

Census of India, 1931

Actuarial Report

on

The Age Tables and Rates of Mortality

with

Life Tables for India and Provinces

by

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REPORT ON THE ESTIMATED AGE-DISTRIBUTION OF THE INDIAN POPULATION AS RECORDED AT THE CENSUS OF 1931 AND THE RATES OF MORTALITY DEDUCED FROM A COMPARISON OF THE CENSUS RETURNS FOR 1921 AND 1931.

I had the honour to be invited by the Government of India to make an investigation into the estimated age distribution of the Indian population as indicated by the Census figures of 1931 and to prepare Life Tables as deduced by a comparison of the Census records of 1931 with one or more of the preceding Census enumerations; and now beg to submit the results of my investigation.

This is the sixth of a series of investigations into the Mortality of the Indian population conducted in connection with each decennial Census from 1881 onwards. The first three were made by the late Sir George Hardy, the fourth by the late Mr. T. G. Ackland and the fifth in connection with the 1921 Census by Mr. H. G. W. Meikle, the then Actuary to the Government of India.

PROVINCES DEALT WITH IN THIS REPORT.

The larger Feudatory Indian States that conduct separately their own Census operations were not included in any of the previous investigations. The areas dealt with in these investigations were mainly British Provinces and the smaller Feudatory States under the direct political control of the Provincial administration. I decided, however, to conduct the present investigation on the Census Statistics available for the whole Indian Empire including all the Feudatory States whether small or large. The Indian Subcontinent, covering an area of more than 1,800,000 square miles and containing a population of almost 353 millions, was divided for the purpose of my enquiry into the following ten large geographical units:

- (1) Sind, Baluchistan and North-West Frontier Province.
- (2) Punjab, Delhi and Kashmir.
- (3) Rajputana, Ajmer-Merwara, Gwalior and Central India Agency.
- (4) The United Provinces.
- (5) Central Provinces, Berar and Hyderabad State.
- (6) Bihar and Orissa.
- (7) Bengal and Assam.
- (8) Bombay Presidency (excluding Sind), Baroda State and the Western India States.
- (9) The Madras Presidency, Coorg, Mysore, Travancore and Cochin States.
- (10) Burma (Burmans only excluding foreign born).

Each British Province includes the small State or States, if any, in direct political relationship with it.

Though Sind is politically a part of Bombay, in view of its great distance from Bombay and the greater affinity of the population of Sind to its immediate neighbours, it was decided to amalgamate it with Baluchistan and North-West Frontier Province.

The data supplied to me for the purpose of my investigation included:—

- (1) The Census Returns of 1931 showing in each Province and for each sex the numbers living at the ages of 0, 1, 2, 3 and in alternate ternary and septenary groups 4-6, 7-13, 14-16, 17-23, etc., with one large group at the end of 74 and over.
- (2) Specimen Schedules, in connection with the 1921 Census, showing out of a selected number, usually about 100,000 of each sex in each Province, the numbers recorded as living at each individual age last birth-day throughout life.
- (3) Birth-place Returns showing—
 - (a) the number of emigrants born in each Province or State and enumerated elsewhere, and

- (b) the number of immigrants enumerated in each Province or State and born elsewhere.
- (4) The Provincial and All-India Census Reports on the 1921 Census.
- (5) The Actuarial Reports based on the 1921 and the preceding Censuses.

No returns at individual ages, except those at the very early ages from 0 to 3, and no specimen schedules showing the distribution of the population at each age, except in the case of the Punjab and Madras out of a sample of 100,000 in each sex, were available in connection with the 1931 Census. This has proved to me a very great handicap* and I could not apply to the 1931 Census certain lines of investigation I made with the aid of the specimen schedules available in the Actuarial Reports of the earlier Censuses, especially in connection with the enquiry whether the very large errors in the Age Returns in India show a tendency to diminish or increase. Nor are their uses confined to the study of errors in age as there are bound to be other lines of Statistical Research in which individual Age Returns of the population will be of great help. By the time the Government of India requisitioned my services in connection with the Actuarial Analysis of the 1931 Census, I learnt to my disappointment that only ternary and septenary groups above referred to were available. I do not think it should entail any great expense if Tables are given for each Province showing the distribution of the population according to individual ages in each sex. The population statistics of England and Wales are available for each age. If, however, for one reason or other, this is considered impracticable for the next few decades in the Census history of India I cannot too strongly recommend that specimens showing distribution of the population at each age should be collected in each Province and in each State that conducts its own Census operations. The characteristics of the specimen are summarised in statistical language in the words "Representative Random Sample". A sample of 100,000 may be a representative one for a small area but may not be so for a large one. The magnitude of the sample should, therefore, depend on the area dealt with. Where again a large area is concerned, the sample should be taken from two or more localities widely separated from one another; otherwise the sample will neither represent the entire area nor be a random one.

SECTION I.

Characteristics of the Decennium 1921-1931.

1. The method to be adopted in the Actuarial Analysis of the Census material of India is very largely influenced by the economic and hygienic conditions prevailing in the decade preceding the Census. A population of which 90 per cent. or more is rural, subsisting mainly on the produce of the soil and cattle, leading a practically insular life in the village of its occupation, with its needs necessarily brought down to the barest minimum, should be extremely sensitive to the caprice of nature. If the rainfall is seasonal and sufficient a good harvest is reaped and the population, remunerated in most cases in kind, moves in harmony with the season. With bountiful harvest, a feeling of optimism permeates the entire atmosphere and conditions are conducive to health and abundant supply of babies. On the other hand, a lean harvest, engendered by the failure of the monsoon, leads to undernourishment and to contamination of any available scanty water supply which makes epidemics of the nature of Cholera, particularly connected with the bowels, break out. The death rate soars very high claiming a very large toll from the very young and the very old and underfeeding due to scarcity usually gives the people, under such circumstances, very little stamina to withstand the attack. The fall in the birth rate, combined with the very high mortality affecting childhood, leaves a deep chasm in the age curve noticeable in the Age Returns of several subsequent decennial Censuses just as a permanent scar from a deep wound.

2. If the next few years after a famine happen to be good or even normal monsoon years, the surviving population consisting mainly of those that have weathered the storm is known to have more than made up for the children lost

* It is usual to have 100,000 individuals of each sex sorted by individual ages for each province. This was not done in 1931 as the Actuary to the Government of India advised that it would not be necessary if Mr. Meikle's method of grouping were adopted.—J. H. H.

during the famine years. By the side of the deep chasm in the age curve above referred to, there would usually appear a big hump and as it very rarely happens that any Province in India is uninterruptedly immune from these seasonal disturbances for a decennial period, the age curve is generally full of undulations at successive short ranges which are either accentuated or masked by the preference for particular digits and the systematic errors in the ages returned by the population. To bring out the true or nearly true age curve from such irregular data, the Actuarial microscope has to be used rather very minutely and the method adopted is made to suit the nature of the statistics presented to the Actuary which in its turn is primarily influenced by the conditions obtaining in the decennium under consideration.

3. In illustration of the point made out in the last two paragraphs, the following Table showing the number of children under 5 per 10,000 of the total population in India in each of the Census enumerations may be found of interest. Corresponding figures for some representative countries in Europe and the United States of America are given which bring out in relief the very large fluctuations in the Indian birth rate due to the effect of famines and the rapidly recuperative nature of the population during normal or sumptuous years.

TABLE I.
Number of children under 5 per 10,000 of population.

Country.	1880-81.	1890-91.	1900-01.	1910-11.	1920-21.	1930-31.
England and Wales ..	1,356	1,225	1,143	1,068	877	..
Germany	1,365	1,300	1,308	1,206	634	..
Sweden	1,232	1,218	1,147	1,121	955	..
Belgium	1,237	1,159	1,171	1,024	694	..
France	923	872	862	886	618	..
Switzerland	Not available.		1,140	1,076	848	..
United States ..	1,379	1,222	1,210	1,156	1,095	..
India	1,369	1,468	1,297	1,379	1,258	1,529

4. The deficiency in the number of young children in the 1881 enumeration is to be traced to the famine of 1876-78 which affected the Provinces of Madras and Bombay. It will be noticed that, in spite of the large reduction of the young shown in the returns of two very large Provinces, the total for India was appreciably in excess of several European countries and was only slightly in defect of the number for the United States of America. The 1891 Census followed a period of general prosperity which is evidenced in the very large proportion of children in the age distribution of the population. The widespread nature of the famine of 1899-1901 is reflected in the very small number of children under 5 returned at the 1901 Census which low record has been beaten only by the 1921 enumeration. The conditions obtaining in the decennium preceding the 1911 Census, though generally free from scarcity and consequent famine, were less favourable than those of the period 1881-1891 as reflected in the number of children under 5 which, though appreciably in excess of the other countries brought in the comparison, is very much in defect of the high level reached in 1891.

5. The particularly low figure for 1921, lower than any previous famine record, bears eloquent testimony to the fact that the young ages were subject to a two-fold depletion due to the selective incidence of the Influenza mortality of 1918-1919. The first wave was particularly fatal to children, while the second and the more virulent one, by claiming a very large toll from the adult ages and proving particularly fatal to women in pregnancy, had struck a heavy blow at the very source of child supply.

6. As against the large fluctuations in the number of children in India with the normality or otherwise of the conditions obtaining during the decade preceding the Census can be set the steady trend towards fall of the number of children in the Western countries due purely to sociological reasons.

7. Where the decade preceding the Census was subject to dire visitations such as famine and pestilence, the method adopted by the renowned Actuaries, who wrote the Reports in connection with the earlier Censuses, was to estimate average rates

of mortality by combining the data of the Census on hand with those of a few earlier Censuses thereby eliminating, as far as this could be done, the effects of the disturbances above referred to.

8. Thus with respect to his 1881 Report, the late Sir George Hardy obtained average rates of mortality, firstly because the earlier Census enumeration was known to be extremely defective and secondly because of the famine of 1876-1878 which affected the two Provinces of Bombay and Madras. Since, however, the decennium ending with the 1891 Census was practically free from famine or epidemic that usually follows in the trail of a famine, he limited his investigation to a comparison of the 1881 and 1891 Census figures. The 1901 Census closely followed on the heels of the severe famine of 1899-1901, which affected extensive tracts in India, and also an epidemic of Plague. Sir George, therefore, deduced average rates of mortality by combining the Census figures of 1881, 1891 and 1901 by giving double weight to the 1891 Return. The decennium preceding the 1911 Census was, in spite of disturbances of moderate intensity in certain localities, taking the country as a whole, generally free from any calamitous visitation, and the late Mr. T. G. Ackland deduced rates of mortality relating to the decennium by combining the 1891 and the 1901 Census figures only. The conditions attending the 1921 Census were, however, exceptional. The population had not by then fully emerged from the devastating effects caused by the great Influenza epidemic which was estimated to have claimed as its victim nearly 7 per cent. of the total population of India. Mr. H. G. W. Meikle, the Actuary to the Government of India, who wrote the Report with the 1921 Census, with the view to deduce average rates of mortality, combined all the previous enumerations from 1881 onwards with the 1921 figures.

9. Though the decennium under consideration opened and closed in gloom, it has been on the whole a prosperous one. In the opening years of the decennium the effects of the Influenza epidemic that prevailed at the close of the last decade and the bad monsoon of 1920 were still evident. This position rapidly altered and a series of good monsoons followed interrupted only by floods notably in Bengal, Gujarat, Sind and South India. Famines were practically local and not very serious and the advancement in Medical Research minimised to a great extent deaths from Tropical diseases such as Cholera, Plague and Kala-azar. These favourable conditions are naturally reflected in the very large increase (10.6 per cent.) in the population which the decennium has witnessed. The closing years of the decennium, however, brought the position practically back to that of the opening ones, with this difference that towards the close there was considerably larger number of mouths to feed than at the commencement on practically identical economic conditions. Trade was depressed to an unprecedented level and the prices of agricultural products fell so low as to be entirely unremunerative to the cultivator. The consequent distress to a population of which nearly four-fifths live directly by agriculture could be easily imagined. Whether the prosperity of the few middle years of the decennium has been of such magnitude as to justify the very large increase of 10.6 per cent. of the population or in absolute figures 33,895,298, an increase which, in the words of Dr. Hutton, the Census Commissioner for India, is "a figure approaching equality with that of the total population of France or Italy and appreciably greater than that of such important European Powers as Poland and Spain" is a subject on which I shall have something to say in another section of this Report. Here I am mainly concerned with the fact that in the decade under consideration the population did contribute a very large—almost abnormally large—increase, apparently both by saving in deaths and by abundant supply of babies and on this account I felt justified in making use of the 1921 and 1931 Census figures only thereby confining my attention solely to the conditions obtaining in the decennium.

SECTION II.

On the peculiar nature of the Methods to be adopted in constructing Mortality Tables from Indian Census Returns.

1. In the preceding section of this Report attention was directed to the characteristics of the decennium under consideration being the main factor influencing the decision of the Actuary as to whether the mortality Table to be constructed should be an average one embodying the experience of more than one decennium or

should be confined only to that of the decennium preceding the Census. In this section I shall consider the peculiar novelty and difficulty of the problem of mortality Table construction as applied to this country caused by the fact that the records of vital occurrences are entirely undependable, which makes it necessary to discard the usual methods of construction of mortality Tables and adopt special ones as I explain below.

2. Where a reasonable amount of reliance can be placed on the ages and numbers returned at the Census enumeration and the records of deaths during the intercensal period, the method almost invariably employed to obtain the rate of mortality at each age of a given population is to compare the living at the various ages as recorded in the Census Returns with the registered deaths at the corresponding ages. The task of the Actuary becomes, under such conditions, comparatively easy for the analysed material will practically tell its own tale and smoothing or graduation will be required only with the view, on the one hand to arrive, very nearly, at that ideal flow of the rates of mortality from age to age that would have been obtained had the volume of statistics analysed not been limited in extent and to eliminate any small irregularities due to minor mis-statements of the age on the other. But the records of vital occurrences in India are yet deplorably undependable as will be evident from the following Table:—

TABLE II.

Comparison between enumerated and deduced population.

Province (British Territory only).	Variation 1921-1930 according to Vital Statistics (Excess of Births over Deaths+, Deficiency—).	Variation 1921-1931 according to Census (Excess +, Defici- ency—).	Difference.	
	Total.	Total.	Excess or defect of column 3 over column 2.	
	1	2	3	4
Assam	+450,854	+1,163,123	+712,269	
Bengal	+1,463,484	+3,411,695	+1,948,211	
Bihar and Orissa	+3,254,095	+3,682,158	+428,063	
*Bombay	+1,728,161	+2,587,404	+859,243	
Burma	+715,458	+1,454,954	+739,496	
C. P. and Berar	+1,423,608	+1,594,963	+171,355	
Delhi	+53,132	+147,794	+94,662	
Madras	+4,398,902	+4,421,122	+22,220	
N. W. F. Province	+94,759	+173,736	+78,977	
Punjab	+2,428,382	+2,895,374	+466,992	
United Provinces	+3,927,768	+3,033,694	—894,074	
Total	+19,938,603	+24,566,017	+4,627,414	

* Excludes Aden.

3. The natural assumption to be made, in drawing conclusions from the above Table, is that the censused figures are very nearly correct and all irregularities are traceable to records of Vital Statistics. As between the records of births and deaths, larger inaccuracies are naturally traceable to the former than to the latter. A study of the figures in the Table will show that Delhi, Assam and Bengal are almost in the vanguard of Provinces that maintain inaccurate vital records as the increases in the population of the decade in these Provinces traced through vital records are nearly 64, 61 and 57 per cent. respectively in defect of the increases revealed by the Census enumeration. Burma and the North-West Frontier Province closely follow with the respective deficiencies of 51 and 45 per cent. Bombay shows a deficiency of 35 per cent. The United Provinces show a large excess of 29 per cent. As this is an emigrating Province, the only explanation is that in this Province the records of deaths are more inaccurate than the

records of births. Madras alone, of all the Provinces, is remarkably accurate as the deficiency is only one-half per cent. It outpaces the second best Province—the Central Provinces and Berar—by a considerable distance as the deficiency in this Province is as much as 11 per cent. It might be possible to approach the censused population with very great accuracy through records of vital occurrences, even if the latter be inaccurately maintained and therefore subject to very large errors, provided such errors are of the same or nearly the same absolute magnitude. For, in arriving at the population on any date with the aid of the records of births and deaths, the numbers relating to births and deaths occur with opposite signs and therefore the errors in these two records are of a compensatory nature. One is therefore forced either to assume that the records of vital occurrences in Madras are maintained up to a great degree of accuracy, or that both the records of births and deaths are teeming with inaccuracies and these inaccuracies happen by chance to be very nearly equal, so as to reproduce the censused population within an error of one-half per cent. As observed above, the records of births in all Provinces except the United Provinces are relatively more inaccurate than the records of deaths. With the Province of Madras, however, as between assuming that both the records of births and deaths are inaccurate or both of them are very accurate, I am inclined to the latter view which is also borne out by the relatively greater accuracy shown by that Province in the statement of ages as will be seen in the section on “Errors in Age”. It may, therefore, be of interest to construct mortality Tables for the Province of Madras according to the usual method of mortality Table construction when the records of births and deaths are dependable and compare the results so obtained with those deduced by making use of Census enumerations only. As, however, I have not been supplied with the full statement of deaths in Madras occurring in the decennium according to each age, this investigation could not be taken up before the time my Report was expected to be ready.

4. With the records of vital occurrences teeming with inaccuracies in each Province, as shown by the above Table, the Actuary has no course open but to make as best an estimate as he could of the rates of mortality prevailing amongst the population by making use of the Census enumerations only, without any reference to the records of births and deaths.

5. For the convenience of the reader who will not take anything on trust, I have tried to set out in the next few articles the *rationalé* of the method to be adopted when mortality Tables are constructed by making use of Census Returns only. As a hint, however, to such of the readers as would let anything in the nature of Mathematics alone, I have placed an asterisk to these articles which can safely be passed over. But they are requested to assume that for the construction of the mortality Table the Actuary requires a series of smooth numbers representing the mean population living from age to age in the period under consideration and also another set of smooth numbers denoting the rate at which the population has increased or decreased at each age in the same period.

Construction of Mortality Tables from Census Returns only.

*6. In countries where a reasonable degree of reliance can be placed on vital occurrences the only correct method of constructing a mortality Table is to make use of Census Returns along with the records of deaths. At the infantile ages, however, where the Census figures are subject to irregularities of a two-fold nature due to both overstatement of age and non-enumeration of infants, use has to be made of the records of births also in the quinquennium preceding the date of the Census to correct the Census figures relating to these early ages. If we are dealing with an ideal population where only as many die in a year as are born in the year, where there are no migration disturbances (called by Actuaries a Stationary Population) and where the adult population has come to such a high level of literacy as to give correct particulars at a Census, we shall arrive at the same results when constructing a mortality Table from Censuses alone as when we make use of both Census Returns and records of vital occurrences. If $P_x^{(1)}$ persons are recorded as having attained age x on their birthday preceding the Census date, their average age taking one with another can be assumed to be $x + \frac{1}{2}$. If at the Census taken 10 years later there are returned $P_{x+10}^{(10)}$ persons of

age $x+10$ last birthday, the latter will be the survivors from amongst the group of $P_x^{(1)}$ persons of age x last birthday recorded at the preceding Census and will be of average age $x+\frac{1}{2}+10$. Provided that the chief desiderata of a stationary population as to the constancy of birth and death rates as also immunity from migration disturbances are actually realized, the ratio $P_{x+10}^{(10)}/P_x^{(1)}$ may be taken as very nearly equivalent to ${}_{10}p_{x+\frac{1}{2}}$ which is the probability of surviving 10 years at exact age $x+\frac{1}{2}$. It will, however, be necessary to find the probability of surviving one year, instead of 10 years for the construction of the mortality Table, which can be obtained as follows:—

*7. Under the ideal conditions of a stationary population which we have assumed, it can be easily seen that the numbers returned at the latter Census at any age x will be identical with the numbers returned at the Census 10 years earlier at the same age. This equality will hold whatever may be the interval between the two Censuses. If two Censuses are taken with an interval of only one year separating them we shall obtain the equation† ${}_1p_{x+\frac{1}{2}} = P_{x+1}^{(2)}/P_x^{(1)}$ where ${}_1p_{x+\frac{1}{2}}$ is the probability of surviving one year at age $x+\frac{1}{2}$ and $P_{x+1}^{(2)}$ represents the population returned as of age $x+1$ last birthday at the latter of the two Censuses. Since the numbers returned at the same age in any two Censuses are identical we have $P_{x+1}^{(2)}/P_{x+1}^{(1)} = P_{x+1}^{(1)}/P_x^{(1)}$ so that ${}_1p_{x+\frac{1}{2}} = P_{x+1}^{(1)}/P_x^{(1)}$. It will be evident from an inspection of the above equations that given a stationary population the numbers returned at each age at one Census enumeration would easily supply the numerical values of the probabilities required for the construction of the mortality Table. But no community conforms to the rigorous conditions imposed, for being called a stationary one and we shall have to modify our formula yielding numerical values of the probabilities of surviving at each age when the ideal requirements are relaxed one by one and we pass on from an imaginary stationary community to one actually met with subject to varying birth and death rates combined with disturbances due to emigration and immigration.

Varying Birth Rate with Constant Death Rate and no Migration Disturbance.

*8. Let us assume that the number of births has been increasing uniformly from year to year for a considerable number of years in geometrical progression while the death rate has been constant at each age and there has been no migration. On our assumptions, the number of births per annum increased from, say, l_0 in that period of one year just preceding the first Census date to $r^m l_0$ in that period of one year just preceding the next decennial Census date. Let us denote the number of children of age less than 1 (age 0 last birthday) returned at the earlier of the two Censuses we are considering by L_0 . These are the survivors out of the l_0 births in the year preceding that Census. The population returned at age 1 last birthday will number $\frac{1}{r}L_0$, for, these are the survivors from amongst the $\frac{1}{r}l_0$ births in that period of one year which commenced exactly two years before the Census date on the basis of a geometrical increase in the number of births. We shall therefore have the total population at each age last birthday returned at the first Census given as follows:—

$$L_0, \frac{1}{r}L_1, \frac{1}{r^2}L_2 \dots \frac{1}{r^{10}}L_{10} \dots \frac{1}{r^{20}}L_{20} \dots \frac{1}{r^{100}}L_{100}, \text{ etc.}$$

On the same assumption, the population returned at the next Census at each age last birthday will be as follows:—

$$r^{10}L_0, r^9L_1, r^8L_2 \dots L_{10}, \frac{1}{r}L_{11}, \dots \frac{1}{r^{10}}L_{20} \dots \frac{1}{r^{90}}L_{100}, \text{ etc.}$$

The L's in the two series with the appropriate suffixes denote the population in each age that would have been returned had the number of births not varied from year to year, that is, on the assumption that all the conditions of a stationary population had been satisfied.

*9. The mean population at any age, meaning thereby the population that would have been returned had a Census been taken at a date exactly at the middle

† Students of Actuarial Science will note that the prefix 1 in ${}_1p_{x+\frac{1}{2}}$ is usually omitted.

point of the two decennial Censuses, is given by $\frac{1}{2} L_x \left(\frac{1}{r^x} + \frac{1}{r^{x-10}} \right)$, $\sqrt{\frac{L_x L_{x-10}}{r^x r^{x-10}}}$ or $\frac{2L_x}{r^x + r^{x-10}}$, according as we take the Arithmetic, Geometric or Harmonic Mean.

Let us denote the expressions by L_x^A , L_x^G and L_x^H respectively. It can easily be verified that $\frac{L_{x+1}^A}{L_x^A} = \frac{L_{x+1}^G}{L_x^G} = \frac{L_{x+1}^H}{L_x^H} = 1 \cdot \frac{L_{x+1}}{L_x} = \frac{1}{r} \cdot p_{x+\frac{1}{2}}$. That this result should be true whatever may be the mean population we are taking could have been foreseen inasmuch as it is true for the populations enumerated at each of the two Censuses we are considering. I could not take it for granted since it may not be evident to one and all of the readers. I have, however, assumed in the case under consideration the death rate to be the same as in the case first considered but only the birth rate to vary. The probability, therefore, of surviving

one year at age $x + \frac{1}{2}$ is even now ${}_1p_{x+\frac{1}{2}} \left(= \frac{L_{x+1}}{L_x} \right)$ being identical with its

value when all the conditions of a stationary population are satisfied. The natural conclusion to be drawn is that, whereas when a population has attained an absolutely stationary condition the number at any age of one Census enumeration, or, what is the same thing, of the intercensal (mean) population between two Censuses, divided by the number at the age next below yields the probability of surviving one year at the half age midway between the two ages, when one of the conditions, namely, constancy of births from year to year, is relaxed, the ratio above described no longer gives the required probability of survivorship, but we shall have to take into account the rate of increase of the population and multiply by this rate the ratio of the mean numbers at consecutive ages to obtain the probabilities of survivorship at each half age from which the mortality Table can be easily constructed.

