main, similar in character but less marked, as a rule, than in the case of the general population. We may note, however, in the case of Auckland, whereas there is a substantial excess of males of ages 25–45, the female population of those ages differs little from the average. Wellington, on the other hand, has a considerable excess of females of these ages, as well as of males. But Auckland has a considerable excess of females of old-age-pension ages, 65 and over, beginning with 6·1 per cent. for the age-period 65–70 and rising to 25 per cent. for the period 80 and over. Wellington is not as deficient in old females as in old males, but still the deficiency is very great.

Canterbury, while deficient in males of the ages 65 and over, has a considerable excess of females of those ages. Otago alone has a smaller percentage of females than of males in the later age-periods, but still the excess is considerable.