*10. Since the population at age x of one Census becomes by survival that at age $x+10$ at the next decennial Census and both of them are the survivors to ages x and $x+10$ in the two Censuses respectively out of births occurring in the same year, we can, by dividing the number returned at any age $x+10$ at a Census by the number returned at age x at the preceding decennial Census, obtain the value of ${}_{10}p_{x+\frac{1}{2}}$ (the probability of surviving 10 years at age $x + \frac{1}{2}$) and thereby eliminate any necessity for bringing into account the rate of increase in the population. From the values of ${}_{10}p_{x+\frac{1}{2}}$ those of ${}_1p_{x+\frac{1}{2}}$ can be obtained by a suitable method of interpolation. Before, however, this method could be adopted, one has to be absolutely certain that the only cause contributing towards a return of varying numbers at the same age from one Census to another is variation in birth rate, of which the magnitude is exactly ascertainable, and the rate of mortality has been practically invariable and the population has also been immune from disturbances due to migration. Such conditions are ideal and are not true to populations that are usually met with. It might be observed in passing that with only varying birth rate, if Census-taking be an annual function, we shall obtain the value of ${}_1p_{x+\frac{1}{2}}$ at each central age by taking the ratio $P_{x+1}^{(2)}/P_x^{(1)}$ where $P^{(1)}$ represents the population at the earlier Census and $P^{(2)}$ at the Census taken one year later, and thereby avoid the necessity for ascertaining the rate at which the population has been varying due to variation in birth rate.

*11. With the view to make it easy for the general reader I have assumed the variation in the population to be brought about by the number of births increasing in a geometrical progression of constant common ratio r . The arguments will still hold if the variation be not at the uniform rate from year to year but at varying rates r_1, r_2, r_3 , etc., and some of these r 's may be greater and others less than unity so that the number of births may be increasing in some and decreasing in other years.

Varying Death Rate and Constant Birth Rate and no Migration Disturbance.

*12. I have so far considered the construction of a mortality Table from Census Returns alone firstly when the population satisfied all the conditions necessary for its being called a stationary one and secondly when only one of the conditions, viz., constancy of the number of births from year to year, was relaxed. We can now assume the births to remain constant from year to year while the

death rate varies. When the birth rate alone varies, either uniformly at a constant rate r or at rates changing from year to year, the force or forces that bring about variation in the population returned at the same age in the several Census enumerations all act at one particular point of age, namely, at birth. When, however, variation in population is a result of continuously varying death rate only, the other conditions of a stationary population holding, these forces act at all age points and the variation at any age between two Census enumerations represents the cumulative effect of these forces from birth up to the age in question. In spite of this apparent complication, since on our assumption the variation in the Census material is introduced by an irregular flow only in rates of death from year to year and from age to age and the assignment of a numerical value of this factor (rate of death) being the object of our enquiry, we shall yet be able to obtain the average value of ${}_{10}p_{x+\frac{1}{2}}$ by the ratio $P_{x+10}^{(10)}/P_x^{(1)}$ as evidently the population numbering $P_{x+10}^{(10)}$ at the later Census at age $x+10$ are the survivors out of $P_x^{(1)}$ at age x at the earlier Census when the latter were subject to irregular incidence of mortality during the intercensal period. The quantity $1 - P_{x+10}^{(10)}/P_x^{(1)}$ would give the average value of the probability of death within 10 years at age $x + \frac{1}{2}$ prevailing in the intercensal period and the probabilities of death or survival for one year at each half age will have to be obtained by interpolation though the resulting values might be very rough and require graduation due to the irregular incidence of mortality. The results of two annual Censuses will have to be made use of if interpolation is to be avoided as in the case when only the birth rate varied.

*13. If P_x^M be the mean population at age x between two decennial Censuses, whether it is the Arithmetic, Geometric or Harmonic mean or mean computed in any other manner, the ratio P_{x+1}^M/P_x^M does not yield the value of ${}_{1}p_{x+\frac{1}{2}}$ as it does when the population has been absolutely stationary. The cause is not far to seek if it is remembered that on our assumption P_{x+1}^M and P_x^M which represent survivors to the middle date of the intercensal period out of births in different, though consecutive, years have been depleted differently by varying incidences of mortality from birth up to age x in each case and the ratio P_{x+1}^M/P_x^M instead of depending upon the mortality rate from age $x + \frac{1}{2}$ to $x + \frac{1}{2} + 1$ is coloured by the varying incidences of mortality above referred to at all ages below age x . To make the ratio P_{x+1}^M/P_x^M yield the value ${}_{1}p_{x+\frac{1}{2}}$ we must multiply it by a quantity r' which represents the ratio of the cumulative effect of mortality from birth to age x for the mean population P_x^M to the corresponding effect of mortality for the mean population P_{x+1}^M . The problem in this case is analogous to that when only the number of births varied, for, it will be remembered in that case to obtain the value of ${}_{1}p_{x+\frac{1}{2}}$ it was necessary to multiply the ratio P_{x+1}^M/P_x^M by r where r is the ratio of the number of births in that year of which P_x^M are the survivors to the births in the year of which P_{x+1}^M are the survivors.

*14. Where, however, it is not possible to ascertain and make allowance for the varying incidences of mortality in the two quantities P_x^M and $P_{x+\frac{1}{2}}^M$ above referred to, due to the death registers not having been accurately maintained, the only method to be adopted is to ascertain for each age an average rate of increase or decrease in the population for the intercensal period and starting from the mean population between the two Censuses as base obtain the population that would have been returned six months anterior and six months posterior to the middle date of the intercensal period from which the values of ${}_{1}p_{x+\frac{1}{2}}$ can be easily deduced.

Varying Birth and Death Rates.

*15. It can now be seen that when both the birth and death rates vary the equation $P_{x+10}^{(10)}/P_x^{(1)} = {}_{10}p_{x+\frac{1}{2}}$ will yet hold. For $P_{x+10}^{(10)}$ and $P_x^{(1)}$ being persons at ages $x+10$ and x in the latter and earlier Censuses respectively are the survivors out of the births occurring in the same year and in taking the ratio of the one to the other the disturbing effect in the constant flow of population from birth to age $x + \frac{1}{2}$ due to variation in the birth rate (the r of the geometric increase or decrease) is eliminated. Again the same fact, namely, that the populations $P_{x+10}^{(10)}$ and $P_x^{(1)}$ relate to births in the same year, is responsible for eliminating in the ratio $P_{x+10}^{(10)}/P_x^{(1)}$ the rates of mortality from birth to age $x + \frac{1}{2}$ and making it depend solely on the rates of mortality for the

period of 10 years after age $x+\frac{1}{2}$. From the values of ${}_{10}p_{x+\frac{1}{2}}$ those of ${}_1p_{x+\frac{1}{2}}$ and then of ${}_1p_x$ can be obtained by interpolation.

*16. The question might naturally be asked at this stage as to why this apparently easy method of arriving at the values of ${}_{10}p_{x+\frac{1}{2}}$ at each half age should not be adopted. The answer is not far to seek if it is remembered that all along we have assumed that the individuals composing the community have come to realize the importance of giving correct particulars both as to numbers and ages at the Census enumeration and do give them. But the necessity for employing the rather out of the way method of constructing the mortality Table by comparing two or more Census enumerations only, without any reference to the record of vital occurrences in the intercensal period, arose out of the fact that the latter were quite unreliable. It will, therefore, be entirely unjustifiable to assume that the ages returned at the Censuses are correct when the birth and death records are entirely undependable. What usually happens with every step taken forward in the scale of literary evolution of a community is that the accuracy of the ages recorded in the death registers precede that of Census Returns. Apart from the fact that Law, under pain of penalties, compels the registration of births and deaths, the usual inducement for overstatement or understatement at particular periods of life which exist with respect to living persons at a Census enumeration is very nearly absent when giving the ages of the dead. That is why it is often said that the only correct method of constructing a mortality Table is to compare the living with the dead with further help from the register of births at infantile ages.

*17. It will hardly need any demonstration to show that, when the Census material is subject to variations due to the combined effect of irregular birth and death rates, the ratio P_{x+1}^M/P_x^M obtained from the mean of the two Census enumerations will not yield the value of ${}_1p_{x+\frac{1}{2}}$. It will be remembered that the ratio did not yield the value of this quantity even when only one of the two disturbing influences was present. To make the above ratio yield the value of ${}_1p_{x+\frac{1}{2}}$ we shall have to isolate the disturbance caused to the uniform flow of population from year to year by irregular variation in births from the disturbance caused by irregular variation in deaths and multiply the above ratio by suitable factors which, in addition to being a complicated process, assumes accurate knowledge of vital occurrences, records of which are extremely defective with respect to the population we are dealing with.

Migration.

*18. The correction for disturbances caused to the censused population due to immigration and emigration is easy to allow for if statistics of the immigrant and emigrant population have been maintained according to age.

*19. If I_x and E_x be the number of immigrants and emigrants respectively at age x during the intercensal period and if out of the excess of immigrants over emigrants there have occurred D_x deaths in the period, we shall have to take for the population at age $x+10$ at the latter of the two Censuses $P_{x+10}^{(10)} - (I - E - D)$ instead of $P_{x+10}^{(10)}$ in each of the ratios given above yielding probabilities of surviving 10 years.

*20. The disturbance due to migration except in the cases of a few Indian Provinces is not very material. Further, Migration Statistics are not available according to age. The Actuary has, therefore, to make as good an estimate as possible of the age distribution of the migrant population. The deaths amongst the net immigrant population though comparatively of small significance will have to be allowed for by him in each age group by using his best judgment.

*21. I think a few words at summarising the results arrived at so far will, in view of the help it may give at clarifying the point under consideration, not be considered redundant. For the sake of simplicity I shall assume either that disturbances due to migration do not exist at all or if they do, appropriate corrections have been made to the censused population to eliminate as far as possible errors due to them. If correct ages are returned at the Census we shall obtain the following results :—

I. On the supposition that the population has been absolutely stationary for a long period so that the number of births in a year is equal to the number of

deaths we shall have $\frac{P_{x+1}^{(10)}}{P_x^{(1)}} = \frac{P_{x+1}^{(2)}}{P_x^{(1)}} = \frac{P_{x+1}^{(1)}}{P_x^{(1)}} = \frac{P_{x+1}^M}{P_x^M} = {}_{10}p_{x+\frac{1}{2}}$

II. If the variation in the populations returned from Census to Census be due solely to variation in birth rate the ratio $\frac{P_{x+1}^M}{P_x^M}$ will have to be multiplied by a factor r as explained above which will have the effect of eliminating irregularity due to varying flow of birth rate from year to year and make the product $r \frac{P_{x+1}^M}{P_x^M}$ yield the value of ${}_{10}p_{x+\frac{1}{2}}$ which we require for the construction of the mortality Table.

III. Similarly when the population has been subject to varying death rate only, we shall have to multiply $\frac{P_{x+1}^M}{P_x^M}$ by a quantity r^1 (explained above) to make the product equal to ${}_{10}p_{x+\frac{1}{2}}$.

IV. When the population has been subject to irregular variation in both births and deaths we shall have to multiply by two different factors r and r^1 the ratio $\frac{P_{x+1}^M}{P_x^M}$ to make the product equal to ${}_{10}p_{x+\frac{1}{2}}$. The factor r eliminates variation due to the irregular flow of births and is obtained by an analysis of the records of births maintained for a long period in the past and the factor r^1 eliminates variation due to irregular incidence of rates of death from birth to age x and is obtained by an analysis of the records of deaths. In all the four cases $\frac{P_{x+10}^{(10)}}{P_x^{(1)}} = {}_{10}p_{x+\frac{1}{2}}$ from which the values of ${}_{10}p_{x+\frac{1}{2}}$ can be obtained by interpolation.

*22. These methods are available if, and only if, both the desiderata given below hold:

- (1) that the ages returned at the Census are absolutely correct, and
- (2) that accurate records of births and deaths, the latter according to correct ages, have been maintained in the past.

*23. Since the ages returned at the Indian Censuses (including the latest one) have been manifestly full of errors both of a major and minor nature, added to which is the proverbial inaccuracy of the records of Vital Statistics maintained by the Provinces, we shall have to adopt special methods and construct mortality Tables by using Census enumerations alone. The fact that the Census enumerations are full of errors rules out the method of decennial interpolation from the equality $\frac{P_{x+10}^{(10)}}{P_x^{(1)}} = {}_{10}p_{x+\frac{1}{2}}$. The fact that the records of Vital Statistics are not maintained accurately makes it impossible to find out the factors r and r^1 (mentioned above) representing correcting factors for the irregular incidences of births and deaths.

*24. The question will naturally be asked as to what is the method to be adopted which will minimise the effect of the errors in the Census material and provide mortality rates on which reasonable reliance can be placed. The answer is naturally suggested by the equation $\frac{P_{x+10}^{(10)}}{P_x^{(1)}} = {}_{10}p_{x+\frac{1}{2}}$ when Census operations are undertaken once in 10 years or by the equation $\frac{P_{x+1}^{(2)}}{P_x^{(1)}} = {}_{10}p_{x+\frac{1}{2}}$ when Censuses are taken annually. Taking the former of the two equalities it will be seen that if the numbers at each age returned at the two Censuses could be successfully graduated so as to remove errors we shall obtain the value of ${}_{10}p_{x+\frac{1}{2}}$ at each age. The disadvantage of this method is due to the fact that methods of graduation are not entirely successful in removing major deliberate errors. Since the values of ${}_{10}p_{x+\frac{1}{2}}$ are to be obtained from two sets of numbers $P^{(10)}$ and $P^{(1)}$ independently graduated and having residual errors in themselves, the errors in the computed values of ${}_{10}p_{x+\frac{1}{2}}$ will be accentuated or masked according as the residual errors in $P^{(10)}$ and $P^{(1)}$ are in opposite or in the same direction with the natural result that small errors in the graduated values of $P^{(10)}$ and $P^{(1)}$ may be magnified in the computed values of ${}_{10}p_{x+\frac{1}{2}}$. With such errors magnified in them these values will not give as accurate a measure as desirable of the manner in which the number $P_x^{(1)}$ at the first

Census diminished to P_{x+10}^{10} at the next decennial Census due to the operation of mortality.

*25. The only other method that would to a large extent minimise this error is suggested by the equality $(r r^1) P_{x+1}^M / P_x^M = {}_1p_{x+\frac{1}{2}}$. According to this method we graduate the mean population of the intercensal period and by comparing the two Census enumerations in suitable age groups obtain and graduate the rates of natural increase of the population which will provide smooth values of r_x the rate of natural increase or decrease of the population at each age x in the decennium due to the combined operation of varying incidences in the birth and death rates. By multiplying the graduated mean population at each age x , P_x^M , by $r_x^{-\frac{1}{20}}$ and $r_x^{\frac{1}{20}}$ respectively we obtain the respective number of people that would have been returned at each age had two Censuses been taken, one on a date six months anterior and the other six months posterior to the middle day of the decennial period. By this device, from the figures of two Censuses taken with an interval of 10 years between them, we obtain the figures of two Censuses with only one year separating them. The values of ${}_1p_{x+\frac{1}{2}}$ at each half age are then obtained from the equality $r_{x+1}^{\frac{1}{20}} P_{x+1}^M / r_x^{-\frac{1}{20}} P_x^M = {}_1p_{x+\frac{1}{2}}$. This is the method that has been adopted in the construction of the mortality Tables for all the Provinces.

26. No apology, I hope, is needed for this lengthy description of the peculiar methods to be adopted in constructing mortality Tables from Indian Census Returns without which, I am sure, those for whose benefit Census publications are usually meant will find it difficult to appreciate why for instance the mean population should be calculated or, as a matter for that, what has the rate of increase in the population to do with the rate of death. The average man of letters is afraid of anything in the nature of statistics on the ground that "it is all dull stuff". It might take several years before the average reader realizes that statistics are nothing but numerical expression of facts a knowledge of which is essential to enable one to be prepared for difficulties which might occur. They are more inclined to swear at statistics whereas they should swear by them. It will therefore be necessary, in the language of my esteemed friend, Mr. S. V. Mukherjea, Census Commissioner for Baroda, "to humanise the document". Talking of the general apathy of the public towards Census publications, Mr. Mukherjea in his characteristic style writes: "My experience has been that a Census Report, although intended for the general benefit of students and officers, is rarely read. Officers and publicists like to get a complimentary copy—for it is the thing to do so—look at its opening pages and then relegate it to their shelves, resorting to it most occasionally as an inducement to sleep when all other "drowsy syrup" of the doctors failed. What destiny is reserved for these humble pages, their author will be the last person to know".

27. If this is the language in which Mr. Mukherjea deplores the lack of interest of the public to a Census Report, my lot has been cast with a drier subject and the lengthy description given above is an humble attempt to "humanise my document".

SECTION III.

Errors in age.

1. The huge magnitude and the very wide range of the errors in the ages returned at the Indian Censuses constitute another important contributing factor towards making the task of the investigating Actuary particularly difficult. So much has been said in the past by successive Census Commissioners and Census Superintendents of each Province and State of the errors that abound in the ages returned at the Indian Census that any lengthy description by me of the psychological factors that lie at the root of these errors would be to emphasise the obvious. A large part of the Actuarial Report in connection with the 1921 Census is devoted to a consideration of the question of errors in age.

2. Before I consider the actual nature and extent of the errors in age one special characteristic of vital importance more or less peculiar to Indian Census has to be mentioned, namely, that people have no clear notions as to the distinction between age last birthday and age next birthday and always mix up the two. This was proved beyond doubt by my predecessor by reference to the 1891 and the 1901 Censuses of the Punjab. Curiously enough, in the former of the two Censuses,

the people of that Province were asked to state their age next birthday whereas in other Provinces the age asked for was the age last birthday. In the subsequent Census, however, the age asked for in the Punjab as well as in the rest of India was age last birthday. In the former of the two Censuses, to bring the Punjab figures in conformity with the figures for the rest of India, conversion was effected from age next birthday to age last birthday by scheduling the number returned at each age opposite the next younger age.

3. A part of the full Table appearing on page 7 of Mr. Meikle's Report on the "Age Distribution and Rates of Mortality" relating to the two Censuses of the Punjab is given below.

TABLE III.

Numbers recorded at each age in 1891 and 1901 out of 100,000 persons in the Punjab.

Age.	1891.		1901.	
	Males.	Females.	Males.	Females.
27—28	1,491	1,500	801	656
28—29	348	400	1,665	1,661
29—30	5,511	6,180	373	374
30—31	219	148	5,257	6,039
31—32	1,830	1,567	200	148
32—33	465	281	1,971	1,748

It will be seen that the large number 5,511 appearing in column 1 was the total population out of 100,000 males returned at age 30 next birthday and is, therefore, scheduled opposite to age 29 last birthday. This number 29 is really a very unpopular one as is evident from the small number 373 returned at that age last birthday at the 1901 Census: Successive Censuses have revealed that numbers, relatively large as compared to the adjoining ages, have been returned at ages ending with 2 and 8.* This is evident from the comparatively large numbers entered opposite age periods 27-28 and 31-32 in the 1891 Census as these were returned for ages 28 and 32 next birthday respectively. In the subsequent Census, however, numbers more or less equally large were returned for ages 28 and 32 last birthday respectively. A study of the full Table to which reference has been made will show that this characteristic is repeated round about all ages which end in 0 or 5. It is, therefore, evident that people fixed their attention only on the number indicating the age to be returned and were not influenced in the least by the age asked for being either the age last birthday or next birthday. Mr. Meikle states that it may, therefore, be assumed that the ages returned are the nearest birthday. What, however, appears to me to be the reasonable conclusion to draw is that the numbers returned at each age would have been the same whether ages next birthday or last birthday or nearest birthday had been asked for. A confusion similar to the one between age last birthday and age next birthday in India affected also the returns as to duration of marriage asked for in the 1911 Census of the United Kingdom as was pointed out by Sir Alfred Watson in the discussion on a Paper submitted by Dr. Stevenson on the "Fertility of the various Social Classes" to the Royal Statistical Society in April 1920.

4. The change made in the 1931 Census of recording age nearest birthday instead of last birthday appears to be one in the right direction on the primary ground that the greater care and thought necessary in giving an age to the nearest birthday taking into account the number of completed months after the last integral age, are more conducive to correct ages being returned when age nearest birthday is asked for than when age last birthday or next birthday is asked for. This appears to have been the main idea at the back of the mind of the Census Joint Committee in the United Kingdom when at the Census of 1921, for the first time, ages were required to be given in years and months though the change was made not with the intention of tabulating ages in years and months.

5. Taking up now the actual errors in the statement of ages at the Census it is said that an investigation into these errors is a study in idiosyncrasy. It would, however, give some consolation if it could be proved that each succeeding Census

* Whether the two digits are really centres of attraction or repulsion is a matter that requires detailed examination and is dealt with lower in this section.

showed that idiosyncrasy was slowly yielding place to sanity. It was, however, impossible for me to make any investigation in this direction with the 1931 Census Returns as by the time Government announced their intention to have the Actuarial Report in connection with this Census written by me the only available statistics were the ternary and septenary groups into which the individual Age Returns were straightaway sorted. Whether the ternary and septenary groupings could be modified so as to secure a more accurate balance of errors in each group is a subject which I shall take up under the head of "Grouping" in this section, but I cannot help observing here at the risk of repeating it that it will be undesirable to make the Census Analysis forego the demographic and psychological study which the distribution at each age out of a representative and random sample of 100,000 persons of each sex in each Province provides.

6. The principal sources of error in Census Statistics are of two kinds, namely, (a) Minor Errors of short range, unbiased in character, and (b) Major Errors of a biassed nature and wide range that produce considerable distortion of the age curve.

7. *Minor Errors.*—The minor errors are attributable mainly to ignorance. Many people, in a country predominantly illiterate, are so indifferent as regards their age that, when questioned by the enumerator, they return round numbers which are primarily the nearest decennial ages and secondarily the nearest quinquennial ages. These errors are cyclical in character affecting ages which are multiples of 10 and 5 and recur, therefore, in cycles of ten-year age periods.

8. It has been held, by an examination of the relatively large numbers returned at ages ending in 2 and 8 as compared with the respective adjoining ages, that these digits are minor centres of attraction, meaning thereby that the numbers returned at these ages are more than the correct numbers at them. It is true that the preference for age 12 is so marked as to throw in the shade the general preference for a multiple of 5 in the age period 10-20 and 8 is very often preferred to age 5 in the period 0-10. A reference to the row "Deviation" in Tables IX, X and XI will show that, beyond the partiality above indicated, preferences for ages ending in 2 and 8 are not so very pronounced in the other sections of the decennial age periods. As a matter of fact, in most provinces, except Bengal, 8 is a centre of repulsion* to a certain extent. All the other digits are repulsed in the order 6, 4, 7, 3, 9 and 1 as is evident from the results of the three Census Returns analysed in Tables IX, X and XI above referred to. The method of construction of these Tables, the conclusions to be drawn from a study of them regarding the magnitude of the attraction or repulsion for ages ending in the several digits from 0 to 9 and the order in which the various digits have been preferred are taken up in greater detail in a few paragraphs of this section occurring later. These minor mis-statements of age are removed by a good method of graduation and disappear if the population is grouped in suitable decennial age periods.

9. *Major Errors.*—The major errors, that affect population statistics producing serious distortion of the age curve and of the rates of mortality deduced therefrom, consist primarily of the transfer of persons from one age period to another and secondarily of substantial omissions in the Census Records especially in ages of infancy and childhood.

10. If accurate records of deaths and migration are maintained according to each age it might be possible to identify the magnitude and locate the position of these major errors to a certain degree of accuracy, by comparing the number returned at any age, say, x at one Census with that returned at age $x+10$ at the next decennial Census by making suitable allowance for deaths and disturbances due to migration to which the first number had been subject in the intercensal period. It is hardly necessary to add that such an investigation is next to impossible with the present condition of death and migration records in India. These wilful mis-statements are generally due to vanity especially in the case of old persons who generally give themselves the advantage of a few more years. There might also be financial reasons for overstatement at the old ages if the laws of the country provide for an old age pension. In a certain number of cases these mis-statements are also due to resentment against the personal nature of the questions

* A digit is a centre of repulsion when the number returned as of that digit is less than the correct number at it.

and suspicion of their motives. Whatever may be the causes for these deliberate mis-statements they are ultimately traceable to ignorance; not ignorance of age itself to which the minor errors are due but to ignorance of the fact that the Census Analysis does not deal with individuals but only with groups and the individuals are merged unidentifiably in the groups dealt with.

11. At the appropriate place in this section comparisons will be effected between the extent and magnitude of the errors in age in India and those of some other countries where the level of education is decidedly higher than in India. The errors in the ages returned at the Censuses in India do not show any tendency to diminish and will not do so, so long as illiteracy permeates the population to the extent it is now doing. We cannot expect better results till education spreads and as a natural result the ignorance of the people in matters relating to the Census is substantially minimised. Talking of this ignorance Mr. G. H. Knibbs in a Paper read before the Royal Statistical Society in 1920 said:—

“It would be easy to publish primers showing the purpose of a Census or of the greater branches of Statistics. Such primers could readily be prepared so as to be supplied to primary and other schools—in such a form as to serve the purpose of a systematic and most useful instruction in Statistical Method—instruction which would be of business value. In this way a popular recognition of the utility of Statistics could readily be created and the work of securing accurate data greatly facilitated.”

12. One would entirely agree with Mr. Knibbs' view that education relating to statistical enquiries of all kinds, which, to make them serve their high purpose, should be presented in an interesting form devoid of all dull series of numerical Tables, should form a compulsory part of the education, in his boyhood, of the future citizen. This will to a large extent mend the no more than a *dilettante* interest shown even by a person of more than average education in matters relating to the Census.

On the Nature and Extent of the Errors in Age in Census Returns.

13. In his Actuarial Report in connection with the 1911 Census the late Mr. T. G. Ackland illustrated the preference for particular digits of age by the following Table:—

TABLE IV.

Showing in each of the six Provinces undermentioned the numbers out of a total of 1,000 returned in respect of each digit of age; also the mean values for the six Provinces and the order in which the several digits were recorded.

		DIGIT OF AGE RECORDED IN CENSUS									
		0	1	2	3	4	5	6	7	8	9
Numbers (per 1,000) recorded in respect of each digit of age											
Bengal	.. ..	253	43	121	56	64	187	76	57	106	37
		(1)	(9)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(10)
Bombay	.. ..	292	43	110	56	60	215	66	47	78	33
		(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)
Butma	.. ..	187	76	106	98	78	142	85	80	84	64
		(1)	(9)	(3)	(4)	(8)	(2)	(5)	(7)	(6)	(10)
Madras	.. ..	264	48	113	64	73	171	89	48	90	40
		(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)
Punjab	.. ..	279	44	110	55	67	198	78	49	84	36
		(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)
United Provinces	.. ..	294	47	113	45	65	186	83	43	91	33
		(1)	(7)	(3)	(8)	(6)	(2)	(5)	(9)	(4)	(10)
Totals	.. ..	1,569	301	673	374	407	1,099	477	324	533	243
Mean values	.. ..	262	50	112	62	68	183	79	54	89	41
Order of Record	.. ..	(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)

14. This Table was intended to show not only the magnitude of concentration at ages ending in certain favourite digits but also the order in which the digits were preferred. Mr. Ackland drew his conclusions on the assumption that had correct ages been returned the number with respect to each digit shown in the Table would have been 100 being a tenth of the total population which was reduced to 1000 for the purpose of this enquiry. In his Actuarial Report with the 1921 Census, Mr. Meikle did not publish any figures based on a similar analysis of the

1921 Census material but evidently indicated his acquiescence with the arguments and conclusions of Mr. Ackland by quoting the order of preference for each particular digit as deduced by the latter for the whole of India.

15. There is however some fallacy in this method. The count evidently commences at age 0 and a cycle is complete at age 9. At age 10 another cycle commences which is completed at age 19 and so on. Each age, therefore, ending with the digit, say, 9 is nine years lower down the scale than age 0 of the same cycle and has therefore been depleted by deaths occurring in these nine years of lifetime. Had there been no preference for particular digits of age, that is, if people had returned their correct ages, even then the total number returned at ages having 9 in the unit's place would have been considerably smaller than the number returned at ages ending in 0. There would have been a progressive and smooth diminution as we go downwards from age 0 to age 9. The method of analysis adopted at the 1911 Report does not make allowance for this progressive diminution due to mortality and therefore loads the scales against ages at the lower half of the cycle in favour of those at the upper half.

16. In illustration of the case in point, I have taken Mr. Ackland's graduation of the specimen schedule of 100,000 males of the Province of Bombay. The graduated numbers are smooth and do not exhibit any preference for any particular digit of age but only diminish smoothly from age to age due to the operation of mortality. The results are set out in the following Table :—

TABLE V.

Distribution of 100,000 Males of the Province of Bombay according to the digit of age in the unit's place.

1911 Census.

		Unit figure in age last birthday.									
		0	1	2	3	4	5	6	7	8	9
A.	..	12,225	11,400	10,845	10,382	9,987	9,638	9,318	9,017	8,732	8,458
B.	..	1.45	1.35	1.28	1.23	1.18	1.14	1.10	1.07	1.03	1.00

17. In the row A the graduated numbers are given while row B shows the ratio which the number at each digit bears to that at digit 9. The latter figures indicate that, without showing any preference for ages ending in particular digits, the total population returned at ages ending in 0 should be 45%, those at ages ending in 1, 35%, at 2, 28%, etc., in excess of those returned at ages ending in 9. Hence, before conclusions are drawn, allowance should be made for this natural excess at all other digits as compared with the number at digit 9.

18. A method that eliminates this fallacy is to obtain for each digit the ratio of the sum of the ungraduated to that of the graduated numbers at that digit and compare these ratios. It is not claimed that the graduated numbers represent absolute truth. A good method of graduation would produce figures which deviate, if at all, from the true figures within the limits of errors due to random sampling. It can, therefore, be claimed that, where the original statistics are manifestly full of errors, the graduated figures represent as near an approach to the true figures as possible; the greater the reliability of the original statistics the closer will be the graduated to the true figures.

19. The three Tables IX, X and XI appearing on pages 128-130 show for the six main Provinces of India in each of the three Censuses (1911, 1901 and 1891) the numbers returned in respect of each digit of age out of a total male population of 1,000 in each Province, the corresponding graduated numbers and the ratios of the ungraduated to the graduated total for each digit. The deviations (excess+, deficiency—) of the ungraduated from the graduated numbers are given in the next row and the row following shows the order in which the different digits have been preferred while returning ages obtained by a comparison of the ratio of the ungraduated to the graduated ages numbers. The last row gives the rank allotted to each digit by the method adopted at the 1911 Analysis by a comparison of the size of the ungraduated numbers only without making any allowance for their progressive diminution due to the operation of mortality as explained above. I could not carry this enquiry down to the 1931 Census as with that Census, with which my work is intimately connected, no returns at individual ages either of the

whole population or of samples, as I have several times said in this Report, are available, while with respect to the 1921 Census, though the numbers at individual ages of specimens are available, the graduated numbers are available only in groups.

20. It should be observed at the outset, at the risk of repeating it, that digits should be allotted their rank in the order of record only by a comparison of the ratio of the ungraduated to the graduated numbers and not by a comparison of the magnitude of the absolute numbers representing deviation. In illustration of this point, we can take the digits 1 and 9 for the United Provinces at the 1911 Census. The ratio for the former digit is .4196 and for the latter .3837 which shows that out of every 10,000 males whose ages had 1 in the unit's place only 4196 returned correct ages and the remaining 5804 other ages. As for the digit 9 the ratio shows that only 3837 out of 10,000 whose ages ended with 9 returned correct ages. It is now evident that, as between the two digits, ages ending with digit 9 were repelled by the U. P. males in 1911 more than ages ending with digit 1. If we had drawn our conclusions from the relative magnitude of the deviation for each digit we would have inferred that 9 was more popular than 1 in that Province. The deviations have their own use in giving a numerical measure of the magnitude of the error at each digit out of each sample of 1,000 of the population having the same age distribution as the total population. For instance, in such a sample of 1,000 persons in the United Provinces in 1911, as many as 112 persons would have been found at ages ending in the digit 1 of which only 47 returned correct ages and the remaining 65 returned incorrect ages. The ratio of 65 to 112 is smaller than the ratio of 53 to 86 showing that the unpopularity of 1 in U. P. at the 1911 Census was less than that of 9 though the absolute figures of deviations for these digits are 65 and 53 respectively. The "total deviation irrespective of sign" gives the total number of males out of each representative sample of 1,000 persons that returned incorrect ages.

21. It will be seen, from a scrutiny of the figures in Tables IX, X and XI, that ages ending with the digits 0, 5 and 2 proved centres of attraction. Confining first our attention to the figures relating to All-India in Table IX, it will be seen that as many as 141 per mille of the total population whose ages did not end with the digit 0 returned ages ending with that digit at the 1911 Census. This is the average figure for the whole of India and varies from a maximum of 175 in the United Provinces to a minimum of 68 in Burma. The magnitude of the plumpings at ages 0 in the other Censuses can be obtained similarly from the figures for these Censuses appearing in Tables X and XI. The next popular digit is 5 though in the age period 10-19 age 12 has a greater degree of concentration than age 15. Next in rank in the order of preference comes the digit 2, followed by 8. From an examination of the All-India ratios for these two digits in all the three Censuses, it will be seen that the numbers returned at these ages are very nearly accurate. The former is the centre of a small attraction though it has been consistently repelled by Burma, and by Madras in two out of the three Censuses analysed. The latter is, if anything, a small centre of repulsion. In the 1891 and 1901 Censuses 1 per mille and 5 per mille respectively of the total population who were of an age ending with digit 8 repelled their true ages and returned other ages. At the 1911 Census, however, 1 per mille of the total population whose age did not end with the digit 8 returned an age ending with that digit. Bengal alone, of all the Provinces, appears to have consistently shown a great partiality for these two digits. I feel it essential to emphasise the fact that the errors at ages ending in digits 2 and 8 are not very material, except at the single age 12 and the single age 8, as it appears to me that it has been assumed in the past that at ages ending in these two digits there has been a substantial overstatement of numbers.

22. The other digits are definite centres of repulsion as in every one of them the actual numbers returned are less, in some considerably less, than the expected or graduated numbers. The same fact is confirmed by the ratios applicable to these digits either for the Provinces or for the whole of India as these ratios are in every case substantially less than unity, which, by the way, would have been the value of the ratio for any digit had correct numbers been returned at that digit.

23. What might, however, prove of interest is the fact that the unpopularity of digits 6, 7, 8 and 9 appearing in the lower half of the cycle has been accentuated and that of digits 1, 3 and 4 in the upper half masked by the method of comparison

adopted at the 1911 Report which omitted to make allowance for the influence of mortality above referred to. For a similar reason the popularity of ages ending in 0 has been further magnified and that of ages ending in 5 not fully brought out by the inherent fault in the old method which compared the several digits as regards their popularity by the absolute magnitude of the crude figures returned at the Census. To take an example, it would appear, by paying attention only to the numbers returned at the Census, that in the Province of Bengal at the 1911 Census as many as 153 per mille of the total population who were not of ages ending with 0 returned such ages whereas the correct number as given by "Deviation" should be only 129. The ungraduated figure for digit 5 would indicate that the cluster round ages ending in 5 was only 87 per mille whereas the correct number is larger being 91. This method of basing conclusions from the magnitude of the crude figures only returned at the Census without allowing for the fall in numbers due to mortality from age to age did perhaps the greatest injustice to digit 5 as against digit 0 at the 1901 Census in the two Provinces of Bombay and Madras. I am not aware if it had been realised that in these two Provinces at the 1901 Census the cluster round ages ending in 5 was proportionately larger than that round ages ending in digit 0. The ratios (which alone give the correct method of assessing the popularity of different digits) relating to these digits show that in the Province of Bombay at the 1901 Census the numbers returned at ages ending in 5 were 208 per cent. of the correct number whereas for digit 0 they were only 192 per cent. The corresponding percentages for Madras were 142 and 141. Since the absolute magnitude of the numbers returned at 0 is considerably larger than that at 5 it is very likely that the fact, that at the 1901 Census in the Provinces of Bombay and Madras, ages ending in digit 5 were more popular than ages ending in digit 0, thereby reversing the usual order of preference of these two digits, was overlooked.

24. The method of comparing ungraduated Census figures has also reversed the relative positions of digits 1 and 9 and the latter has come in for a measure of unpopularity rather undeserved. It will be seen from a reference to Table IV that digit 9 has been given the last rank in the order of record for all the Provinces and naturally for the whole of India and digit 1 the next higher rank in almost all Provinces and for the whole of India, while in the United Provinces this digit was given as high a rank as the 7th. It will, however, appear from a comparison of the sizes of the ratios that at the 1911 Census in all the Provinces and in the whole of India 9 was more popular than 1 except in the United Provinces where the order was reversed. A reference to all the three Tables IX, X and XI will show that except in two instances (1901 Burma, and 1911 U. P.) digit 9 always secured the 9th rank and 1 the last, *viz.*, 10th rank, thereby proving clearly the greater popularity of ages ending in digit 9 as compared with ages ending in digit 1. The other incorrect ranks allotted by the old method are all indicated in Table IX.

25. Exigencies of space and time forbid my making any further elaboration on this subject relating to the order in which ages ending in the different digits were preferred at the three Censuses that have been analysed for this study. It is, however, necessary to state in closing this topic that the other odd numbers excluding 5 were preferred in the order 3, 7, 9 and 1 and not in the order 3, 7, 1 and 9, as made out in the older Reports. As between digits 3 and 7 it is not quite decisive which of the two is the more popular. Each is repelled practically to the same extent as is evident by the extreme closeness of the ratios relating to these two digits in all the three Censuses for the whole of India.

26. As regards how far these errors show a tendency to diminish, I fear, I am not in a position to make any statement that would show a satisfactory state of things. Information in this respect is given by the numbers called "total deviation irrespective of sign" in Tables IX, X and XI. For the whole of India about 522 per mille of the male population returned incorrect ages at the 1891 Census which happily dwindled down to 376 at the 1901 Census but at the 1911 Census the number rose again to 466. If we examine particular digits the same tendency is revealed. For instance, the concentration at age 0 at the 1891 Census was 166 per mille which diminished to 108 at the 1901 Census and again rose to 141 in 1911. It will be found that in the case of all Provinces except Burma there has been a set-back in this respect from the 1901 to the 1911 Census. It is not possible to say how far Burma has been consistent.

in the tendency for improvement it has shown, as this Province, for reasons explained by Sir George Hardy, was not included in the 1891 Actuarial Analysis. Madras which showed a very large deviation of 562 at the 1891 Census was remarkably accurate at the 1901 Census, for, at that Census only 180 per mille of the total male population gave incorrect ages. At the 1901 Census the accuracy shown by Madras was substantially superior to that of all the other Provinces including Burma. But it has since taken fast strides in the retrograde direction as will be evident from the large number, 450 per mille, that returned incorrect ages at the 1911 Census. This figure, though significantly smaller than the figures of the other Provinces excluding Burma, is almost double that of Burma and shows Madras as exactly two and a half times worse off in this respect as judged by the standard set up by Madras itself at the 1901 Census. It is not, I hope, necessary to make further comments as the figures of 'ratios', 'deviation' and 'total deviation irrespective of sign' tell their own tale. The general conclusion to be drawn from a scrutiny of these figures is that the tendency towards improvement shown by all the Provinces from 1891 to 1901 practically vanished in 1911, Burma alone being an exception. What has happened since 1911 I am not in a position to pronounce any opinion upon backed by Statistical Analysis, as, for reasons I have already explained more than once, it has not been possible for me to make any investigations in this direction with the 1921 and 1931 Census materials.

27. It has often been held, not without justification, that the magnitude of these errors is directly correlated with the percentage of illiteracy in a country. It might, therefore, be instructive to compare in this respect India with some representative countries of the world. An easy method of comparison is obtained by using the "Index of Concentration" devised by the United States Census Bureau. By this method the number of persons between 23 and 62 years whose ages are returned as multiples of 5 is compared with one-fifth of the total number between the two ages. The method is based on the justifiable assumption that had there been no concentration on multiples of 5 these two figures would be "about equal". The limits 23 and 62 were selected as they covered the period in which the concentration under investigation was most marked. The method suffers, to a certain extent, from the same disadvantage as attaches to that adopted at the 1911 Actuarial Analysis in proving the order of preference for particular digits of age. Since, however, numbers ending in 5 and 0 are symmetrically placed in each cycle that commences with 3 and ends with 2, any bias in favour of 5 introduced by the method is neutralized by the bias contrariwise against 0. Again, since the small error yet attaching to the method affects more or less equally all the countries, comparison of one country with another is not vitiated by this method. The following Table effects such a comparison in which the total for multiples of 5 is expressed as a percentage of the total for all ages from 23 to 62 and is taken from the 1921 Report for the Province of Bombay by Mr. Sedgwick. It should, however, be stated that 100 would mean no concentration at all and 500, the maximum value of the index, would mean that all ages returned between 23 and 62 were multiples of 5.

TABLE VI.

<i>Region.</i>						<i>Index of concentra- tion.</i>
Bombay—Males. Selected area 1	..	..	..	..	..	325
Bombay—Males. Selected area 2	..	..	..	..	..	314
Bulgaria	..	..	..	..	..	245
Russia	..	..	..	..	..	182
Hungary	..	..	..	..	..	133
United States	..	..	..	..	..	120
Canada	..	..	..	..	..	110
France	..	..	..	..	..	106
Germany	..	..	..	..	..	102
Sweden	..	..	..	..	..	101
England and Wales	..	..	..	..	..	100
Belgium	..	..	..	..	..	100

28. Another method of indicating the tendencies of people to concentrate at ages ending in certain digits and avoid others is to find the ratio of the total number returned at ages ending in particular digits to the corresponding graduated total which was also explained earlier in this section. The following Table, compiled by Mr. G. H. Knibbs, gives for males and females of Australia the ratio described above for the three Censuses taken in 1891, 1901 and 1911.

TABLE VII.

Ratio of number recorded to adjusted number. Censuses—1891, 1901 and 1911—Australia.

Year of Census.	Unit figure in age last birth-day.									
	0	1	2	3	4	5	6	7	8	9
	MALES.									
1891 ..	1.1388	.9167	1.0088	.9545	.9969	1.0366	1.0207	.9513	1.0055	.9532
1901 ..	1.1044	.9309	1.0072	.9677	.9809	1.0343	1.0134	.9636	1.0144	.9667
1911 ..	1.0485	.9956	.9944	.9787	.9990	1.0085	1.0097	.9691	1.0191	.9695
	FEMALES.									
1891 ..	1.1251	.9288	.9978	.9848	.9943	1.0077	1.0117	.9640	1.0125	.9558
1901 ..	1.0926	.9270	1.0039	.9861	.9979	1.0106	1.0128	.9708	1.0165	.9738
1911 ..	1.0367	.9895	.9935	.9895	1.0056	1.0050	1.0066	.9770	1.0148	.9760

A Table similar to the above, with respect to the male population only of the whole of India for the same three Censuses, is given below :—

TABLE VIII.

Ratio of number recorded to adjusted number. Censuses—1891, 1901, and 1911—All-India—Males.

Year of Census.	Unit figure in age last birthday.									
	0	1	2	3	4	5	6	7	8	9
1891 ..	2.3719	.3596	1.0556	.5481	.6800	1.9175	.8065	.6444	.9773	.4471
1901 ..	1.8925	.5575	1.0556	.6923	.7600	1.7708	.8298	.7143	.9432	.5882
1911 ..	2.1652	.4425	1.0370	.5962	.6800	1.8865	.8404	.6000	1.0114	.4824

29. It need hardly be stated that unity for any digit would mean that ages ending in that digit have been correctly returned. A cursory scrutiny of the above Tables will make it evident how very slight the bunchings are in Australia at ages ending in 0 and 5 as compared with the pronounced cluster round these ages in India. The same characteristic might also be noted at ages which are centres of repulsion. The chief reason why these Tables are given here is to show that, whereas in Australia there is a pronounced tendency for the ratios relating to each digit to approach unity, that is, for the errors in age, already very small, to show a definite tendency towards diminution, no such tendency is exhibited by the figures relating to India. I have only to repeat what I have already observed that though 1901 Census figures showed some improvement on those of 1891, the figures relating to the 1911 Census indicated a definite move in the retrograde direction as is also evident from Table VIII.

Grouping.

30. Germane to the subject of errors in age is that of the groupings to be adopted to minimise the effect of the accidental errors that affect Age Returns. This is, however, a topic on which opinion is divided and whether one particular method or another is to be preferred will depend on the certainty with which it will be possible to say how far the statistics collected are afflicted with errors of overstatement or understatement and whether the range of these errors is short or long. The central idea underlying all methods of grouping is that groups should be formed as far as possible containing the popular age along with the adjoining ages from which the former has drawn numbers so that, though returns at individual ages may be incorrect, the total of the group may be considered reasonably correct and the group totals are used as the basic data for any subsequent investigations. The most satisfactory grouping is that which makes the deviations between the total in each group and the ideal total in that group that would have been evident had correct

ages been returned a minimum. We are then faced with the problem of giving due weight to the rival claims of two considerations each acting contrary to the other. With the view to minimise the errors left over in them it is desirable to form large groups; on the other hand, large groups may have the effect of obscuring peculiar conditions prevailing in the decennium affecting only short range or ranges in the age curve.

31. Had the plumpings been confined only to ages ending in 0, groups 5-14, 15-24, etc., would deal effectively with such errors on the assumption that the concentration at ages ending in 0 is only drawn from the adjoining four or five ages on either side. The records of deaths of England and Wales were presented in this form for many years. Since, however, ages ending in 5 are also secondary centres of disturbance, the decennial groups above referred to will have to be abandoned in favour of quinquennial groups. Had there been concentrations of equal intensity at ages 0 and 5, groups 3-7, 8-12, etc., wherein the digit of concentration occupies the central position in each group would have been satisfactory. Indian Census Returns have, however, indicated concentration of greater intensity at all decennial ages than at quinquennial ones. This is the main point of criticism against this method added to which is the fact that ages ending in 2 which are also favoured to a certain extent occur at the end of alternate groups. In what follows this will be referred to as the 3-7 group. Had the concentrations at the two favourite digits been due to systematic over-statements of ages only, groups 1-5, 6-10, etc., would have eliminated them. Similarly groups 0-4, 5-9, etc., would have satisfactorily dealt with understatements. Except, however, at particular short periods of life there is no reason why systematic over-statement or under-statement alone should affect the Age Returns. The former method (0-4 group) had been adopted in the past as the standard one for grouping and presenting Census figures. This was condemned by my predecessor, Mr. Meikle, as the least accurate of all the methods of grouping and I find myself in entire agreement with his condemnation of the method as I shall show lower down in the course of this enquiry. I should also make special mention here of the great service rendered by Mr. Meikle to the cause of Indian Census by focusing attention on this important subject of grouping. The recommendations made by him, though in my opinion could be improved upon, were decidedly in the nature of improvements on the old methods. There are two more groupings, namely, 2-6, 7-11, etc., and 4-8, 9-13, etc. Five different methods of grouping have altogether been mentioned respectively designated as 0-4, 1-5, 2-6, 3-7 and 4-8 groups. We can also call 0-4 grouping as the 1st place method designating the method of grouping by the position of the most popular age of the group relative to it. For a similar reason 4-8 group will be called 2nd place method and 3-7, 2-6 and 1-5 will respectively be called 3rd, 4th and 5th place methods. Each of these methods of grouping could be associated with either age last birthday, next birthday or nearest birthday thereby giving rise to 15 different methods. In India, however, since people do not make any distinction in returning ages between age last birthday, next birthday or nearest birthday, there are only five different methods to be taken into account.

32. For adoption in connection with the 1931 Census Mr. Meikle recommended a method of grouping in alternate ternary and septenary groups 4-6, 7-13, etc., to be used in conjunction with the age nearest birthday. This method of grouping, according to my analysis, is a decided improvement on the old 0-4 method. There is, however, an inherent defect in the method in so far as it exaggerates bunchings in ages which are multiples of 10 and does not give full weight to those at ages which are multiples of 5. Ages of the former type occupy the central place amongst seven ages while those of the latter type occupy the central place amongst three ages only. It will, therefore, be evident that this method of grouping is based on the assumption that the concentration at ages ending in 0 is very nearly three times that at ages ending in 5. By reference to the ratios in Tables IX, X and XI it will be seen this is by no means the case. It was also pointed out earlier in this section that in two instances (Bombay and Madras, 1901) the actual proportion of concentration at ages ending in 5 was in excess of that at ages ending in 0.

33. It will, therefore, be desirable to slightly diminish the number of ages grouped along with an age ending in 0 and increase correspondingly the number grouped along with an age ending in 5. Since there is markedly greater concentration about ages ending in 0 than about 5, the number of ages in the former group should be larger than at the latter very nearly in proportion to the relative concentrations. I have, therefore, considered the claim for recognition of the following quaternary

and senary groupings in conjunction with age last birthday at the date of Census. A quaternary group is formed about an age ending in 5 which is placed centrally with an age and a half on either side of it. A senary group is formed about an age ending in 0 placed centrally with $2\frac{1}{2}$ ages on either side of it. The earliest quaternary group comprises all persons whose ages are 3, 4, 5 and 6 last birthday. The next higher quaternary group is composed of persons of ages 13, 14, 15 and 16 last birthday and so on. The earliest senary group is formed of persons of ages from 7 to 12 last birthday, the next higher from 17 to 22 and so on. It would appear that these groups could easily be formed if the age asked for at the Census is last birthday. It will, however, be desirable not to sacrifice the greater accuracy secured, if any, in the ages returned by asking for the nearest age, the suggested quaternary and senary method of grouping will only necessitate dividing into two equal halves the numbers returned at all ages ending in 3 and 7. One half of the number at an age ending in 3 will be taken with the upper senary group and the other half with the lower quaternary group. Similarly half of the number returned at an age ending in 7 will be taken with the upper quaternary group and the other half with the lower senary group.

34. We have now to consider the relative accuracy of seven different methods of grouping which are described as follows :—

- (1) 0-4 group called also 1st place method.
- (2) 4-8 group called also 2nd place method.
- (3) 3-7 group called also 3rd place method.
- (4) 2-6 group called also 4th place method.
- (5) 1-5 group called also 5th place method.
- (6) The Ternary and Septenary method.
- (7) The Quaternary and Senary method.

TABLE IX.
1911 Males.

Provinces.	Unit figure in age last birthday.											
	0	1	2	3	4	5	6	7	8	9		
Bengal.	Ungraduated	253	43	121	56	64	187	76	57	106	37	
	Graduated	124	115	109	104	100	96	93	89	86	84	
	Ratio	2.0403	.3739	1.1101	.5385	.6400	1.9479	.9172	.6405	1.2326	.4440	
	Deviation	+129	-72	+12	-48	-36	+91	-17	-32	+20	-47	
	Order of record	(1)	(10)	(4)	(8)	(7)	(2)	(5)	(6)	(3)	(9)	
	Ackland's order of record	(1)	(9)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(10)	
	Total deviation irrespective of sign	504										
Bombay.	Ungraduated	292	43	110	56	60	215	66	47	78	33	
	Graduated	122	114	109	104	100	96	93	90	87	85	
	Ratio	2.3934	.3772	1.0092	.5385	.6000	2.2396	.7097	.5222	.8966	.3882	
	Deviation	+170	-71	+1	-48	-40	+119	-27	-43	-9	-52	
	Order of record	(1)	(10)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(9)	
	Ackland's order of record	(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)	
	Total deviation irrespective of sign	580										
Barma.	Ungraduated	187	76	106	98	78	142	85	80	84	64	
	Graduated	119	113	108	104	100	97	94	91	88	86	
	Ratio	1.5714	.6725	.9815	.9423	.7800	1.4639	.9043	.8791	.9545	.7442	
	Deviation	+68	-37	-2	-6	-22	+45	-9	-11	-4	-22	
	Order of record	(1)	(10)	(3)	(5)	(8)	(2)	(6)	(7)	(4)	(9)	
	Ackland's order of record	(1)	(9)	(3)	(4)	(8)	(2)	(5)	(7)	(6)	(10)	
	Total deviation irrespective of sign	226										

Provinces.		Unit figure in age last birthday.										
		0	1	2	3	4	5	6	7	8	9	
Madras.	Ungraduated	264	48	113	64	73	171	89	48	90	40	
	Graduated	120	112	108	104	100	97	94	91	88	86	
	Ratio	2.2000	.4285	1.0463	.6154	.7300	1.7629	.9468	.5276	1.0227	.4651	
	Deviation	+144	-64	+5	-40	-27	+74	-5	-43	+2	-48	
	Order of record	(1)	(10)	(3)	(7)	(8)	(2)	(5)	(8)	(4)	(9)	
	Ackland's order of record	(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)	
Total deviation irrespective of sign 450												
Punjab.	Ungraduated	279	44	110	55	67	108	78	49	84	36	
	Graduated	120	113	108	104	100	97	94	91	88	85	
	Ratio	2.3250	.3894	1.0185	.5288	.6700	2.0412	.8298	.5385	.9545	.4276	
	Deviation	+159	-69	+2	-49	-33	+101	-16	-42	-4	-49	
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)	
	Ackland's order of record..	(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(10)	
Total deviation irrespective of sign 524												
United Provinces.	Ungraduated	294	47	113	45	65	186	83	49	91	33	
	Graduated	119	112	108	104	100	97	94	91	89	86	
	Ratio	2.4706	.4198	1.0463	.4327	.6500	1.9175	.8830	.4726	1.0225	.3837	
	Deviation	+175	-65	+5	-59	-35	+89	-11	-48	+2	-53	
	Order of record	(1)	(9)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(10)	
	Ackland's order of record	(1)	(7)	(3)	(8)	(6)	(2)	(5)	(9)	(4)	(10)	
Total deviation irrespective of sign 542												
All-India.	Ungraduated	262	50	112	62	68	183	79	54	89	10	
	Graduated	121	113	108	104	100	97	94	90	88	85	
	Ratio	2.1652	.4425	1.0370	.5962	.6800	1.8865	.8404	.6000	1.0114	.4824	
	Average deviation	+141	-63	+4	-42	-32	+86	-14	-36	+1	-45	
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)	
	Ackland's order of record	(1)	(9)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(1)	
Total deviation irrespective of sign 466												

TABLE X.
1901 Males.

Bengal.	Ungraduated	234	47	135	57	74	169	82	60	98	44
	Graduated	123	114	109	104	100	96	93	90	87	84
	Ratio	1.9024	.4123	1.2385	.5481	.7400	1.7604	.8817	.6667	1.1264	.5238
	Deviation	+111	-67	+26	-47	-28	+73	-11	-30	+11	-40
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)
	Total deviation irrespective of sign 442										
Bombay.	Ungraduated	235	57	119	63	68	200	68	59	81	50
	Graduated	122	114	108	104	100	96	93	90	88	85
	Ratio	1.9262	.5000	1.1018	.6058	.6800	2.0833	.7312	.6556	.9205	.5882
	Deviation	+113	-57	+11	-41	-32	+104	-25	-31	-7	-35
	Order of record	(2)	(10)	(3)	(8)	(6)	(1)	(5)	(7)	(4)	(9)
	Total deviation irrespective of sign 456										
Burma.	Ungraduated	199	74	96	99	78	155	81	86	77	55
	Graduated	119	113	108	104	100	97	94	91	88	86
	Ratio	1.6723	.6549	.8889	.9519	.7800	1.5979	.8617	.9451	.8750	.6396
	Deviation	+80	-39	-12	-5	-22	+58	-13	-5	-11	-31
	Order of record	(1)	(9)	(5)	(3)	(8)	(2)	(7)	(4)	(6)	(10)
	Total deviation irrespective of sign 276										
Madras.	Ungraduated	169	104	100	93	90	138	81	77	76	72
	Graduated	120	113	108	104	100	97	94	91	88	85
	Ratio	1.4083	.9204	.9259	.8942	.9000	1.4227	.8617	.8469	.8636	.8471
	Deviation	+49	-9	-8	-11	-10	+41	-13	-14	-12	-13
	Order of record	(2)	(4)	(3)	(6)	(5)	(1)	(8)	(10)	(7)	(9)
	Total deviation irrespective of sign 180										

Provinces.		Unit figure in age last birthday.										
		0	1	2	3	4	5	6	7	8	9	
Punjab.	Ungraduated	274	40	119	57	67	198	74	49	86	38	
	Graduated	122	114	108	104	100	98	93	90	88	85	
	Ratio	2.2459	.3509	1.1018	.5481	.6700	2.0625	.7957	.5444	.9773	.4235	
	Deviation	+152	-74	+11	-47	-33	+102	-19	-41	-2	-49	
	Order of record	(1)	(10)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(9)	
	Total deviation irrespective of sign	530										
United Provinces.	Ungraduated	262	58	113	65	78	162	80	56	81	45	
	Graduated	119	112	107	104	100	97	94	92	89	86	
	Ratio	2.2016	.5179	1.0561	.6250	.7800	1.6701	.8511	.6087	.9101	.5233	
	Deviation	+143	-54	+6	-39	-22	+65	-14	-36	-8	-41	
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)	
	Total deviation irrespective of sign	428										
All-India.	Ungraduated	229	63	114	72	76	170	78	65	83	50	
	Graduated	121	113	108	104	100	96	94	91	88	85	
	Ratio	1.8925	.5575	1.0556	.6923	.7600	1.7708	.8298	.7143	.9432	.5882	
	Average deviation	+108	-50	+6	-32	-24	+74	-16	-26	-5	-35	
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)	
	Total deviation irrespective of sign	376										

TABLE XI.
1891 Males.

Bengal.	Ungraduated	249	49	122	61	70	170	79	61	94	45
	Graduated	122	114	108	104	100	97	93	90	87	85
	Ratio	2.0410	.4298	1.1296	.5865	.7000	1.7526	.8495	.6778	1.0804	.5294
	Deviation	+127	-65	+14	-43	-30	+73	-14	-29	+7	-40
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)
	Total deviation irrespective of sign	442									
Bombay.	Ungraduated	288	37	116	51	66	213	67	44	78	40
	Graduated	122	114	108	104	100	97	93	90	87	85
	Ratio	2.3808	.3246	1.0741	.4904	.6600	2.1059	.7204	.4889	.8906	.4708
	Deviation	+166	-77	+8	-53	-34	+116	-26	-46	-9	-45
	Order of record	(1)	(10)	(3)	(7)	(6)	(2)	(5)	(8)	(4)	(9)
	Total deviation irrespective of sign	580									
Burma	.. ..	*	..	..	..	..	..	..	..	..	..
Madras.	Ungraduated	310	33	102	59	68	185	77	44	92	30
	Graduated	121	113	108	104	100	97	93	91	88	85
	Ratio	2.5620	.2920	.9444	.5673	.6800	1.9072	.8280	.4835	1.0456	.3529
	Deviation	+189	-80	-6	-45	-32	+88	-16	-47	+4	-55
	Order of record	(1)	(10)	(4)	(7)	(6)	(2)	(5)	(8)	(3)	(9)
	Total deviation irrespective of sign	562									
Punjab	.. ..	†	..	..	..	..	..	..	..	..	..
United Provinces.	Ungraduated	301	45	114	56	67	177	78	47	80	35
	Graduated	120	113	108	104	100	97	94	91	88	85
	Ratio	2.5083	.3092	1.0555	.5384	.6700	1.8247	.8298	.5165	.9001	.4118
	Deviation	+181	-68	+6	-48	-33	+80	-16	-44	-8	-50
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)
	Total deviation irrespective of sign	534									
All-India.	Ungraduated	287	41	114	57	68	186	75	49	86	38
	Graduated	121	114	108	104	100	97	93	90	88	85
	Ratio	2.3719	.3596	1.0556	.5481	.6800	1.9175	.8065	.5444	.9773	.4471
	Average deviation	+166	-73	+6	-47	-32	+89	-18	-42	-1	-48
	Order of record	(1)	(10)	(3)	(8)	(6)	(2)	(5)	(7)	(4)	(9)
	Total deviation irrespective of sign	522									

* For reasons explained by him Sir George Hardy did not make any investigation with the Burma figures.

† It was not possible to include the Punjab in the 1891 Analysis as the ages next birthday were tabulated for that Province at that Census.

35. It will be desirable here to say a few words about the two criteria by which the suitability of any method of grouping is generally tested. The first criterion is what is called "goodness of fit". According to this criterion that method of grouping is the best which yields values at individual ages which deviate the least in the aggregate from the originally observed values. The second criterion relates to "smoothness" and helps to single out that method of grouping as the best which makes the values progress smoothly from one group to another.

36. Each of the first five methods of grouping was the subject of more than one severe test in the past with the view to find out which of them gave the most satisfactory result. In that gigantic work in connection with the preparation of Life Tables for the United States of America for 1890, 1901, 1910 and 1901-1910, Mr. James W. Glover, Professor of Insurance in the University of Michigan, conducted elaborate investigations with the statistics relating to the male population in the State of New York estimated as of July 1910 and the deaths of the three-year period 1909-1911.

37. In testing "goodness of fit" his first method was to obtain the rates of mortality for all ages from 15 to 85 by a method of osculatory interpolation when the population and the deaths were combined according to each of the five quinquennial age groups. These rates were compared with the rates of mortality obtained from the average of these five sets of graduated populations and statistics of deaths. The smallness of the deviations and the frequency with which these deviations changed sign were made the criterion by which to judge which method of grouping gave the most satisfactory result. By his second method he obtained the deviations of the expected from the actual deaths for each of the five methods of grouping. His third criterion was to consider that method of grouping the best which made the weighted squared deviations of the graduated values from the observed values a minimum. Each of the three methods detailed above can only be of theoretical interest to us in India so long as the records of Vital Statistics are in the present state of unreliability.

38. Instead of comparing the rates of mortality as deduced by every one of the methods of quinquennial grouping with the average for all groupings or with the observed rates of mortality as Professor Glover did because the data supplied to him comprised *inter alia* dependable statistics of deaths, I had, in the absence of this desideratum, no other option but to compare the actual numbers in each group for each method with the corresponding expected (or what is the same thing graduated) number. Whatever may be the actual groups in which the original statistics are collected they have to be finally transformed to the 0-4 groups (1st place method). This is more or less essential as the Age Statistics of most other countries and of India itself have all been published in this form and if any other method of grouping be adopted for the final presentation of population figures, comparisons with other countries and with past Censuses of India itself, which are always of very great value in Census study, would be practically impossible. The three Tables XV, XVI and XVII appearing at the end of this section show for the All-India Males in each of the three Censuses, 1891, 1901 and 1911, the deviations between the actual numbers returned at the Censuses and the graduated numbers in 5-9, 10-14, etc., groups for all the methods of grouping. It will be seen that, according to all the other methods except the first, the original statistics are not collected in 0-4 groups (*i.e.*, according to the 1st place method). All the other six methods were transformed from their respective groups to the 0-4, etc., groups which, as observed above, is desirable with the view to effect useful comparisons with other Census Statistics.

39. A word of explanation as to how this transformation from the original grouping to the 0-4 grouping should be effected may be necessary. Taking for instance the 2nd place method, the group, say, 4-8 should part with a fifth of the total ungraduated number in that group to the previous group and obtain a fifth of the total ungraduated number from the following, namely, 9-13 group. The result can very nearly be taken to be the 5-9 group and so on for transforming other groups. Similarly the 3rd place method of grouping should cede the population relating to ages ending in 3 and 4 to the preceding group and obtain the population relating to ages ending in 8 and 9 from the succeeding group. Each group should therefore cede two-fifths of its number to the preceding group and

obtain two-fifths of the number in the succeeding group. The adjustments to be made to the 4th and 5th place methods of grouping to transform them to the 1st place method should now be evident.

40. The assumption is made in this process of transforming one group into another that the numbers in all the ages in a quinquennial group are equal and no allowance is made for the progressive diminution of the population from age to age in that group. I have, however, satisfied myself that except at the ages of infancy and childhood and at the extreme old ages (say, above 70) the resulting error is of small magnitude. At the early ages, however, statistics of population should be tabulated according to single age periods and at the very old ages the statistics are usually combined into a single group, say, 70 and over. It will, therefore, be evident that at those age periods where the grouping device is adopted to minimise the effects of minor mis-statements of age the error introduced by the above assumption is of no great moment. The ternary-septenary and the quaternary-senary methods of grouping are transformed easily into 0-4, etc., groups by the dichotomous process explained by Mr. Meikle with respect to the former method of grouping which he advocated. By this method groups are formed by taking the sum of one-half of any two consecutive groups and the resulting new groups are of the 0-4, 5-9, etc., type.

41. The smallness of the number called "total deviation without sign" is the basis by which to judge each of the seven methods for the first criterion, namely, "goodness of fit".* This number shows the sum of the deviations (whether in excess or in defect) of the recorded numbers from the graduated numbers when the former in each of the six methods of grouping (except of course the first which is in the required form) are finally transformed into 0-4, 5-9, etc., groups by processes of which full explanation was given above. The algebraic sum of the deviations does not provide the criterion by which to judge the methods, as two deviations, one very large and positive and another negative and equal or very nearly equal, would produce a small algebraic sum of the deviations in spite of the large error of the observed number in each case from the ideal number. Judged by the criterion of the smallness of the "total deviation without sign" it will be evident that the 4th place method (2-6, 7-11, etc., groups) is foremost in rank of all the seven methods considered. The sum of the deviations irrespective of sign is the smallest for this method in each of the three Censuses considered. Second in rank as regards accuracy is the "Quaternary and Senary" method explained in detail earlier in this section though the "Ternary and Septenary" method shows itself as slightly superior at the 1891 Census, but this is more than compensated for by the very large differences in the other two Censuses in favour of the former method. It will be of interest to note that the 1st place method (0-4, etc., groups) shows the largest deviation of all the seven methods in all the three Censuses. This is the method of grouping of the population that had been adopted in the past and Mr. Meikle was quite justified in condemning this method as the least accurate of all the methods of grouping population statistics in India.

42. I felt it might be of interest to ascertain which of the seven methods gave the least deviation between graduated and ungraduated numbers in their original groups themselves before the transformation into 0-4, etc., groups was effected. The results are set out in the following Table:—

TABLE XII.
All-India—Males.

Year of Census.	Total deviation without sign.						
	1st place method. '0-4.'	2nd place method. '4-8.'	3rd place method. '3-7.'	4th place method. '2-6.'	5th place method. '1-5.'	Ternary and Septenary method.	Quaternary and Senary method.
1891	49,062	51,348	67,473	43,373	50,470	30,227	46,083
1901	66,580	61,227	81,085	51,174	55,564	59,563	52,122
1911	58,531	57,874	73,915	47,487	62,561	52,148	52,798

43. It will be seen from an examination of the figures of deviations in the above Table that '2-6' method shows the least deviation between ungraduated and graduated numbers before the original groups in which the population statistics are

* This test is usually adopted to judge the closeness of fit of the graduated numbers to the observed ones. Here, however, it has to be used contrariwise.

summed are altered to produce the '0-4' groups. In one instance (1891) when the errors in age were very large in magnitude, the Ternary and Septenary method shows a deviation smaller than the '2-6' method. But this is more than compensated for by the large difference between the deviations of the two methods in favour of the '2-6' method at the other two Censuses. The deviations appearing in the above Table do not provide a very important criterion by which to judge the methods as ultimately all the six methods (except the first) are altered to the groupings of the first one.

44. As for the second criterion, namely, "smoothness" by which to judge the methods of grouping, it is satisfactory to be able to say that I have been able to adopt the same method of analysis as was adopted by Professor Glover with the population statistics relating to the United States of America above referred to. The smoothness of a series of values grouped in five ages is tested by the regularity of progression of the ratio $\frac{G_x}{G_{x-5} + G_{x+5}}$ where G_x is the total for ages from x to $x+4$ inclusive. Such ratios were formed from '0-4' groups for each of the seven methods of grouping considered. As when testing the methods for "goodness of fit", the groupings in such of them, six in number, as were not originally in the '0-4' groups were transformed to these groups. Where the earliest age in a quinquennial group in the numerator of the above ratio is a multiple of 10 the ratio is called ${}_6M_x$ and where the earliest age is a multiple of 5 it is called ${}_5M_x$. For instance, the ratio $\frac{G_{20}}{G_{15} + G_{25}}$ is called ${}_6M_{20}$ and the ratio $\frac{G_{25}}{G_{20} + G_{30}}$ is called ${}_5M_{25}$. The three Tables XVIII, XIX and XX give the values of ${}_6M_x$ and ${}_5M_x$ for each of the seven methods of grouping in each of the three Censuses 1891, 1901 and 1911. The average values of ${}_6M_x$ and ${}_5M_x$ and the difference between the average values of these quantities are given below each method of grouping. To make it easy to understand that the method which gives smooth progression of the grouped values is that for which the difference between the average value of ${}_6M_x$ and ${}_5M_x$ is a minimum, the values of ${}_6M_x$ and ${}_5M_x$ for the graduated population in each Census are also given. The graduated numbers of the population progress smoothly from age to age and therefore the quinquennial groups formed from them should also progress smoothly. That they do so is demonstrated by the extremely small magnitude of the difference between the average value of ${}_6M_x$ and ${}_5M_x$ for the graduated population in each of the three Censuses considered. The seven methods of grouping population statistics under consideration are arranged in each Table according to the smoothness of progression of the grouped values judged by the criterion of the smallness of the difference between the average value of ${}_6M_x$ and ${}_5M_x$.

45. The first rank of the '2-6' method amongst all the seven methods considered will be evident. The "Quaternary and Senary" method secures the second rank and the "Ternary and Septenary" method the third. It is not by a narrow margin that the '2-6' method secures the first rank. Even at the 1911 Census where the "Quaternary and Senary" method which is always second in rank makes the closest approach to the '2-6' method, the difference between the average ${}_6M_x$ and ${}_5M_x$ according to the former is more than 50 per cent. larger than the corresponding difference of the latter. What may be of interest is that the '0-4' method (the method of grouping population statistics adopted so far) in addition to occupying uniformly the last rank in all the three Censuses shows at each Census a figure of difference several times larger than that of the '2-6' method and in the 1901 Census it was very nearly 20 times as large. The method, therefore, so far adopted in grouping population statistics has been the least accurate of all the methods considered from every point of view.

46. As a result of his analysis, Prof. Glover rejected the '0-4' and '1-5' methods as unsuitable and was not able to pronounce as decisive an opinion in favour of one of the other three methods, '2-6', '3-7' and '4-8', as it has been possible to do with the analysis on Indian Age Returns for the main reason that the mis-statements of age in the American Census Returns are not so pronounced as in the case of the Indian Returns. He ultimately decided in favour of the '4-8' method and his arguments for so doing may be quoted in his own words. "However, the decision as to groups '2-6', '3-7' and '4-8' still remains a problem. As between these three groups it will be observed that groups '2-6' and '3-7'

contain both the ages ending in the digits 0 and 8 in the same quinquennial age group while the adjacent five-year groups contain the ages ending in the digit 5. This tends to exaggerate unduly alternate quinquennial age groups in these sets. With the group '4-8', however, the ages ending in the digits 5 and 8 are in the same quinquennial group and the ages ending in the digit 0 are in the adjacent five-year groups. Since the exaggeration for ages which are multiples of 10 is undoubtedly greater than for ages which end in the digit 5, the group '4-8' would seem to furnish a better balanced grouping than the group '2-6' or '3-7'."

47. It will be evident from Prof. Glover's arguments that the chief reason why he decided in favour of the '4-8' grouping is the fact that in U. S. A. Age Returns ages ending in digit 8 formed definite centres of attraction next in popularity after the two digits 0 and 5. To secure, therefore, a better balance of the errors between two consecutive quinquennial groups he decided to keep the most favoured digit 0 in one group and the next two favoured digits 5 and 8 together in the adjacent quinquennial group. The late Mr. George King who analysed the population of England and Wales with the 1911 Census also pronounced in favour of the '4-8' method as his analysis also revealed that ages ending in digit 8 were nearly as favoured as ages ending in 5 which is shown by the following Table:—

TABLE XIII.

<i>England and Wales, Males—1911. Ages 10—89.</i>										
Digit of age.	0	1	2	3	4	5	6	7	8	9
Ratio of recorded to graduated number on basis of 100,000 graduated at each age ..	1.0887	.9230	1.0094	.9687	.9941	1.0031	1.0016	.9661	1.0320	.9991
Ratio to digit 9 as shown by Mr. King ..	1.090	.924	1.010	.970	.995	1.004	1.003	.967	1.033	1.000

48. The results of three Australian Censuses appearing in Table VII also indicate concentration at ages ending in 8 of an intensity next only to ages 0 and 5.

49. Apart from the fact that the results of the analysis to which the three Censuses have been subjected have indicated the decided superiority of the '2-6' method of grouping over all the other methods taken in the comparison, we could have, on precisely the same arguments as induced Messrs. Glover and King to decide in favour of the '4-8' method, pronounced in favour of the '2-6' method. Their chief argument was that the second and third favoured digits, 5 and 8, should appear in one quinquennial group to balance the pronounced concentration at digit 0 which is the first favourite. Tables IX, X and XI appearing in this section have clearly indicated that in India digit 2 is the third favourite after 0 and 5 and not digit 8.

50. We should, therefore, include digits 2 and 5 in the same quinquennial group. The '2-6' and the '1-5' methods are the only two that satisfy this condition but the latter having an age of pronounced concentration at the end of a group can be *prima facie* rejected as unsuitable, leaving the choice only on the '2-6' method.

51. We are now in a position to see why the '2-6' method gives results, judged by any criterion, markedly superior to all the other methods. Any two consecutive groups of this method are formed from the two sets of digits, 2, 3, 4, 5, 6 and 7, 8, 9, 0, 1. It was shown earlier in this section that as between the two digits 3 and 7 it was not quite decisive which was repelled the more. These two digits appearing one along with digit 5 in one group and the other along with digit 0 in the other introduce, in so far as they are concerned, balancing errors in two adjacent groups. The marked concentration at digit 0 as compared with digit 5 should then be neutralized by combining with the former digits relatively unpopular as compared with those combining with the latter. The '2-6' method of grouping is able to effect this as digits 1 and 9 which are the least liked of the ten digits are grouped along with 0 as against 4 and 6 grouped with 5. The combination of 2 with the 5 group and that of 8 with the 0 group serve as the final correcting factor in this respect.

Recommendations for adoption at the 1941 Census.

52. (a) *Grouping*.—They say that figures speak more emphatically and convincingly than words and if that is so, it can be claimed that the unique position of the '2-6' method of grouping amongst all the seven methods considered, in minimising the effects of mis-statements of age in population statistics, has been established beyond any pale of doubt. I, therefore, very strongly recommend its being adopted at the 1941 Census.

53. (b) *Age*.—The method of grouping recommended is particularly easy to adopt if age last birthday is asked for at the Census. The change made in the 1931 Census of asking people to return their age on nearest birthday, though theoretically expected to diminish significantly the errors in the ages returned, does not appear to have had the desired effect. This is evident from the distribution according to each age at the 1931 Census of a sample of 100,000 persons of each sex of the Presidency of Madras and the Punjab which alone were forwarded to me as the available statistics showing the distribution of any sample at individual ages. Amongst the larger Indian States the Census Commissioner for Baroda has given age distribution of the population at individual ages. These samples indicate the same degree of concentration, as in the earlier Censuses, at the usual favourite digits. Had the change made in this respect at the 1931 Census any effect at all, the concentration at ages ending in 0 should have been more or less equally divided between ages ending in 0 and 1, for, if a person returns his or her completed age as a favourite figure, say, 30, it is as likely that the person has passed more than six months since completing age 30 as less than six months. If, therefore, all those persons, who usually give ages clustering round numbers ending in digits 0 and 5 when age last birthday is asked for, were to give a moment's thought to the change in the age to be returned because what is asked for is no longer age last birthday but nearest birthday, very nearly one half of them would have returned nearest ages ending in 0 and the other half those ending in 1. This would have had the effect of very nearly levelling up the concentration at digits ending in 0 by dividing it more or less equally between ages ending in 0 and 1. For a similar reason the concentration at ages ending in 5 should have been more or less equally divided between ages ending in 5 and 6. The statistics to which reference has been made do not exhibit any such tendency as the following Table for Madras clearly indicates thereby confirming the statement made at an earlier part of this section that people were not in the least influenced by the age asked for being last birthday, nearest birthday or next birthday.

TABLE XIV.
Madras—Males.

Numbers returned at each digit of age out of a total population of 1000.

Date of Census.	Digit of age.									
	0	1	2	3	4	5	6	7	8	9
1891	310	33	102	59	68	185	77	44	92	30
1901	169	104	100	93	90	138	81	77	76	72
1911	264	48	113	64	73	171	89	48	90	40
1931	253	53	108	64	62	208	68	52	95	37

The large deficiencies noticed in ages ending in 1 and 6 do not show any tendency to close up as a result of the change made in the 1931 Census in recording the age. On the other hand, the deficiency at 6 has been the largest at 1931 of all the four Censuses.

54. It has been observed in other countries that the form of the age enquiry has an appreciable influence on the accuracy of the Age Returns. Dr. A. A. Young, in his Report on ages at the 12th U. S. A. Census, applied a test to the data of several countries some of which obtained ages in years, others in years and months and a third set actually called for the date of birth. He concluded, as a result of his test, that the statistics were most dependable when the date of birth was called for.

55. To call for the date of birth will be an impossibility for several decades in the Census history of India. At the same time, while returning ages to the enumerator, people's minds should be set about thinking for a while instead of

returning any age at random. I should, therefore, recommend ages being called for in completed number of years and months. The enumerator should write in his form the number of completed years and months. While grouping, however, according to the '2-6' plan recommended, the months should be ignored. We shall thereby get the age last birthday which is best suited to the method of grouping recommended without in any way sacrificing the accuracy, if any, that might accrue to the Age Statistics by calling for something more than mere age last birthday. In those cases where the number of months passed since the last birthday cannot be obtained it is immaterial as the grouping is according to the completed number of years (that is, age last birthday) only. I do not make myself bold to say that the suggested method of asking for age last birthday and the number of months completed since last birthday will have any metamorphic effect at the 1941 Census. It might, however, have some effect of slowly curing the Age Returns of its ills as decades pass on, as otherwise, with the existing system of calling only for ages whether last birthday, next birthday or nearest birthday, the malady shows no signs of coming under control. If, however, it is considered too early in the Census history of India to burden the schedule with ages and months (though the latter are to be ignored in the grouping) the age last birthday with the suggested '2-6' method of grouping could be depended upon to give the best results of all the other methods of grouping.

56. In adopting the '2-6' method of grouping, returns for ages 0, 1, 2, etc., up to 6 last birthday should be scheduled separately and groups should be formed of ages 7-11, 12-16, 17-21, etc., to 67-71 with a last group of 72 and over. Table XXI gives a practical example of how the population supposed to have been straightaway sorted in the above groups are further transformed into 5-9, 10-14, etc., 65-69, 70 and over groups, with the returns at ages 0, 1, 2, 3 and 4 stated individually.

TABLE XV.
1891—All-India—Males.
Deviations.

Age group.	1st place method. '0-4'.	2nd place method. '4-8'.	3rd place method. '3-7'.	4th place method. '2-6'.	5th place method. '1-5'.	Ternary and Septenary method.	Quaternary and Senary method.
5-9	+6,254	+7,956	+8,348	+5,086	+7,253	+3,312	+5,479
10-14	-382	-1,488	-296	+465	-2,810	+1,276	-664
15-19	-8,901	-6,209	-7,026	-4,635	-2,269	-7,907	-7,437
20-24	-5,448	-5,508	-1,508	-1,466	-584	-1,952	-1,968
25-29	+1,393	+2,773	+1,822	+2,757	+3,888	+1,924	+2,118
30-34	+4,947	+3,013	+3,106	+1,718	-1,079	+2,387	+2,005
35-39	-188	+548	+838	+3,023	+4,719	+1,013	+1,217
40-44	+5,658	+3,690	+2,492	+110	-1,761	+1,268	+1,119
45-49	-2,029	-1,013	-626	+832	+1,704	-325	-234
50-54	+4,519	+2,507	+1,088	-902	-3,207	+81	-33
55-59	-2,678	-1,822	-1,027	+199	+1,164	-634	-586
60-64	+4,024	+2,643	+1,404	-106	-1,481	+660	+609
65-69	-1,327	-1,158	-1,021	-757	-605	-1,049	-1,004
70-74	+936	+535	+195	-207	-597	+15	-23
75-79	-78	+5	+76	+238	+288	+97	+106
	+27,731	+23,670	+19,309	+14,428	+19,016	+12,033	+12,653
	-21,331	-17,198	-12,104	-8,163	-14,393	-11,867	-11,949
Total deviation without sign.	49,062	40,868	31,473	22,591	33,409	23,900	24,602

TABLE XVI.
1901—Males—All-India.
Deviations.

Age group.	1st place method. '0-4'.	2nd place method. '4-8'.	3rd place method. '3-7'.	4th place method. '2-6'.	5th place method. '1-5'.	Ternary and Septenary method.	Quaternary and Senary method.
5-9	+11,543	+12,417	+12,513	+9,686	+12,265	+8,821	+10,485
10-14	+8,718	+6,151	+6,106	+6,960	+5,199	+8,125	+5,655
15-19	-10,595	-6,689	-7,219	-4,387	-4,034	-10,341	-9,024
20-24	-9,752	-9,111	-5,524	-5,142	-4,517	-5,418	-5,661
25-29	-407	+892	-60	+162	+1,700	-404	-71
30-34	+3,361	+1,537	+2,264	+1,490	-866	+2,084	+1,398
35-39	-1,771	-618	-459	+1,437	+2,215	-1,259	-809
40-44	+3,539	+1,709	+827	-747	-1,366	+198	-158
45-49	-1,535	-446	+1,124	+1,245	+1,905	-223	+21
50-54	+5,201	+3,118	+2,447	-214	-2,065	+916	+699
55-59	-2,029	-1,089	-2,157	+860	+1,866	-391	-223
60-64	+4,750	+3,021	+1,553	-112	-579	+843	+684
65-69	-1,500	-1,216	-1,102	-841	-693	-1,331	-1,236
70-74	+1,545	+877	+407	+17	-370	+317	+199
75-79	+334	+444	+525	+636	+600	+342	+414
	+38,991	+30,166	+27,766	+22,302	+25,810	+21,646	+19,555
	-27,599	-19,169	-16,521	-11,443	-15,290	-19,427	-17,182
Total deviation without sign.	66,580	49,335	44,287	33,835	41,100	41,073	30,737

TABLE XVII.
1911—All-India—Males.
Deviations.

Age group.	1st place method. '0-4'.	2nd place method. '4-8'.	3rd place method. '3-7'.	4th place method. '2-6'.	5th place method. '1-5'.	Ternary and Septenary method.	Quaternary and Senary method.
5-9	+6,019	+8,489	+8,760	+4,893	+8,501	+4,167	+6,351
10-14	+3,268	+1,038	+2,053	+2,651	-802	+3,574	+1,270
15-19	-10,130	-6,428	-7,928	-3,925	-643	-9,303	-8,310
20-24	-6,483	-6,279	-880	-774	-465	-1,235	-1,431
25-29	+2,540	+4,519	+2,714	+3,563	+5,285	+2,283	+2,693
30-34	+5,275	+3,031	+4,182	+2,702	-744	+3,558	+2,949
35-39	+388	+1,219	+1,298	+3,798	+5,648	+1,114	+1,432
40-44	+6,794	+4,399	+3,047	+513	-1,582	+1,827	+1,551
45-49	-1,253	-237	+101	+1,796	+2,772	+278	+436
50-54	+6,261	+3,590	+1,833	-687	-3,596	+684	+487
55-59	-3,338	-2,109	-1,384	-198	+842	-1,140	-1,053
60-64	+4,530	+2,802	+1,501	-89	-1,352	+719	+651
65-69	-861	-940	-1,103	-2,704	-1,085	-1,529	-1,396
70-74	+262	-219	-586	-1,069	-1,706	-714	-832
75-79	-529	-418	-262	-10	+184	-231	-211
	+35,937	+29,087	+25,539	+19,996	+23,232	+18,204	+17,820
	-22,594	-16,630	-12,143	-9,456	-12,065	-14,152	-13,233
Total deviation without sign.	58,531	45,717	37,682	29,452	35,297	32,356	31,053

TABLE XVIII.
1891 Census—All-India—Males.
Values of ${}_0M_x$ and ${}_5M_x$.

Transformed Age Groups.	Age group in which Population is originally summed.															
	Graduated.		'2-6'.		Quaternary and Senary method.		Ternary & Septenary method.		'2-7'.		'1-5'.		'4-8'.		'0-4'.	
	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$
(1)	(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
10-14 .. ..	.495	.501	.498	.451	.498	.425	.536	.409	.488	.419	.441	.494	.470	.466	.505	.424
15-19 .. ..	.601	.500	.494	.540	.511	.516	.516	.528	.521	.515	.483	.573	.448	.468	.478	.525
20-24 .. ..	.500	.500	.482	.540	.506	.532	.515	.528	.529	.515	.420	.573	.522	.563	.576	.525
25-29 .. ..	.500	.499	.482	.540	.506	.493	.515	.484	.529	.484	.420	.573	.522	.450	.576	.404
30-34 .. ..	.498	.496	.458	.534	.513	.483	.520	.484	.556	.464	.394	.630	.594	.450	.676	.404
35-39 .. ..	.498	.496	.436	.534	.507	.473	.514	.467	.570	.430	.331	.642	.592	.392	.815	.333
40-44 .. ..	.492	.488	.495	.528	.508	.444	.438	.438	.602	.384	.358	.725	.871	.310	1.110	.241
45-49 .. ..	.483	.470	.495	.308	.333	.325	.325	.325	.588	.299	.526	.704	.248	.860	.204	.204
50-54 .. ..	.441	.446	.446	.529	.529	.545	.545	.545	.588	.346	.346	.704	.248	.860	.204	.204
Total	3.410	2.953	3.309	2.991	3.662	2.700	3.753	2.649	3.944	2.511	2.773	3.590	4.270	2.429	5.018	2.131
Average .. ..	.487	.492	.473	.499	.523	.450	.536	.442	.563	.419	.396	.598	.610	.405	.717	.355
Difference between ${}_0M_x$ and ${}_5M_x$.	.005	.005	.026	.026	.073	.094	.094	.094	.144	.144	.202	.202	.205	.205	.362	.362

TABLE XIX.
1901 Census—All-India—Males.
Values of ${}_0M_x$ and ${}_5M_x$.

Transformed Age Groups.	Age group in which Population is originally summed.															
	Graduated.		'2-6'.		Quaternary and Senary method.		Ternary and Septenary method.		'1-5'.		'3-7'.		'4-8'.		'0-4'.	
	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$
(1)	(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
10-14 .. ..	.495	.500	.526	.458	.531	.427	.561	.407	.503	.465	.520	.439	.518	.457	.555	.418
15-19 .. ..	.500	.500	.472	.521	.490	.522	.500	.513	.470	.547	.482	.517	.441	.451	.458	.530
20-24 .. ..	.500	.500	.508	.518	.521	.480	.535	.468	.488	.548	.529	.473	.516	.470	.553	.435
25-29 .. ..	.498	.496	.466	.530	.503	.491	.513	.481	.448	.548	.506	.473	.535	.470	.586	.435
30-34 .. ..	.493	.496	.403	.524	.513	.491	.524	.452	.390	.579	.569	.488	.594	.444	.634	.397
35-39 .. ..	.488	.491	.482	.524	.556	.462	.571	.452	.399	.641	.655	.371	.698	.379	.837	.320
40-44 .. ..	.488	.479	.482	.425	.373	.373	.361	.361	.483	.483	.357	.655	.314	.637	.265	.265
45-49 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
50-54 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
55-59 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
60-64 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
65-69 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
70-74 .. ..	.454	.467	.467	.525	.525	.551	.551	.551	.424	.534	.357	.605	.248	.860	.204	.204
Total	3.428	2.965	3.334	2.971	3.638	2.755	3.755	2.682	3.100	2.260	3.795	2.643	3.907	2.615	4.395	2.365
Average .. ..	.490	.494	.483	.496	.520	.459	.536	.447	.443	.543	.443	.441	.558	.436	.688	.394
Difference between ${}_0M_x$ and ${}_5M_x$.	.004	.004	.012	.012	.061	.089	.089	.089	.100	.100	.101	.101	.122	.122	.214	.214

TABLE XX.
1911 Census—All-India—Males.
Values of ${}_0M_x$ and ${}_5M_x$.

Transformed Age Groups.	Age group in which Population is originally summed.																	
	Graduated.		'2-8'.		Quaternary and Senary method.		Ternary and Septenary method.		'3-7'.		'4-8'.		'1-5'.		'0-4'.			
	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$	${}_0M_x$	${}_5M_x$		
(1)	(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)			
10-14497	.501	.513	.393	.513	.435	.543	.418	.509	.433	.497	.489	.484	.501	.534	..
15-19
20-24501	.500	.495	.525	.514	.519	.522	.511	.517	.510	.452	.564	.477	.560	.475	.531
25-29
30-34499	.498	.490	.527	.509	.488	.520	.478	.523	.470	.501	.468	.435	.594	.542	.433
35-39
40-44497	.495	.463	.533	.507	.484	.515	.475	.534	.470	.560	.422	.414	.514	.616	.372
45-49
50-54493	.491	.457	.497	.513	.439	.521	.433	.559	.400	.620	.348	.308	.620	.737	.280
55-59
60-64489	.489	.558	.326	.583	.392	.593	.379	.627	.384	.714	.432	.432	.511	.856	.321
65-69
70-74462	..	.490	..	.451	..	.476	..	.468	..	.514	..	.310	..	.576	..
Total	3.438	2.965	3.466	2.771	3.590	2.757	3.690	2.695	3.737	2.849	3.858	2.623	3.900	3.400	4.336	2.369
Average491	.494	.495	.462	.513	.460	.527	.449	.534	.442	.551	.438	.414	.567	.619	.395
Difference between ${}_0M_x$ and ${}_5M_x$003	..	.033	..	.053	..	.078	..	.092	..	.113	..	.153	..	.224	..

TABLE XXI.

Age group.	Original population as sorted straight according to groups stated in (1).	4x5 year groups of Col. (2).	-Δ of Col. (3).	(4) + (2) = adjusted population in '5-9' etc., groups.	Age group.
(1)	(2)	(3)	(4)	(5)	(6)
0
1
2
3
4
5
6
7-11
12-16
17-21
22-26
27-31
32-36
37-41
42-46
47-51
52-56
57-61
62-66
67-71
72 and over
100,000

SECTION IV.

1. In this section I shall attempt a brief description of the methods adopted in the construction of mortality Tables for the various Provincial groups detailed in the opening pages of this Report with some discussion on topics relevant thereto.

2. It was explained in an earlier section of this Report, that, in view of the conditions prevailing in the decennium 1921-1931, the Table of mortality of each area was to embody the experience of this decennium only. The statistics of population used therefore were only those relating to the 1921 and 1931 Censuses without any reference to earlier enumerations. The population of each area at the 1931 Census is available for nearest age on Census day—this having been the age asked for according to instructions to enumerators—for ages 0, 1, 2 and 3 stated separately and in alternate ternary and septenary groups 4-6, 7-13, 14-16, 17-23, etc., to 67-73 with one large group at the end of 74 and over. The passage from ternary and septenary groups to the ordinary quinquennial age groups 0-4, 5-9, etc., is effected very easily by taking half the sum of two consecutive age groups. For instance, the age group 5-9 is obtained by taking the sum of one half of the ternary group 4-6 and one half of the septenary group 7-13. It should also be noted that the resulting quinary group 5-9, on the assumption that the ages returned were the ages nearest birthday, would include all persons whose ages were 5, 6, 7, 8, and 9 last birthday. In this way the statistics of the population returned at the 1931 Census were arranged in quinquennial age periods 0-4, 5-9, etc., to 65-69 with one large group at the end of 70 and over, according to age last birthday in conformity with the method of grouping adopted at the previous enumerations in India to facilitate comparison. The numbers in each age group were reduced by a constant ratio so as to produce a total of 100,000 for all ages.

Correction for Mortality.

3. The method described above of redistributing the original ternary and septenary age groups into quinary groups introduces an error—though not very material—due to the fact that in the process of redistribution the assumption has been made that the numbers relating to each age in each septenary and ternary group are equal to one another and no allowance has been made for the progressive diminution of these numbers as age increases in each group due to the operation of mortality.

4. To allow for this error Mr. Meikle recommended certain percentages being transferred from groups like 10-14, 20-24, 30-34, etc., to the respective earlier groups, 5-9, 15-19, 25-29, etc. I have, however, to state with regret that I have not been able to satisfy myself as to how quinquennial groups with the earliest age a multiple of 10 like 20-24, 30-34, etc., alone have to part with certain percentages to the respective earlier groups. Taking, for instance, the transformed quinary group 30-34 one can easily see that this age group is made up of the lower half of the septenary group 27-33 and the upper half of the ternary group 34-36. In so far as it is made up of the lower half of the septenary group 27-33 it owes a certain number to the upper half of the same septenary group which is amalgamated with the quinary group 25-29. Again in so far as this age group 30-34 is made up of the upper half of the ternary group 34-36 it took rather less than its correct quota from that group when it was bisected and the upper half taken with the 30-34 group and the lower half with the 35-39 group. I think therefore any age group like 30-34 owes a certain number to the previous age group 25-29 and has to get another number from the succeeding age group 35-39. This is the case with respect to all transformed quinary groups. It is true that age groups like 30-34, 40-44 and so on with the earliest number in the group a multiple of 10 owe to the respective preceding quinary groups more than what they have to get from the succeeding ones with the result that on final adjustment they have to meet with a net diminution. But if we deal with the net diminution only and transfer this net amount entirely to the upper age group we shall be, what in common parlance is called, "robbing Peter to pay Paul" and our final adjustments will not be quite correct in transferring numbers from one age group to another to that degree of approximation which it is desirable to have if mortality correction is to be given effect to.

5. I have, on the same assumption as made by Mr. Meikle which is accurate enough for our present purpose, calculated this mortality correction to be applied

to each group. I shall represent by the symbol s_{30} the total number in the septenary group of which 30 is the middle age and so on for other septenary groups. Similarly t_{25} represents the total in the ternary group of which 25 is the middle age and so on for other ternary groups. The total number s_{30} in the septenary group 27-33, for instance, can be assumed approximately to be distributed at each of the seven ages in that group as follows :—

$$\frac{s_{30}}{7} (1+3 q_{30}) \text{ as of nearest age 27,}$$

$$\frac{s_{30}}{7} (1+2 q_{30}) \text{ as of nearest age 28,}$$

$$\frac{s_{30}}{7} (1+ q_{30}) \text{ as of nearest age 29,}$$

$$\frac{s_{30}}{7} \text{ as of nearest age 30,}$$

$$\frac{s_{30}}{7} (1-q_{30}) \text{ as of nearest age 31,}$$

$$\frac{s_{30}}{7} (1-2 q_{30}) \text{ as of nearest age 32,}$$

$$\frac{s_{30}}{7} (1-3 q_{30}) \text{ as of nearest age 33.}$$

The upper half of the above distribution relating to the age group from exact age $26\frac{1}{2}$ to exact age 30 should contain (the q 's denoting rates of mortality throughout)

$$\frac{s_{30}}{7} (1+3q_{30}) + \frac{s_{30}}{7} (1+2q_{30}) + \frac{s_{30}}{7} (1+q_{30}) + \frac{1}{2} \frac{s_{30}}{7} \text{ which is equal to } \frac{1}{2} s_{30} + \frac{q}{7} s_{30} q_{30}.$$

Instead, therefore, of taking $\frac{1}{2} s_{30} + \frac{q}{7} s_{30} q_{30}$ as relating to the upper half of the septenary group 27-33 and $\frac{1}{2} s_{30} - \frac{q}{7} s_{30} q_{30}$ to the lower half, the method of bisection takes $\frac{1}{2} s_{30}$ to both the halves. It will therefore be evident that age group 30-34 has to cede $\frac{q}{7} s_{30} q_{30}$ to the group 25-29. Considering similarly the ternary group 34-36 it can easily be seen by a similar analysis that the group 30-34 has to get $\frac{1}{3} t_{35} q_{35}$ from the group 35-39. The whole scheme of correction is given in the following Table :—

Quinquennial age group.	Should give to the preceding quinquennial group.	Should get from the succeeding quinquennial group.
0-4 .. ..	..	$\frac{1}{5} q_5 t_5$
5-9	$\frac{1}{5} q_5 t_5$	$\frac{1}{5} q_{10} t_{10}$
10-14	$\frac{1}{5} q_{10} t_{10}$	$\frac{1}{5} q_{15} t_{15}$
15-19	$\frac{1}{5} q_{15} t_{15}$	$\frac{1}{5} q_{20} t_{20}$
20-24	$\frac{1}{5} q_{20} t_{20}$	$\frac{1}{5} q_{25} t_{25}$
25-29	$\frac{1}{5} q_{25} t_{25}$	$\frac{1}{5} q_{30} t_{30}$
30-34	$\frac{1}{5} q_{30} t_{30}$	$\frac{1}{5} q_{35} t_{35}$
35-39	$\frac{1}{5} q_{35} t_{35}$	$\frac{1}{5} q_{40} t_{40}$
40-44	$\frac{1}{5} q_{40} t_{40}$	$\frac{1}{5} q_{45} t_{45}$
45-49	$\frac{1}{5} q_{45} t_{45}$	$\frac{1}{5} q_{50} t_{50}$
50-54	$\frac{1}{5} q_{50} t_{50}$	$\frac{1}{5} q_{55} t_{55}$
55-59	$\frac{1}{5} q_{55} t_{55}$	$\frac{1}{5} q_{60} t_{60}$
60-64	$\frac{1}{5} q_{60} t_{60}$	$\frac{1}{5} q_{65} t_{65}$
65-69	$\frac{1}{5} q_{65} t_{65}$	$\frac{1}{5} q_{70} t_{70}$
70 and over	$\frac{1}{5} q_{70} t_{70}$	..

To give effect to the mortality correction in each Provincial group I adopted the rates of mortality from the 1911 Actuarial Report relating to the Province. Where any Provincial group is dealt with for the first time the rates of mortality relating to the whole of India were taken.

6. The population of each area according to the 1921 Census is available in the usual 0-4, 5-9, etc., groups according to age last birthday. With the view, however, to bring the population statistics of 1921 in conformity with those of 1931, ternary and septenary groups were formed from the sample of 100,000 for each sex available in respect of each area. These samples are available for each Census unit: To obtain samples applicable to each of the ten large geographical groups for which separate mortality Tables were to be constructed, the distribution according to each age in each Census unit was weighted according to the population in that unit and a new sample applicable to the geographical area dealt with was formed.

7. For instance, the Madras group is composed of the following Census units:—

- (a) The British Province of Madras (including the small States of Pudukkottah, Banganapalli and Sandur).
- (b) Mysore State.
- (c) Travancore State.
- (d) Cochin State.
- (e) Coorg.

The sample age distribution out of a total of 100,000 for each sex in each of the above areas was weighted at each age according to the population (taken to the nearest million) in that area and the sum of the products thus obtained was divided by the sum of the weights. In this manner was formed the sample distribution at each age out of a total population of 100,000 in each sex for each of the ten large areas into which the whole of India (including Burma) was divided for the purpose of this analysis. I have also made suitable adjustments to transform each ternary and septenary age group of the 1921 population in each area from age last birthday to age nearest birthday. From the ternary and septenary age groups, quinary groups 0-4, 5-9, etc., for ages last birthday were formed in the same manner as with the 1931 Return.

Migration.

8. Allowance was made at this stage for the disturbance caused by migration in the case of those Provincial groups where it was of such magnitude as to affect the rate of increase of the population or its age distribution. Taking India as a whole, for its size and the magnitude of its population, immigration and emigration, as observed by the Census Commissioner, Dr. Hutton, are practically unimportant. The direct effect of dividing India into ten large sections including British Provinces and the adjoining States has been to neutralize the large movement of population between contiguous political divisions where these are grouped together. The grouping has rendered ineffective, for instance, making any allowance for the presence of the large number of Bengalis in Assam and Madras in Mysore, Travancore and Cochin States and *vice versa*. In the Provincial groups of Madras and the United Provinces and in the group Bengal and Assam, migration, in spite of the neutralizing force above referred to, was too significant to be ignored. In the case of the first two groups the balance of migration was adverse in each of the two Censuses taken in 1921 and 1931. The total number of net emigrants per 100,000 of the total population at the respective Censuses in the case of each of these two Provincial groups was added to the quinquennial groups above referred to representing age distribution per 100,000 of total population in each sex. The age distribution of the migrant population was taken to be the same as was estimated by Sir George Hardy in 1891 by reference to the three Provinces, Coorg, Berar and Lower Burma where the immigrant population was relatively very large. Sir George has given full explanation of the methods followed by him in his 1891 Report. In the case of the Provincial group, Bengal and Assam, the balance of migration was in favour. The disturbance caused in the case of Burma by the presence in that Province of a large immigrant male population was eliminated by confining my investigation to Buddhists only who form almost entirely the indigenous population of that Province engaged almost exclusively in agricultural pursuits and of a non-migratory temperament. In this respect my investigation has fallen in line with all the earlier ones and

it is desirable that it should do so from another point of view. The Burman Buddhists have been observed in the past, as has also been confirmed by my investigation, to experience mortality markedly superior to that of Hindus or Muhammadans. To have combined the Buddhists of Burma with those following other religions would have introduced an element of heterogeneity in the investigation very much undesirable. The assumed age distribution of the emigrant population in the case of Madras and the United Provinces and of the immigrant population of Bengal and Assam enabled the correction due to migration disturbances being easily applied in each age group to the population of these Provincial groups in 1921 and 1931 respectively. The corrected population in each Census was again proportioned for in each quinary group relative to a total of 100,000 and the arithmetic mean of the two corrected populations was obtained in each age group.

Graduation.

9. It is now necessary to graduate or adjust the figures in each quinary group of the mean population, obtained by processes described above, with the view to remove or at best reduce to a minimum the effect of major and minor errors (referred to in detail in the last section) inherent to population statistics particularly in India. With this end in view it was decided to adopt a mathematical formula which, while producing a smooth progression of numbers from one quinquennial group to another, provided also a law by which the number at each age could be easily obtained.

10. The method of graduation adopted was with reference to a standard Table recommended by the late Mr. Alfred Henry in the discussion on a Paper submitted to the Institute of Actuaries by Mr. Ackland in connection with his 1911 Report to the Government of India. Mr. Meikle also adopted this method though that of Mr. Ackland was curve fitting and Sir George Hardy made use of a formula of graduation based on a modification of Makeham's Law. The choice of the Table to be used as the standard was a matter that required some investigation. The standard chosen has to be perfectly smooth and should preferably have been graduated by a mathematical formula. A first attempt was made by using the English Life Table No. 9. A suitable addition was made to the age in the ungraduated Indian population statistics to allow for the higher mortality prevailing in India as compared to England. Several trial graduations were made and the number of years added to the age in each quinary group of the Indian population before effecting comparison with the English population in corresponding age groups was varied from trial to trial. It was ultimately found that a rating up of between 10 and 11 years to the Indian age gave a smooth progression of the population from age to age, which, combined with the graduated rates of increase to be described later, gave satisfactory rates of mortality from only about age 35 onwards. It would therefore have been necessary to modify the Proclaimed Clans experience, more than half a century old by now, not only to supply the rates of mortality at the ages of infancy and childhood up to age 12, at which that experience stopped, but also to fill up the large gap between ages 12 and 35 by a smooth junction at both ends. This would have been entirely unsatisfactory. Mr. Meikle rejected, quite rightly, the Proclaimed Clans experience as entirely unsuitable for his purpose. They are still more so now. Mr. Ackland had made suitable adjustments to the Proclaimed Clans experience, on the basis of the rates of mortality derived by him at the older ages, to make it yield rates which would approximately reflect the mortality at the ages of infancy and childhood. One advantage, therefore, in adopting the Indian Life Table for 1911, which was also graduated by a mathematical formula and therefore satisfied the condition of being perfectly smooth, was to have on hand a Table in which the experience relating to the very young ages has been brought up to comparatively recent times. Another advantage, which is in my view rather substantial, is the fact that comparisons could be made and the requisite ratios—the subject of graduation—could be formed without making any addition to the age of the ungraduated population. I have found that in comparing with English Life Table the addition to the age which was necessary to produce a good fit at ages, say, from 30 to 65 or 70 was too large at the very young and the very old ages. I therefore adopted the Male Life Table prepared for the whole of India by Mr. Ackland as the standard Table for the graduation of the male experience in each of the ten areas dealt with by me.

11. The mean in each age group, relative to a total of 100,000 of the population for each area corrected for migration in certain cases as explained above, was summed from the bottom upwards to produce the population aged 0 and upwards, 5 and upwards, etc. These were denoted by the respective symbols T_0, T_5, T_{10} , etc., to T_{70} . Corresponding sums for the standard Table adopted were denoted by the symbols T'_0, T'_5, T'_{10} , etc., to T'_{70} . The ratio $\frac{T}{T'}$ was made the subject of graduation. A cubical parabola given by the equation $y=1+ax+bx^2+cx^3$ was fitted to the observed ratios of $\frac{T}{T'}$ in each case. It is not necessary to go fully into the technical details of this process of graduation. I desire, however, to state that I have found the process of fitting a curve by the method of "Least Squares" particularly suitable not only for its easy application but also for the facility this method afforded for discarding the ratio at any age if due to gross mis-statement in age it was found to be entirely undependable. The graduated ratio multiplied by the population according to the standard at any age yielded the graduated mean population at that age.

Rates of increase.

"A Nation ought to devote its best energies to the self-imposed task of carrying out in its manifold details the following general programme:—

- (i) *of steadily raising the natural level of successive generations, Morally, Physically and Intellectually by every reasonable means,*
- (ii) *of keeping its Numbers within approximate limits,*
- (iii) *of developing the Health and Vigour of the people. In short, to make every individual efficient both through Nature and by Nurture."*

FRANCIS GALTON.

12. To deduce, from the graduated mean population obtained by processes explained in the last few paragraphs of this section, the fundamental column of the mortality Table showing the number of survivors at each age out of a fixed number of births, say, 100,000, it is necessary to determine the average rate of increase of the population in each of the various Provincial groups during the period taken into account which in the present case is the decennium 1921-1931. The following Tables taken mainly from Mr. Marten's Report for 1921 show the average rate of increase, both real and actual (the latter based on Census figures only), in each decennial period since the first general Census of India in 1872.

TABLE XXII.

Census of	Population.	Variation per cent. since previous Census.
1872	206,162,360	..
1881	253,896,330	+23.2
1891	287,314,671	+13.2
1901	294,361,056	+2.5
1911	315,156,396	+7.1
1921	318,942,480	+1.2
1931	352,837,778	+10.6

TABLE XXIII.

Period.	Increase due to		Real increase of population.	Total.	Rate per cent. of real increase.
	Inclusion of new areas.	Improvement of method.			
(1)	(2)	(3)	(4)	(5)	(6)
	Millions.	Millions.	Millions.	Millions.	
1872-1881	33.0	12.0	3.0	48.0	1.5
1881-1891	5.7	3.5	24.3	33.5	9.6
1891-1901	2.7	.2	4.1	7.0	1.4
1901-1911	1.8	..	18.7	20.5	6.4
1911-1921 .. .. .	.1	..	3.7	3.8	1.2
1921-1931 .. .. .	..	..	..	..	10.6

13. The rates of increase shown in Table XXII are not of any practical interest as they have been coloured substantially by artificial increases due to inclusion of new areas and to progressive increase in the accuracy of the enumeration from Census to Census.

14. It will be seen that the real rate of increase has been the largest in the decennium 1921-1931 of all the periods. It may not be out of place at this stage to make some observations as to the desirability or otherwise of the very large rate of increase in the population which the decennium has witnessed, applied particularly to this country where the standard of living is proverbially low. Otherwise, the poignant words of Francis Galton, inscribed in bold characters on the walls of the Biometric Laboratory of University College, London, by Galton's worthy and famous disciple, Prof. Karl Pearson and quoted at the beginning of this topic, would be irrelevant.

15. The rate of increase of the population has always remained a matter of absorbing interest during the one hundred and thirty-five years since Malthus in his *Essay on Principle of Population* expressed real alarm at the rapid rate at which population was increasing and presented a very vivid and horrid picture of the results of indiscriminate multiplication. He enunciated a law which in mathematical language can be stated thus: If the population of a confined area increases in geometrical progression, while the food production increases only in an arithmetical progression, the former must inevitably overtake and surpass the latter and within a short period there will be several people without any food. A few sentences may be quoted from Malthus' *Essay* in illustration of his graphic description:—

“The population of the island (Great Britain) is computed to be about 7 millions and we will suppose the present produce equal to the support of such a number. In the first 25 years the population would be 14 millions and the food being also doubled, the means of subsistence would be equal to the increase. In the next 25 years the population would be 28 millions and the means of subsistence only equal to the support of 21 millions. In the next period the population would be 56 millions and the means of subsistence just sufficient for half that number. And at the conclusion of the first century the population would be 112 millions and the means of subsistence just only equal to the support of 35 millions which would leave a population of 77 millions totally unprovided for.”

16. Malthus has been the subject of a certain amount of criticism on the score of having depicted too horrid and too gruesome a picture. He might have indulged in a little bit of exaggeration of which he should have been quite conscious. It should, however, be remembered that he was practically the pioneer amongst the great thinkers of the world who directed their attention to this great problem relating to population and its increase. Just as in the realm of Literature a Tragedy is considered to inculcate a moral better than a Comedy, so also, in this case, Malthus having felt himself to be in the role of a teacher of the moral regarding population and its uncontrolled growth had to depict a shocking picture to impress on the imagination of the public the consequences if the moral was disobeyed. He has also been criticised for making the starving millions breed and multiply in each period. The surplus population would not be straightaway wiped out but the immediate effect of population overtaking the means of subsistence would be a fall in the standard of living for the majority in the area which would give an impetus to indiscriminate multiplication making the standard of living fall still lower thereby completing what is called the vicious circle, of which India provides a good example. That birth rate is very highly and inversely correlated with status in the social scale, that is, with the standard of living, is illustrated by the following Table relating to England and Wales appearing in Mr. Carr-Saunders' book on Population.

TABLE XXIV.

The number of births in the year 1911 per 1,000 married men under 55 years of age in England and Wales grouped according to the occupation of the father.

Occupation of the father.	Number of births.
(1) Upper and middle classes	119
(2) Intermediate'	132
(3) Skilled workmen	153
(4) Intermediate	158
(5) Unskilled workmen	213

17. Let us now examine the truth of the Malthusian proposition enunciated at the end of paragraph 15.

Let r be the common ratio of the geometrical progression in which population is increasing.

If P_0 be the population in the area under consideration at the commencement of an epoch and P_t the population at time t measured from the beginning of the epoch we shall have $\frac{dP_t}{dt} = P_t r$, giving $\frac{1}{P_t} \frac{dP_t}{dt} = r$ or $\frac{d \log P_t}{dt} = r$ leading to $\log P_t = rt + \text{constant}$, or $P_t = P_0 e^{rt}$ since when $t=0$, $P_t = P_0$. Therefore the population at any time t measured in years is $P_0 e^{rt}$.

If the means of subsistence increase in an arithmetical progression at a rate K times the rate at which the population is increasing so that the common difference of the arithmetical progression of increase of foodstuffs and other necessaries of life is Kr , we shall, on the supposition that the available amount of the necessaries of life at the commencement of the epoch was just sufficient to support the population then existing in the area, viz., P_0 , obtain for the number of people which the resources of the area then available can support at the end of time t the quantity $P_0 (1 + Krt)$. If on Malthus' assumption the population, increasing in geometrical progression, were to overtake the means of subsistence increasing in an arithmetical progression, though at a rate several times larger than the rate at which the population is increasing, we should have a value of t satisfying the equality

$$P_0 e^{rt} = P_0 (1 + Krt)$$

$$\text{or } 1 + rt + \frac{r^2 t^2}{2} + \frac{r^3 t^3}{2 \cdot 3} + \dots = 1 + Krt \text{----- (A)}$$

The values of t given by the equation (A) give the period at the end of which population would overtake means of subsistence and there would subsequently result a shortage of food. One value of t is 0 corresponding to the commencement of the epoch, when the assumption was made that population had just sufficient for subsistence. Another value of t , if one exists, would give the critical number of years at the end of which the food problem in the community would come to tell. Practical values of r are never greater than .03. Only undeveloped countries like Canada and New Zealand show anything near this rate. Even for Australia the value of r is about .02. For all practical values of r and practical values of K (the number of times food supply exceeds the needs of population) it is possible to find value of t by a process of successive approximation so well known to students of Actuarial Science. The values of t , the number of years at the end of which the population would overtake the food supply for practical values of r and K , have been called "Malthusian equivalent intervals". These values have been calculated by Mr. G. H. Knibbs and are exhibited in the following Table.

TABLE XXV.

Malthusian equivalent intervals corresponding to various rates of increase.

K	Number of years (t) before population overtakes food-supply, the former increasing in a geometrical progression of ratio r and the latter in an arithmetical progression of common difference Kr.			
	r=0.01	r=0.015	r=0.02	r=0.03
2	126	84	63	42
4	234	156	117	78
8	332	221	166	111
16	423	282	211	141

18. The annual rate of increase of population in India which the decennium under consideration has engendered is very nearly 1%. The above Table shows that if population continues to increase at this rate and if the food supply were to increase at double this rate, i.e., at 2% (on the supposition that the present food supply in India is just sufficient for supporting the present population, which is far from being the case), food shortage would come to tell at the end of 126 years.

If food supply increases at 4% while population increases only at 1% the critical period will be reached at the end of 234 years. For 8 and 16 per cent. increases in food supply, population and food supply will attain equality at the end of 332 and 423 years respectively. These are small as compared with historical and geological periods. Thus the truth of the Malthusian proposition is established beyond doubt.

19. The adage "Population begets Population" naturally points at a geometrical progression as the law governing the rate of increase of population. If, however, we proceed on this assumption, we are faced with incongruous results. Mr. Knibbs, several times referred to by me, has computed the average rate of increase of the population of the world weighted according to the population of each country during the quinquennium 1906-1911 to be 1.159 per cent. per annum. The largest annual rate of increase of 2.98% was shown by Canada. Ireland was the only one of all the countries that indicated an annual rate of decrease of .006%. Amongst countries that showed an increase, France exhibited the lowest rate per annum being .016%. Referring to the average rate of increase of the population of the world of 1.159% per annum, Mr. Knibbs has some very interesting observations to make which I am quoting *in extenso* :—

" Either this rate of increase must be enormously greater than has existed in the past history of the world or enormous numbers of human beings must have been blotted out by catastrophes of various kinds from time to time. For, putting the present population (of the world) at 1,649,000,000 at the average rate of increase, this number would be produced from a single pair of human beings in about 1,782 years, that is to say, since A. D. 132 or since Salvius Julianus revised under Hardian the Edicts of the Praetors. Even the rate given by the world-populations 1804 and 1914, *viz.*, (0.0086) gives only 2,397 years, carrying us back to only B. C. 483, or since the days of Darius I of Persia.

" The profound significance of this fact, accentuated also by the extraordinary increase in the length of life (expectation of life at age 0) which has revealed itself of recent years, is obvious when the correlative food requirements are taken into account. The resources of Nature will have to be exploited in the future more successfully than in the past to maintain this rate of increase (0.01159) which doubles the population every 60.15 years and would give for 10,000 years the colossal number 22,184 with 46 noughts (10^{46}) after it.

" This number is so colossal that it is difficult to appreciate its magnitude. Assuming the earth to be a globe of 3,960 miles radius, of a density 5.527 compared with water, that water weighs about $62\frac{1}{2}$ lbs. per cubic foot, and that a human being weighs on the average, say, 100 lbs. (7 st. 2 lbs.) the actual mass of the earth would be equivalent only to say, $132,265 \times 10^{18}$ persons; that is, it would require $16,771 \times 10^{23}$ times as much "matter" as there is in the earth. Or, to consider it as a question of surface, allowing $1\frac{1}{2}$ square feet per person, the earth's entire surface area would provide standing room for only $36,625 \times 10^{11}$ persons. That is, the population would be $60,570 \times 10^{30}$ times as great as there would be standing room if the whole earth's surface were available. It is evident from this that the rate of increase of human beings must have been more approximate to the rate for France at the present time if the earth has been peopled for 10,000 years: the French rate, 0.0016, would require 12,842 years to give the present population from a single pair. This rate, however, would give a population of only 17.55 millions in 10,000 years.

" The foregoing analysis of the effect of the rate of increase, with which we are familiar, established the fact that the rate must have passed through great changes, and could not have been maintained for any long period, either at its present average, or that characteristic of the last century. It is not improbable that the rate of the last quinquennium will not be long maintained; and it is certain that however great human genius or effort may be, in enlarging the world's food supplies, that rate cannot possibly be maintained for many centuries. The contention of Malthus is thus placed beyond question, from a different point of view. "

20. From the above vivid description, it will be evident that the power of population just as the power of compound interest over a period measured in centuries is just as to shock the imagination. While solving problems in compound interest, how many of us did not regret the fact that a great-great-grand-parent of ours of a couple of centuries back did not invest a few rupees at a small rate of interest, compounding annually, so as to amount to several lakhs for our present use. With increasing experience, however, we realize that in the realm of practical finance this is an absurdity. Similarly it is absurd to try to forecast the population in a given area, say, a thousand years hence, on the basis that the present rate of increase will continue to progress in a geometrical ratio. Correcting factors will

be at work to keep down the rate of growth. Malthus indulged purposely in some exaggeration when he omitted to make mention of the correcting factors.

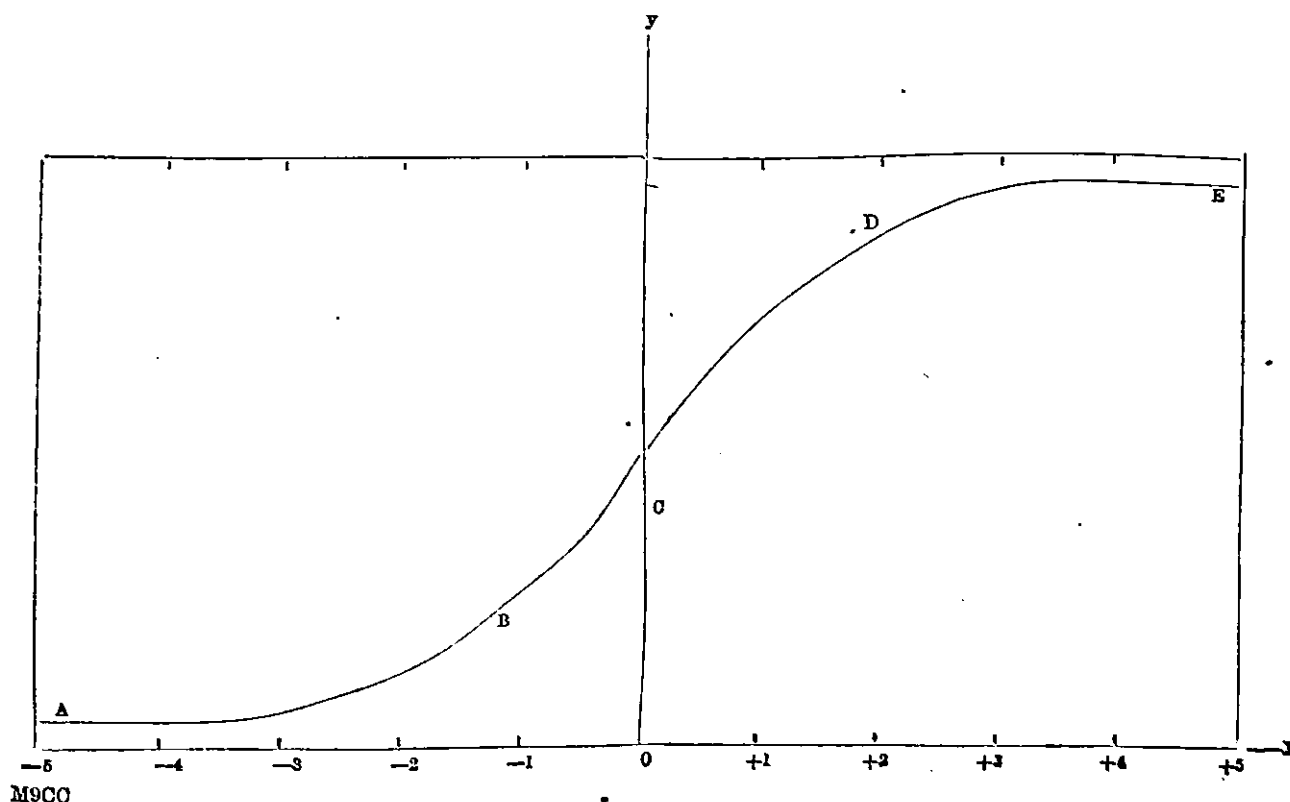
21. If geometrical progression is to be ruled out, the question might naturally be asked as to what the law underlying population growth is. Quetelet's brilliant analogy between the growth of population and the motion of a body through a resisting medium suggests a rational solution. In the case of such a body when the velocity is small, the force to impede the velocity is also small. As the velocity increases, the resistance also increases till the body cannot move in the medium at a velocity greater than a particular one, called the limiting velocity, whatever may be the magnitude of the force acting on the body making it move forward. Similarly, when the resources of a country and the amount of space available are large as compared to the population, very little impediment will be felt to the growth of population and it may actually increase at a rate approximating to the geometric progression. As density increases, and as the ratio of the undeveloped resources of the area to the population diminishes, the rate of growth will be arrested and will slowly diminish, attaining the value 0 when the population in the area will attain a stationary or constant value beyond which it cannot increase.

22. To evolve a mathematical formula for the law of population growth on the above analogy was, however, left first to Verhulst and then, quite independently of him, to Pearl and Reed. It is not necessary to give in detail here the mathematical processes by which the equation to the curve of population growth is obtained. The reader is referred to either "Studies in Human Biology" by R. Pearl or to the Presidential address delivered by Mr. G. Udny Yule before the Royal Statistical Society and appearing in Volume 88 of the Journal of that body.

23. The rate per unit of time at which the population in a given area increases at any moment depends upon the absolute magnitude of the population in the area at that moment subject to a retarding influence or, in mathematical language, a reducing factor depending on the difference between the maximum population which the area can support and the population at that moment. This leads to a differential equation for the law of population growth of the form $\frac{dy}{dt} = \frac{y}{\alpha} (1 - \frac{y}{L})$

which when solved leads to the equation, $y = \frac{L}{1 + e^{-\frac{y}{\alpha}(t - \beta)}}$ (B)

where y is the population at any time t and L is the limiting value of the population which is approached when t becomes infinitely great. The form of the curve given by equation (B) representing a rational law of population growth is given by the accompanying diagram.



Time is measured along the X axis and the population along the Y axis. The part ABC of the curve of population growth is convex to the X axis (the axis of time) showing that in this section the increase of population in any year is larger than in the preceding year. Up to the point C corresponding to time β , the density of population in the area is not very large and the impediment to growth of population is not very intense. When the population already existing in the area is small compared with the limiting population L, we can prove that the rate of increase in the population is very nearly in a geometrical progression. For, in the differential equation to the curve, namely, $\frac{1}{y} \frac{dy}{dt} = \frac{1}{\alpha} (1 - \frac{y}{L})$ by making y very small as compared with L we obtain the simplified equation $\frac{1}{y} \frac{dy}{dt} = \frac{1}{\alpha}$ or $y = Ae^{t/\alpha}$ which is the same as a logarithmic curve, or the curve of a geometrical progression.

24. At the point C, the density of population in the area is one-half the limiting density and this is a point of inflexion at which the curve changes from convexity to concavity. Over the section CDE of the curve the increase of population in any year is smaller than in the preceding one and goes on diminishing from year to year till the increase vanishes and the population attains a limiting value based on the area available for occupation and the capacity of the area to provide means of subsistence. That this curve for the law of population growth very nearly fits in with the observed facts with respect to several countries has been proved by Messrs. Yule and Pearl in the Papers by these authors referred to above.

25. It appears, from the above analysis, it is reasonable to assume that in those countries such as for instance Canada, Australia, etc., where the available resources are not fully mobilized and the density is small as compared with the area fit for human habitation, population would continue to increase very nearly in conformity with the law "Population begets Population", that is, in a geometrical progression. That this rate of increase will in course of time be compelled to slow down by such methods as modern civilization would tolerate and vanish when the population would attain its limiting value appears to be the only rational assumption.

26. In those countries, where the level of education is high, this final or limiting value of the population will be reached by a voluntary and deliberate limitation of the birth-rate which will bring as a natural reward a fall in the death-rate thereby minimising misery. That most of the countries in Europe did substantially restrict the size of their families is proved with all the force of statistical analysis. The fall in the French birth-rate is proverbial. In England the fall practically synchronised with the famous Bradlaugh Case (1877) which served to attract with an extraordinary force public interest to a pamphlet giving information on birth-control written by Dr. Knowlton of which Bradlaugh and Mrs. Besant were the publishers. The Germans were rather late in taking interest in the subject. But when once they did they were systematic and thorough and flooded their country with literature on the subject. The fall in the German birth-rate in the years just before the Great War was phenomenal.

27. In other countries, of which India is a good example, where due to lack of imagination which education inculcates and the consequent *laissez faire* attitude of the people towards matters of vital importance, actions are not intelligently directed towards safeguarding the happiness of the future, but by adopting a policy of drift pinning faith on the proverb "with every mouth God sends a pair of hands" the limiting population will be reached by a high birth-rate bringing in its trail a high death-rate and the inevitable physical and mental suffering which a high death-rate would naturally entail. The following Table comparing England and Wales and India over a quinquennium shows that in England and Wales where the birth-rate is low, due to a larger fall in death rate, the survival rate is really larger than in India where the effect of a larger birth-rate is neutralized by a heavy death rate.

TABLE XXVI.

Year.	England and Wales.			British India.		
	Birth-rate.	Death-rate.	Survival rate.	Birth-rate.	Death-rate.	Survival rate.
1910	25	13	12	40	33	7
1911	24	14.5	9.5	39	32	7
1912	24	13	11	39	30	9
1913	24	14	10	39	29	10
1914	24	14	10	40	30	10

28. The statistics relating to most other countries of Western Europe go to confirm what was observed with respect to England and Wales, that the fall in the birth-rate synchronised with a larger fall in the death-rate as the following Table taken from the journal of the Royal Statistical Society, Volume 88, page 33, clearly indicates.

TABLE XXVII.

Decreases in the death-rate and the birth-rate between 1871-80 and 1901-10 in certain States of Western Europe : points per 1,000 of the population.

Country or State.	Fall in.	
	Death-rate.	Birth-rate.
1. Hamburg	11.5	12.2
2. Wurtemberg	11.3	10.3
3. Saxony	10.8	10.8
4. Bavaria	9.2	5.9
5. Netherlands	9.2	5.7
6. Baden	8.3	5.8
7. Prussia	8.2	5.5
8. Austria	8.2	4.3
9. Hesse	8.0	5.9
10. Alsace-Lorraine	7.9	5.4
11. Belgium	6.4	6.2
12. England and Wales	6.0	3.2
13. Denmark	5.2	2.8
14. Scotland	5.0	6.5
15. Finland	4.0	5.8
16. Sweden	3.4	4.7
17. Norway	2.8	3.6
18. Italy	2.6	2.3
19. Switzerland	2.3	3.8

29. Those countries that restrict their birth-rate help Nature in her task of keeping the numbers within the bounds of the capacity of the area, while others that allow the birth-rate to soar high will have to pay large penalties in the shape of heavy death rates, for, Nature is a relentless task-mistress and will always have her own way.

30. One can judge whether or not a country is suffering from the effects of over-population by the standard of living obtaining in the country as economists

hold that low standard of living is a sure index of over-population. When the number of mouths is considerably larger than the capacity of the soil to provide food for them, the standard of living should naturally fall. Let me quote from what Carr-Saunders says in this connection with particular reference to India and China.

“Infanticide was employed in India and China until recently ; it has now been abandoned and no other method of keeping the size of the families small has taken its place. An examination of the social conditions suggests that the people are not living as well as they might ; famines are not uncommon and are never far off. The symptoms point to over-population, of which the cause would seem to be the failure to replace the custom of infanticide by some other method of regulation.”

31. No greater proof is required of the fact that what primarily ails India is over-population than the low, miserably low, standard of living of the masses. This would indicate that the actual position of the Indian population in the Logistic curve of population growth given in page 147 is in the section CDE of the curve, possibly very near E round about which point, if Nature's Law is to be obeyed, any further increase in the population should be practically nil. In other words, there should be, very nearly, only as many babies born as there is wastage due to deaths. To subject the soil to increased pressure due to the addition of nearly 34 millions in a decade when the standard of living is proverbially low is a situation that should cause real alarm in the minds of well-wishers of India. Without an addition in real wealth of, at least, the same extent, of which there has been no very large indication, the existing low standard of living is sure to be depressed further, leading, as has already been indicated, to further over-population and consequent increase in the loss of the spirit of enterprise. For, successive generations of life on less than bare margin of subsistence and the natural indolence and despondency which such a state engenders have probably made the majority of Indians abstain from making any strenuous effort to raise their standard of living, which could be achieved in the first instance by limiting the size of the families. Being itself both the cause and effect of over-population the low standard of living of the average Indian completes what is called the “vicious circle”.

32. That the primary cause of the abnormally heavy mortality experienced by the masses in India is traceable to very low economic status is illustrated by the difference between the rates of mortality and the expectations of life relating to males between the experience of the Oriental Government Security Life Assurance Company embracing the period of two decades 1905-1925 and those of the male population of India ascertained after the 1931 Census as clearly shown by the following Table :—

TABLE XXVIII.

Age.	Oriental—Males Ultimate 1905-1925.		All India Males 1931.	
	Mortality per cent.	Mean after life-time.	Mortality per-cent.	Mean after life-time.
	20	·725	37·16	1·27	29·57
25	·817	33·53	1·53	26·50
30	·887	29·89	1·93	23·60
35	1·001	26·22	2·41	20·99
40	1·263	22·58	2·94	18·60
45	1·743	19·11	3·49	16·40
50	2·513	15·95	4·10	14·31
55	3·663	13·18	4·81	12·27
60	5·097	10·86	5·79	10·25
65	6·685	8·88	7·27	8·26
70	8·643	7·15	9·76	6·35
75	11·254	5·60	14·27	4·61
80	15·145	4·25	21·80	3·13
85	20·351	3·12	36·08	1·95
90	26·890	2·14	57·70	1·12
95	54·300	·48	—	—

33. It need hardly be stated that the economic status of the policy holders of the Oriental must necessarily be much higher than that of the general population in India. The rates of mortality of the latter are more than 100 per cent. heavier up to the middle age of life than those of the former. The low economic status of the masses in India is firstly the direct cause of heavier mortality through under-nourishment and secondly it helps to maintain mortality at a very high level by depressing the standard of living which brings about a very large increase both in birth and death rates.

34. The remedy, in short, lies in Birth Control among families of poor economic status. In the Census Report for Mysore State, just to hand, one is pleased to find the following sentence: "By an order issued a year ago Government instituted in the Maternity Hospital at Bangalore a Birth-Control clinic for advice and supply of contraception appliances to married women who, for reasons of health or household economy, wish to restrict conception." India's primary need is the opening of several centres of the type of the Bangalore Birth-Control Clinic covering its entire area. If this is done, the second in rank amongst the three self-imposed tasks which, according to Galton, a nation ought to devote its best energies to will be directly achieved and, as a by-product, the other two will naturally follow.

35. The populations returned at the two Censuses, after having been corrected for migration in the cases of certain Provincial groups, as explained above, were compared in decennial age groups 0-9, 10-19, etc., and rates of increase of the population applicable to each of these groups were obtained. The logarithms of the rates of increase ($\log r_x$) were made the subject of graduation. The graduating curve was in this case also a cubical parabola and the process of fitting the curve was, as in the case of the graduation of the population, the method of "Least Squares".

36. In this manner were obtained the graduated values of r_x (the rate of increase at age x) in each Provincial group. The graduated population L_x at age x multiplied into $r_x^{\frac{1}{20}}$ (that is, $r_x^{\frac{1}{20}} L_x$) gave the population that would have been returned had a Census been taken six months posterior to middle date of the decennium. Similarly $r_x^{-\frac{1}{20}} L_x$ gave the population on a date six months anterior to the middle date of the decennium. The values of $p_{x+\frac{1}{2}}$ (the probability of surviving one year at age $x+\frac{1}{2}$) were obtained from the ratio $\frac{r_{x+\frac{1}{2}}^{\frac{1}{20}} L_{x+\frac{1}{2}}}{r_x^{\frac{1}{20}} L_x}$ from which the values of p_x and q_x were obtained. The methods adopted for obtaining the rates of mortality q_x relating to females were identical with those adopted in the case of the males, except that to allow for the mortality correction above referred to and for the standard Table made use of in the graduation corresponding female Tables of the 1911 Census were adopted.

37. The method detailed above yielded the rates of mortality from age 1 onwards to the end of life in each Provincial group. The important problem of allotting a value to the rate of mortality at age 0 (q_0) remained. Sir George Hardy graduated the Proclaimed Clans figures available for infantile ages up to 12 for the years from 1876 to 1891 by a formula of the type

$$l_x = A + Hx + Bc^x + \frac{m}{n x + 1} \quad (1).$$

Students of Actuarial Science will easily see that according to Makeham's modification of Gompertz's law for the Force of Mortality the following equality holds:—

$$\log l_x = A + Hx + Bc^x \quad (2).$$

Sir George, evidently, made two modifications to the Makeham formula. Firstly he dealt with l_x instead of $\log l_x$. This appears to have been adopted mainly for the facility the l_x form gave to obtain the values of L_x (the population at each age) at the young ages by integration and not from the more easy and approximate formula $L_x = \frac{l_x + l_{x+1}}{2}$ applicable to adult ages which due to the rapid fluctuation of mortality rates at the ages of infancy and childhood is inapplicable at these ages. The principle of "uniform seniority" which is obeyed by the formula when $\log l_x$ is equated to the right-hand side of equation (2) will naturally be sacri-

ficed when l_x is equated to the same quantity. This is immaterial while constructing mortality Tables not mainly intended for financial operations and even if they are, the sacrifice of the conveniences derived from this principle at the very young ages is not of any consequence. The second modification made by Sir George was the addition of the term $\frac{m}{nx+1}$ to provide for the higher mortality and the consequent faster decrement of the numbers surviving to each age at the infantile ages and ages of childhood as compared with the adult ages. This term has its maximum value at age 0 and diminishes rapidly as age increases.

38. The rate of mortality at age 0 (q_0) of Burma males was first obtained as follow :—From the graduated values of q_1, q_2, q_3, q_4 , etc., the fundamental column of the mortality Table showing the numbers surviving to each age up to 4 (l_2, l_3, l_4) out of a fixed number commencing age 1 (l_1) were calculated. The values of the constants appearing in equation (1) were obtained from these values of l . The resulting equation took the following form :—

$$l_x = 97191 \cdot 335 - 1762 \cdot 505x + 30178 \cdot 684 (\cdot 45)^x + \frac{13488 \cdot 550}{29 \cdot 8125x + 1} \text{ ——— (3)}$$

39. Having found the value of l_0 from equation (3) the constants in this equation were proportionately reduced so as to make $l_0 = 100,000$, the usual convenient radix of a mortality Table. The modified equation is given below.

$$l_x = 68999 \cdot 235 - 1251 \cdot 259x + 21424 \cdot 812 (\cdot 45)^x + \frac{9575 \cdot 953}{29 \cdot 8125x + 1} \text{ ——— (4)}$$

The resulting value of the function l_x at the young ages provided the value of q_0 for Burma and the values of this quantity for the other Provincial groups were obtained graphically using the values for Burma for the first five ages as base.

40. For constructing the mortality Table for each sex relating to the whole of India, an average age distribution applicable to each of the two Censuses 1921 and 1931 out of a total of 100,000 in each sex was obtained by weighting the numbers in each age group in each area by the total population in that area taken to the nearest million. Having thus obtained the age distribution in each Census, applicable to the whole of India out of a total of 100,000 in the usual quinary age groups 0-4, 5-9, etc., the construction of the mortality Table followed identically on the lines of the method adopted for each Provincial group.

41. The mortality Tables for each sex and for each Provincial group including those for All-India, constructed by methods detailed above, are given in pages 173—194 and called A, B, C, etc., to V.

Explanation of the Columns of the Mortality Table.

42. It is usual to say a few words at this stage explaining the fundamental columns of the mortality Table. The column, headed "Living at age x ", usually denoted by the symbol l_x , represents the number of persons alive at the beginning of each age interval out of 100,000 persons born alive. The words "born alive" are used with the view to call attention to the fact that still-births are excluded and the column refers only to survivors of living births. It should also be particularly noted that the meaning of the heading "Living at age x " is living at the beginning of the age interval x to $x+1$, that is, at the precise moment of completing the integral number of years of age x . It may also be added that the 100,000 persons under observation from birth are not assumed as having been born at the same moment. The main point to be stressed is that the flow of lives from age to age in this column is based on the assumption that every one of the 100,000 births is kept under observation from the moment of birth and a regular record is maintained as to how many are alive at exact age one year, how many at exact age two years, and so on to the end of life. The total number counted as alive at exact age one year is entered opposite to age 1 in this column and so on for other ages. This is the fundamental column of the mortality Table and shows the decrement of life from age to age throughout the whole range of life. Taking, for example, Table A, relating to All-India Males, we see that out of 100,000 chil-

dren born alive only 52,439 attain age 18, the age of majority in India. The original number is reduced to one half at about age $21\frac{1}{2}$. The proverbial "three-score and ten years" is attained only by 7,036 out of every 100,000 born.

43. The next column 3 headed "Dying between ages x and $x+1$ " shows the number dying after attaining the age shown in column 1 but before attaining the next higher age out of 100,000 persons born alive. It is merely the decrement of the numbers in column 2 and is obtained by taking the difference between successive numbers in that column. The number of deaths, very high for the age interval 0 to 1, diminishes rapidly till about age 10, 11 or 12 (there being minor variation from Province to Province) which is the most favourable period in life. From this point onwards the number of deaths increases till it attains a maximum more or less in the neighbourhood of age 40 for males and then slowly tails off to zero. In countries where the rates of mortality till about middle age are not so heavy as in India this maximum appears much later in life, that is, after age 70. Since this column indicates the number of deaths occurring in each age interval amongst a diminishing number of persons alive at the beginning of that age interval, it cannot give an adequate idea of the rate of mortality at each age. This is however given by the next column.

44. The next column headed "Mortality per cent." shows the number dying in each age interval among 100 alive at the beginning of the interval. Just as in the case of the preceding column relating to the number dying between the ages x and $x+1$ the mortality per cent. which is very large for age 0 rapidly diminishes to age 11 or 12. From this point onwards it increases slowly at first and more rapidly from and after age 50 and towards the end of the Table the rate of increase is extremely rapid.

45. Column 5 with the heading "Living between ages x and $x+1$ " has to be particularly distinguished from column 2 headed "Living at age x ". It might be of interest here to mention that the Life Table or mortality Table under explanation shows the number of persons surviving to each year of age and the number of persons dying between two consecutive integral ages in a *stationary population* undisturbed by migration and where only as many are born as die during the year in all the age periods. In other words, in the construction of the mortality Table, disturbances due to migration and irregular flow of births and deaths from year to year over the period considered are eliminated and rates of mortality obtained as applicable to the population when freed from these disturbing influences. This column shows the number of persons that would have been enumerated at each age last birthday in a stationary population supported by 100,000 births had a Census been taken at any moment during the year. In other words, the total number opposite to age 25, say, is the population between ages 25 and 26 at all fractional ages between these two integral ones.

46. The number in column 6 recorded opposite to any age shows the total population that would have been returned as of that age and all older ages to the end of the Table at a Census taken at any time. It is obtained by adding the population in the preceding column from the current age to the end of the Table. The number in this column opposite to age 0 represents the total population maintained by 100,000 births per annum in a community subject to the rates of mortality given in column 4. This column is of particular interest in so far as it enables two countries or two communities subject to different rates of mortality to be compared as regards their age distribution. Due to the heavy rates of mortality to which Indian population is subject, we find on reference, for instance, to the All-India Male Table A that about half the population is under age 24 and the other half aged 24 and above and only about a quarter of the population lives aged 40 and above, whereas, in countries subject to lighter rates of mortality these proportions occur at ages substantially later. For instance, in the United States of America (1910 experience) half the population is over 31 years of age and about one-fourth over age 50. The corresponding ages for England and Wales (1911 experience) are 33 and 51. The numbers appearing in this column can also be interpreted in another way. The number appearing, for instance, opposite to age 25 not only represents, as explained above, the total population aged 25 and upwards but also the total number of years of future life-time that would be lived by those alive at the beginning of age 25 given in column 2, namely, 47,787.

47. The next and the last column headed "Mean after life-time at age x " is also commonly known as the "expectation of life". Being, as is more or less explained by the heading itself, the mean or average future life-time lived by all persons attaining a particular age x , the number in this column opposite to any age, on the basis of the explanation given towards the end of the last paragraph, is obtained by dividing the number in column 6 by the number in column 2 appearing opposite to the same age. This expression "expectation of life" is associated in public minds with not a little confusion due to the unfortunate choice of the word "expectation" which has however come to stay. It is much better to call it "mean after life-time" or "average after life-time". People usually consider the expectation of life at any age to represent the number of years any individual of that age may "reasonably expect" still to live. This is, however, not the case. Given a large number of individuals, say, aged 30 not chosen by any selective process, we shall find persons in all states of health. The expectation of life at age 30 means only the average life-time lived by all persons of that age in the future, some living very long and others having only a short span of life. In the process of averaging we take the excess from those who live long and distribute it among those who die early, so as to place all on an equality. As applied, therefore, to any particular individual, the expectation of life has no significance whatsoever. If he is in a very bad state of health his future life-time may be far shorter and if he be in sound health it may be far longer than the expectation of life. The chief importance of this function lies in the fact that it affords a ready means of comparing two mortality Tables for the cumulative effect of mortality at all ages above any particular age.

Comparisons.

48. It will be essential before concluding the Report to compare the results arrived at by my investigations with the earlier ones. Before, however, this is done, it is necessary to stress that a few important points should be borne in mind. The essential difference between my investigation and those of my predecessors is traceable to the fact that, whereas I included in each area the British Province and the adjoining Feudatory Indian States, their investigations were confined to British Provinces only. A certain amount, therefore, of the difference between the rates of mortality as deduced by me and by my predecessors with respect to each Provincial group can, naturally, be traced to the variations in the areas dealt with. In the absence of mortality Tables constructed separately relating to the larger Indian States, it will not be possible to say how far their inclusion has tended either to increase or diminish the aggregate mortality of the respective British Province with which each of them has been grouped. It was, however, felt that the vitality of the Indian Empire should be appraised in suitable geographical groups without omitting any area and on the Census Commissioner expressing his opinion in favour of this procedure, I agreed very gladly to conduct my investigations on these lines as I was also very strongly in favour of adopting this course.

49. Another point to bear in mind, when comparing the mortality of the same Province in two different Censuses, is the fact that the rates of mortality may appear as having improved, whereas they may have deteriorated, due to improved efficiency in methods of Census enumeration showing artificially a very large increase. In illustration of this point I have only to refer to Tables XXIX and XXX showing the rates of mortality and Tables XXXI and XXXII showing expectations of life for males and females respectively in the Provincial group, Central Provinces and Hyderabad. By referring to either of these Tables, it will be evident that the mortality in this area is considerably superior in 1931 as compared with what it was in 1881. The Hyderabad State has returned at the 1931 Census a total population which is nearly 15 $\frac{3}{4}$ % in excess of the population returned at the 1921 Census, whereas the rate of increase for the whole of India is only about 10 $\frac{1}{2}$ per cent. The very large increase in the population, shown by the Hyderabad State at the 1931 Census, has been attributed by the Census Commissioner to increased efficiency of the Census staff and there can be no other convincing explanation. Since the rates of mortality depend on the rates of increase, the very large increase in population shown by the Hyderabad State should have lightened significantly the mortality rates relating to the Central Provinces, Berar and Hyderabad group. A substantial part, therefore, of the improvement in vitality shown by the Central Provinces between 1881 and 1931 might be traced to this cause.

50. There is yet a third point to be borne in mind consequent upon the deduced rates of mortality being to a certain extent sensitive to the methods of graduation adopted both with respect to the population and the rates of increase. With respect to the latter, whether a constant rate of increase at all ages or a variable one from age to age has been adopted (after graduation) also affects the results to a certain extent. Where, however, the collected statistics are subject only to minor errors due to the paucity of the data, different methods of graduation will have very little effect upon the deduced rates of mortality. With respect to the Indian Census Returns, where the errors are of very large magnitude, smoothing formulas of very great power have to be adopted with the result, above mentioned, that the calculated rates of mortality depend to a significant extent upon the smoothing formula or the formula of graduation. This is particularly so at the ages of infancy and childhood where, even in countries which place a substantial reliance on the statistics at the other ages, help has to be derived from the records of births and deaths to correct irregularities relating to them. We are without any guide whatsoever in India with respect to the flow of vital occurrences at the very young ages. The only small material on hand is nearly half a century old and therefore quite obsolete for our present purpose. It also refers only to a limited area which, as compared to the size of the Indian Subcontinent, is entirely unrepresentative of parts distant from itself. All these factors have to be borne in mind before comparisons are effected between either the results of one Province from one Census to another or of one Province with another in the same Census. If, therefore, in effecting comparison on the above lines the differences traced are only very small, it will be unsafe to attach any large significance to them.

51. The task of comparing the results brought out by me with those of my predecessors appears a huge one as I have constructed as many as twenty-two Tables for both the sexes after dividing India and Burma into ten large geographical areas. The mortality Tables corresponding to three of these areas, namely, Bihar and Orissa ; Rajputana, Ajmere-Merwara and the Central India States and Agency group ; Sind, Baluchistan and N. W. F. Province, have been constructed by me for the first time. With respect to these areas, therefore, in the absence of mortality Tables relating to the earlier Censuses, it will not be possible to say in what direction variation in mortality lay. As regards the other Provinces, I propose to draw conclusions relating to the trend of mortality on broad and general lines only.

52. The obvious way of comparing two Tables of mortality either with respect to the same locality at different epochs or of two different localities or communities at the same epoch is to compare the rates of mortality, that is, the numbers appearing in the column headed "Mortality per cent." in the Life Tables A to V. Though this method provides an effective way of comparing the trend of mortality at individual ages without the comparison being vitiated by variations at all other ages between the Tables compared, it suffers from the disadvantage of being too laborious as every age has to be compared individually. Where, therefore, it is considered desirable to eliminate minor fluctuations at individual ages, Tables could be compared in large groups of quinquennial or decennial age periods by computing what is called the probability of dying over 5 or 10 year age periods. Tables XXIX and XXX give for each sex the rates of mortality at all quinquennial age points, 0, 5, 10, etc., in each Province from the 1881 to 1931 Censuses wherever these are available. Though a general tendency may be discerned in the case of some Provinces for the rates of mortality at the adult and older ages to diminish, this is, however, subject to such large fluctuations as to make any statement to this effect devoid of its emphasis. Burma, however, shows itself to have slightly deteriorated even at these ages. A substantial improvement in the rates of mortality at the very young ages is, however, apparent in each Province. It would have been unsafe to place too much reliance on the lighter mortality, exhibited at the young ages as a result of the present analysis, due to the great unreliability of the data relating to these ages but for the fact that the available statistics of deaths pertaining to these ages have gone to confirm this inference. These statistics of deaths are, of course, not dependable but they are no more so now than formerly and, on the supposition that the amount of error has remained constant, there is room for drawing the conclusion that the mortality at the very young ages, notably in the first year after birth, has improved to a certain extent. It would,

therefore, appear that the several Baby-Week Exhibitions and other propaganda relating to the proper bringing-up of children carried on frequently during the last decade have come to bear some fruit. The Nation, therefore, should feel grateful to the organisers of these exhibitions.

53. Another point of great importance which must cause concern to workers in the cause of public welfare, especially in connection with minimising the perils attendant on maternity revealed not only by the 1931 Actuarial Analysis but also by the earlier ones, is the heavier mortality of females as compared with males practically from about age 12 to about age 45. In the other sections of the Table, female mortality is lighter than that of males. It will be of interest in this connection to refer to the rates of mortality of both the sexes with respect to England and Wales given in Tables XXIX and XXX. It will be observed that in England female mortality is, in the major part of the Table, substantially lighter than male mortality and between ages 10 and 15 where female mortality rises relatively to male mortality it only approaches the latter without exceeding it. A reference to the Life-Tables relating to other countries notably the United States of America also indicates that female mortality is throughout lighter than male mortality. The heavier mortality of females as compared with that of males from about the age of adolescence to the age when capacity for child-bearing may be expected to cease appears to be a feature of the mortality experience of Indian females. A considerable part of the heavy mortality of girls in their teens can naturally be traced to immature maternity if correct statistics are maintained according to age and cause of death. That noble piece of Legislation called by the name "Sarda Act" has not been sufficiently long on the Statute Book for its effects to make themselves evident in the decennium considered. The salutary restriction imposed by this Act against the marriage of immature boys and girls combined with increasing knowledge on matters relating to maternity and to pre-natal and post-natal ailments, will, it is hoped, make considerable part of the excess mortality of females at the reproductive ages diminish.

54. Another method of comparing mortality Tables that has been very largely adopted in the past is to compare what has been called "the mean after life-time" which is also commonly known as "the expectation of life" the method of calculation of which from the fundamental column, showing the number of survivors from age to age, of a mortality Table was explained in an earlier paragraph. The chief advantage of this quantity lies in the fact that by its use one is able to compare mortality Tables for the cumulative effect of mortality over its entire length from any given age. For instance, comparing two mortality Tables by their expectations of life, say, at age 25, one would be able to judge which of the two Tables shows in the aggregate lighter mortality from age 25 up to the end of the mortality Table. This method of comparison by expectation of life has, therefore, the advantage of not giving prominence to minor fluctuations in mortality rates at particular ages. Where, however, it is desired to compare mortality Tables over short ranges, the function called temporary expectation of life can be made use of. Tables XXXI and XXXII give the expectations of life for all the Provincial groups from 1881 to 1931 for males and females separately. By comparing the expectation of life at age 0 for two Provinces or for two different Censuses of the same Province, one is able to compare the mortality rates to which the populations of the two Provinces are subject in the former case and the variation in the mortality of the Province from one Census to another in the latter. It need hardly be mentioned that the larger the expectation of life the lighter is the mortality. It will be seen that the expectation of life at age 0 shows a substantial improvement at the 1931 Census over the other four Censuses brought in the comparison excluding that of 1921 with respect to which no expectation of life was calculated. Since the rates of mortality relating to the very young ages in India are not entirely dependable, one would rather be inclined to draw conclusions by eliminating these ages, that is, by comparing the expectation of life at age 5 or preferably age 10.

55. I shall make a few observations relating to the trend of mortality in each Province by comparing the expectations of life at age 10. These observations will be mostly confined to the male Tables. It will however be easy for any one to draw his own conclusions from the experience of female lives from a study of Table XXXII on more or less identical lines. The mortality in the Province of

Bengal does not show any decided tendency to improve substantially. Though the expectation of life at age 10 in 1931 is somewhat larger than in 1901 and in 1911, it is to a certain extent smaller than in 1891 and substantially so as compared with 1881. Bihar and Orissa, which have been dealt with separately in one group for the first time after the 1931 Census, exhibit expectations of life up to age 50 markedly superior to those of the adjoining Province of Bengal. Bombay and Madras have substantially improved as compared with 1881 but it will be remembered that they had to bear the brunt of the 1876-78 famine which accounted for the very heavy mortality and the consequent low expectations of life of these two Provinces in 1881. The expectations of life at age 10 in these two Provinces in 1931 are smaller than in 1891, the decade 1881-1891 having been one of comparative prosperity for them. Bombay shows substantial improvement in 1931 as compared with 1901 and 1911. As regards the main cause of the low expectation of life shown by Bombay in 1901 it should be observed that this Province along with Central Provinces was affected by the 1899-1901 famine though Madras was unaffected by it. The expectation of life at age 10 for the province of Madras has been keeping more or less steady from 1911 onwards. Burma has always been noted for its lighter mortality as compared with other Indian Provinces in the past which reputation it yet maintains though the expectation of life of this Province does not indicate any decided tendency to increase but is keeping more or less steady. The first Life-Table with respect to the Central Provinces was constructed after the 1881 Census and the second one after the 1931 Census. The latter, however, includes the experience of the very large population contained in H. E. H. The Nizam's Dominions. It will be seen that the Central Provinces show substantial improvement in mortality in 1931 as compared with 1881. As has already been observed, a large portion of this improvement should naturally be traced to the improved machinery of Census-taking set up by the Hyderabad State at the 1931 Census. The Punjab group, comprising the British Provinces of the Punjab and the adjoining smaller Indian States together with Kashmir, the biggest in area of all the Indian States, shows in 1931 an improvement in mortality which is decidedly substantial. In 1911, however, this Province showed the heaviest mortality of all the Indian Provinces except perhaps the United Provinces. The improvement noticed in 1931 has been such as to bring the position practically back to the 1891 level when the experience of the Province as to mortality was the lightest of all the decennial investigations. It is highly probable that a part of the improvement has been due to combining the Punjab with Kashmir noted for its highly salubrious and temperate climate. It is, however, not possible to make any definite statement to this effect before proving by Actuarial analysis that the people in Kashmir are subject to lighter mortality than those in the Punjab as other factors may be at work, for instance, low economic status, neutralising the effect of the salubrious climate. Rajputana and Ajmere-Merwara as also Sind, Baluchistan and North-West Frontier Province are two Provincial groups with respect to which mortality Tables have been constructed for the first time at the 1931 Census. The former group has indicated the heaviest mortality for males of all Provincial groups dealt with. The United Provinces show some improvement in mortality in 1931 though it is not very substantial as indicated by the small increase averaging about a year as compared with 1891 in the expectation of life up to about age 40. The improvement in mortality for the male population of the whole of India in 1931 is indicated by the value of the expectation of life at age 10 which is very nearly one year in excess of the highest value of this function which was reached in 1891. Generally speaking, it can be said that the influence of the hygienic and economic factors that prevailed in the decennium 1921-1931 was such as to bring the condition of the Indian population as to its mortality experience nearly back to the 1891 position.

56. Amongst all the Provincial groups analysed, Burma shows the lightest mortality. As a matter of fact, it has been keeping up the first rank in this respect in all the three Censuses analysed with respect to this Province. Madras which used to keep always the second rank appears to have lost a little bit of ground, as the Punjab, judged by the value of the expectation of life at age 10, has superseded it in 1931. Whether the grouping of the British Province of Madras with the adjoining Indian States has proved a disadvantage to it and the grouping of the Punjab with Kashmir has proved an advantage to the Punjab group is a matter

which requires further detailed analysis. It is, however, somewhat significant that the two Provinces, Burma and Madras, which have been indicating substantially lighter mortality than that of the other Indian Provinces, have been the least inaccurate in returning ages. Bihar and Orissa for which a Life Table has been constructed for the first time in connection with the 1931 Census indicate mortality at all ages up to 50 substantially lighter than the adjoining Provincial group, Bengal and Assam, which exhibits the worst vitality of all the Provinces except perhaps Rajputana and Ajmere-Merwara group. The difference between the vitalities of these two Provincial groups is not, however, very substantial.

57. The comparative statements detailed above have been made with special reference to the expectations of life relating to male lives of the various Provincial groups and for All-India appearing in Table XXXI. The corresponding expectations of life relating to females are given in Table XXXII. Here again Burma females show the lightest mortality. As between Madras and the Punjab females, the former show lighter mortality at all young ages up to 30 and after this age the position is reversed. The heaviest mortality amongst females is shown by the Sind, Baluchistan and North-West Frontier Province group. This is very probably due to the strict 'purdah' observed by the females in this group of which the population is predominantly Muhammadan. Vitality, only superior to that of the Provincial group just considered but inferior to the rest of India, is shown by Bengal and Assam, and Rajputana and Ajmere-Merwara groups. The former shows heavier mortality than the latter upto about age 40 after which the position is reversed. Taking female mortality as a whole it can be stated that the deterioration which set in from 1901 onwards has not yet taken a definite turn towards improvement. Whereas in the case of males the position in 1931 with respect to vitality was such as to bring it back very nearly up to the high level reached in 1891, the female vitality, however, does not indicate any recovery of the lost ground.

58. So far I have compared either the same Province at different Censuses or one Province with another at the same Census. It will, however, be interesting to compare Indian mortality with that of the other countries of the world. It has often been said that the Indian population exhibits the worst vitality of all the countries of the world which have analysed their mortality experience but, except perhaps for Tables comparing India with England, no statistics have been published so far to indicate the force of the statement that India exhibits the heaviest mortality of all civilised countries. Believing in the truism that figures speak more forcibly than words, I have taken advantage of the publication in Prof. Glover's admirable volume, "United States Life-Tables 1890—1910" of the mortality Tables relating to no less than thirteen representative countries of the world including India. These are exhibited in the six Tables from XXXIII to XXXVIII three of which relate to males and the other three to females. Prof. Glover has given in his volume extensive figures for all the functions of the mortality Tables and for each age to which none, interested in studying the comparative mortality of the countries of the world, can help referring. I have, however, chosen only three of these mortality functions and have also further condensed my Tables by giving values only at quinquennial ages. Tables XXXIII and XXXIV give for males and females respectively the number of persons that die in a year out of 1,000 observed at each quinquennial age. The very heavy rate of mortality experienced by the Indian population as compared with all the other twelve countries will be evident. It will also be observed that the ratio of the mortality in India to the mortality of the other countries is very large at the younger ages and at some age points the mortality in India is more than nearly seven times as heavy as that of countries which exhibit light mortality. As age advances there is a tendency for the ratio to diminish; yet the Indian mortality keeps substantially heavier than that of the other countries. Tables XXXV and XXXVI, showing for the two sexes how rapidly the numbers surviving to each quinquennial age out of 100,000 children born diminish, might be considered as affording a better basis for comparative study by some people. It will be seen that, in India, before age 5 is reached nearly 45,000 young lives out of 100,000 children born are lost, whereas even the country that exhibits the lowest survivorship amongst the other twelve brought into the comparison shows a wastage of only about 27,000 and Norway noted for its very light mortality loses only something less than 12,000 in the first 5 ages. Survivors to age 10 are only about half the number of children born in India and the very large number surviving

to this age in other countries will be evident from a study of the Tables. The two Tables afford a ready means of making such comparisons at all quinquennial ages and the appallingly heavy toll claimed by death in India will be evident even from a cursory scrutiny of them. Tables XXXVII and XXXVIII give the values of the expectations of life for all the countries and the small values, as compared with other countries, of this function relating to India as a sure indication of the very heavy mortality experienced by it will be evident.

59. In bringing this Report to a close, I have to draw the special attention of the authorities in charge of the registration of the vital occurrences in India to the extreme desirability, nay necessity, of focussing particular attention on a limited area in each Province with the view to obtain complete statistics of births and deaths in the locality, the latter either according to individual ages or quinquennial age periods grouped in the same manner as recommended by me for the 1941 Census enumeration. As many as six Actuarial analyses undertaken in connection with Indian Censuses have been performed by methods more or less in the nature of make-shifts and it will be extremely desirable to make the seventh and subsequent ones, at least, follow the normal and, therefore, comparatively more easy method of mortality Table construction. I know it will be practically impossible to expect the records of vital statistics with respect to the entire area in each Province in India to come up to the requisite degree of accuracy within a decade. That is why I am recommending a representative small area in each Province being subject to special scrutiny so that it may provide, by the time of the next Census, dependable records of vital occurrences. The relatively great accuracy of the records of vital statistics in the Presidency of Madras have been commented upon earlier in this Report. If this accuracy is maintained and further improved upon, we shall have by 1941 sufficient material on hand with respect to one very large Province supplying a long felt want.

60. Just when this Report is nearing completion, practically at the very moment I am writing these lines, I have received from the Census Commissioner a Table showing the deaths in the Presidency of Madras that occurred during the ten calendar years, 1921 to 1930, both inclusive. It will, therefore, not be possible for me to make any investigations making use of the statistics of deaths, in such time as to enable the results to be incorporated in this Report. This will, however, be done in a Paper I propose to submit to the Institute of Actuaries, London. The infantile deaths, *i.e.*, deaths below age one, are divided in this Table into four useful categories as follows: "under one week", "over one week (and under one month)", "over one month but not exceeding six months" and "over six months but not exceeding twelve months". With respect to higher ages, however, up to age 20, one finds the orthodox quinquennial groupings '1-4', '5-9', '10-14' and '15-19'. From age 20 onwards the groupings are decennial with one large group at the end of 60 and over. The groups could preferably be modified to be in conformity with those to be adopted in collecting population statistics at the 1941 Census. It will be essential, if the Life Tables to be constructed after the 1941 Census are to include the Indian States in the same way as the Life Tables constructed now do, that the Indian States should also make efforts to supply reliable statistics of vital occurrences in the inter-censal period between now and the date of the next Census. If this is not done and if reliable records of births and deaths are only available for British Provinces there will be no other alternative but to revert to the old method of constructing Life Tables only with reference to the British Provinces in India.

61. The situation takes a different aspect altogether when we come to consider the ages of infancy and childhood. Here without exaggeration we are simply groping in the dark and it has only been repeated too often by my predecessors and myself that the Proclaimed Clans experience of nearly half a century ago is entirely useless as giving any basis to deduce mortality rates at the very young ages applicable to the present generation of children. If the recommendations made in the previous paragraph are given effect to from now there would be sufficient statistics on hand by about the next Census date which would provide reliable basis to the investigating Actuary to deduce mortality rates not only at the ages of infancy and childhood but also at the older ages. If, however, it is found not possible just yet to give immediate effect to them in their entirety, steps should be taken to maintain accurate records of births and deaths up to

age 15 at least in representative small areas in each Province. This will provide the Actuary at the next Census with sufficient material to deduce reliable rate of mortality at the very young ages. Recommendations to this effect were made by Sir George Hardy after the 1901 Census, repeated by Mr. Ackland after 1911 Census and emphasised by Mr. Meikle after the 1921 Census, but, one has to state with regret, to no purpose. Mr. Ackland said in this connection "The record and investigation of these statistics (Proclaimed Clans statistics) apparently ceased in 1904 and, as explained earlier in the present Report and in Mr. Hardy's 1901 Report, the data furnished between 1891 and 1904 were so limited as to age as to be practically useless for the purposes desired. It is clear that results based on statistics referring to the period 1876-1890, could not properly be employed in any future investigation of Census Returns; and it is therefore most desirable, and indeed essential, if complete Life-Tables are to be deduced in future, that some effort should be made to secure trustworthy data as to the births in the several Provinces, and the deaths at the ages of infancy and childhood". Ackland's words expressed in the above terms twenty years ago, will hold even more emphatically by the time the next Census falls to be taken. It is, therefore, earnestly hoped that the Government of each Province will take the necessary steps to give effect to the recommendations in this respect at least.

Acknowledgments.

62. It is now my pleasant duty to acknowledge help from various persons which I received not only in the preparation of this Report but also in making the very elaborate calculations which the construction of the twenty-two Life Tables had involved, of which only those that have had any experience in conducting statistical investigations in all their various details would have an adequate idea. I had naturally to be in constant correspondence with Dr. Hutton, the Census Commissioner for India, and his replies to my various enquiries were prompt, full and marked by an extreme measure of courtesy which is gratefully acknowledged. I found his intimate knowledge of the conditions obtaining in the different parts of India and of Indian sociology of particular help in forming my Provincial groups. I have to express my indebtedness to my friend and colleague in the Oriental Life Office, Mr. Douglas Forrest, F.F.A., who read the Report in manuscript and gave suggestions of a useful character. As regards the help I received to complete the laborious work in connection with the preparation of the Life Tables I have been particularly fortunate, for, what I received was not help of a purely clerical nature, but help from young men aspiring for Actuarial honours and therefore imbued with the desire to learn the work. It was a pleasure to see these young men from day to day ever ready to take up with a cheerful countenance the large quantity of laborious work they were called upon to do. To one and all of them I express my gratitude and do hope that the training they received will stand them in good stead, when in the fullness of time some of them at least may be called upon to undertake investigations of a similar nature. My sincere thanks are also due to Mr. Minocher J. S. Khras, F.S.S., a friend and colleague of mine whose very long association with the Royal Statistical Society extending over a period of more than a quarter of a century was particularly helpful in placing at my disposal the vast store of Statistical knowledge carefully preserved in the pages of the Journals of that body to which and to the pages of the Journals of the Institute of Actuaries—that storehouse of knowledge on Actuarial matters—I had constantly to refer to derive inspiration when the work was in progress.

L. S. VAIDYANATHAN,

M.A., F.I.A.

ORIENTAL BUILDINGS,

Bombay, 29th March 1933,

TABLE XXIX.

Comparative Rates of Mortality (100q_x) at quinquennial ages, as deduced from the results of the 1881, 1891, 1901, 1911, 1921 and 1931 Censuses respectively in the several Provinces specified and over the combined area, with corresponding values for England.

MALE LIVES.

Age.	Bengal.						Bihar and Orissa.	Bombay.					Burma.				Central Provinces and Hyderabad.		Madras.								
	1881.	1891.	1901.	1911.		1921.		1931.	1881.	1891.	1901.	1911.	1921.		1931.	1901.	1911.	1921.	1931.	1881.	1931.	1881.	1891.	1901.	1911.	1921.	1931.
				Hindus	Mahomedans.								Hin-	Mahome-														dus.	medans.
0	28.27	28.82	29.89	29.86	..	..	24.06	23.75	28.44	26.35	20.70	20.00	..	..	23.85	23.83	22.34	..	22.30	28.44	24.90	28.75	20.35	26.81	27.30	..	23.55
5	2.29	2.86	3.03	2.97	2.00	2.65	2.22	1.51	2.43	2.58	2.81	2.60	2.95	2.53	1.78	1.93	1.74	1.99	1.59	2.43	1.53	2.71	2.58	2.34	2.55	2.43	1.04
10	1.04	1.22	1.49	1.42	.90	1.17	1.04	.45	1.19	1.10	1.26	1.03	1.28	.95	.60	.83	.75	.89	.54	1.13	.56	1.25	1.10	1.03	1.14	1.22	.60
15	1.51	1.22	1.47	1.51	1.04	1.48	1.41	.74	1.62	1.04	1.15	.95	1.30	.91	.92	.91	.77	.90	.87	1.62	.92	1.73	1.04	1.01	1.08	1.17	.91
20	1.76	1.56	1.75	1.82	1.40	1.69	1.38	1.11	1.93	1.18	1.30	1.53	1.43	.96	1.27	1.20	1.15	.95	1.14	1.95	1.30	2.06	1.18	1.21	1.15	1.23	1.18
25	1.86	1.92	2.07	2.06	1.81	1.97	1.81	1.36	2.13	1.38	1.55	2.12	1.81	1.32	1.56	1.47	1.55	1.08	1.30	2.15	1.56	2.22	1.38	1.41	1.31	1.30	1.37
30	1.99	2.32	2.42	2.34	2.36	2.38	2.41	1.66	2.35	1.64	1.90	2.03	2.29	1.95	1.88	1.73	1.82	1.35	1.52	2.39	1.85	2.37	1.61	1.66	1.64	1.72	1.73
35	2.17	2.72	2.77	2.74	3.04	2.93	3.02	2.15	2.60	1.98	2.40	3.09	2.84	2.61	2.27	1.96	1.91	1.77	2.02	2.69	2.31	2.55	1.90	2.06	2.12	2.19	2.28
40	2.46	3.16	3.12	3.24	3.80	3.57	3.65	2.81	2.88	2.44	3.05	3.56	3.50	3.32	2.76	2.19	2.04	2.29	2.49	3.03	2.89	2.79	2.24	2.66	2.71	2.79	2.81
45	2.89	3.68	3.48	3.77	4.48	4.15	4.25	3.52	3.29	3.05	3.85	4.06	4.20	4.00	3.31	2.43	2.32	2.76	2.78	3.47	3.35	3.11	2.64	3.40	3.19	3.33	3.33
50	3.47	4.30	3.97	4.38	5.19	4.78	4.81	4.32	3.97	3.85	4.80	4.67	5.03	4.82	4.04	2.73	2.73	3.29	3.12	4.13	3.73	3.61	3.13	4.20	3.72	3.97	3.90
55	4.38	5.06	4.74	5.14	5.86	5.40	5.43	5.30	5.07	4.90	5.90	5.44	5.95	5.66	5.03	3.18	3.25	3.87	3.68	5.27	4.12	4.46	3.83	5.01	4.33	4.66	4.50
60	5.88	6.21	5.97	6.30	6.58	6.11	6.17	6.60	6.71	6.30	7.26	6.46	7.11	6.73	6.32	3.98	4.51	4.59	4.62	6.99	4.73	5.84	4.93	5.93	5.06	5.49	5.43
65	8.25	7.92	8.08	8.31	7.52	7.10	7.35	8.51	9.35	8.26	9.20	7.89	8.68	8.24	8.17	5.38	6.57	5.69	6.36	9.73	6.34	8.01	6.59	7.44	6.10	6.67	6.87
70	11.96	10.48	11.62	11.80	..	..	9.42	11.32	13.42	11.11	12.52	10.01	..	..	11.00	7.75	9.36	..	9.09	13.96	10.11	11.44	9.06	10.16	7.78	..	9.37
75	17.53	14.30	17.01	17.86	..	..	14.07	15.04	19.56	15.21	17.74	13.46	..	..	15.71	11.76	13.56	..	14.07	20.32	16.02	16.79	12.78	14.66	10.70	..	13.96
80	25.32	19.99	25.27	28.32	..	..	23.43	22.56	28.33	21.35	25.73	19.74	..	..	23.58	18.00	19.74	..	21.74	29.43	23.85	24.91	18.32	21.40	16.38	..	21.88
85	36.65	23.49	36.59	44.82	..	..	38.48	35.63	41.54	30.50	37.50	31.16	..	..	37.62	27.18	28.58	..	31.90	44.00	39.91	35.48	26.62	31.07	27.22	..	35.63
90	60.00	41.20	51.22	65.73	..	..	58.57	54.38	100.00	43.89	54.00	48.72	..	..	62.13	39.71	40.49	..	44.64	100.00	56.09	60.00	38.90	44.40	45.74	..	55.48

1800

TABLE XXIX—(contd.)

Comparative Rates of Mortality (100q_x) at quinquennial ages, as deduced from the results of the 1881, 1891, 1901, 1911, 1921 and 1931 Censuses respectively, in the several Provinces specified and over the combined area, with corresponding values for England.

MALE LIVES.

Age.	Punjab.						Rajpu- taua and Ajmer- Merwara.		United Provinces.						All India.						England.				
							1931.	1931.																	
	1881.	1891.	1901.	1911.	1921.	1931.	1881.	1891.	1901.	1911.	1921.		1931.	1881.	1891.	1901.	1911.	1921.	1931.	1911.	1921.				
											Hindus.		Maho- medans.												
0	26.27	26.35	29.79	29.79	..	23.98	27.39	26.01	28.44	26.35	26.81	29.79	..	..	27.86	28.41	27.26	28.54	29.00	..	24.87	12.04	9.00
5	2.20	2.58	2.81	2.81	2.50	2.07	2.47	1.89	2.43	2.58	2.33	2.81	2.64	2.18	2.37	2.41	2.68	2.67	2.75	2.52	1.93	.49	.42		
10	1.04	1.10	1.26	1.22	1.36	.77	1.30	.90	1.14	1.10	1.03	1.26	1.27	1.06	1.05	1.11	1.14	1.24	1.25	1.22	.79	.19	.18		
15	1.41	1.02	1.24	1.77	1.38	.91	1.22	1.09	1.56	1.15	.95	1.27	1.36	1.32	1.11	1.56	1.13	1.17	1.32	1.26	.98	.23	.22		
20	1.65	1.12	1.52	2.04	1.48	1.25	1.29	1.35	1.87	1.40	1.13	1.93	1.68	1.63	1.34	1.85	1.39	1.43	1.69	1.42	1.27	.35	.3		
25	1.85	1.36	1.86	2.30	1.67	1.53	1.67	1.61	2.11	1.88	1.46	2.52	2.03	1.91	1.56	2.00	1.69	1.69	2.03	1.68	1.53	.40	.40		
30	2.05	1.67	2.16	2.62	2.01	1.78	2.33	2.11	2.33	2.28	1.91	2.94	2.37	2.29	1.91	2.18	2.04	2.02	2.37	2.10	1.93	.48	.43		
35	2.26	2.04	2.46	3.04	2.49	2.07	2.02	2.82	2.56	2.72	2.50	3.30	2.87	2.72	2.40	2.38	2.43	2.49	2.77	2.67	2.41	.62	.55		
40	2.51	2.49	2.76	3.61	3.07	2.42	3.51	3.52	2.85	3.19	3.23	3.65	3.60	3.24	2.99	2.66	2.85	3.01	3.24	3.33	2.94	.81	.69		
45	2.85	3.02	3.06	4.18	3.58	2.82	4.10	4.17	3.31	3.72	4.06	4.06	4.27	3.78	3.61	3.05	3.37	3.64	3.72	4.00	3.49	1.09	.88		
50	3.34	3.62	3.43	4.62	4.07	3.32	4.71	4.76	4.04	4.36	4.90	4.62	5.08	4.41	4.30	3.66	3.98	4.30	4.28	4.72	4.10	1.48	1.18		
55	4.10	4.36	3.99	5.14	4.61	4.06	5.51	5.36	5.22	5.21	5.77	5.41	6.00	5.12	5.16	4.61	4.78	5.09	4.98	5.46	4.81	2.11	1.76		
60	5.35	5.22	4.99	5.80	5.28	5.24	6.65	6.00	7.01	6.41	6.98	6.52	7.20	6.12	6.34	6.12	5.93	6.25	6.00	6.31	5.79	3.04	2.56		
65	7.30	6.47	6.70	6.68	6.30	7.17	8.43	7.37	9.86	8.21	9.05	8.05	8.83	7.68	8.05	8.50	7.64	8.14	7.57	7.43	7.27	4.38	3.98		
70	10.32	8.42	9.62	8.76	..	10.34	11.22	11.05	14.22	10.89	12.28	10.27	..	..	10.77	12.18	10.16	11.36	10.17	..	9.76	6.47	6.00
75	14.95	11.30	14.35	14.15	..	15.63	16.05	17.62	20.71	14.92	17.26	13.52	..	..	15.37	17.68	13.93	16.12	14.71	..	14.27	9.75	9.38
80	21.47	15.62	21.59	22.04	..	24.30	24.15	26.50	30.05	20.96	24.69	19.54	..	..	23.18	25.28	19.58	23.55	22.55	..	21.80	14.30	14.00
85	31.47	22.07	32.12	36.23	..	37.10	37.37	38.24	42.00	30.01	35.14	33.04	..	..	37.30	36.17	28.03	33.88	36.35	..	36.08	19.91	19.97
90	90.50-00	31.77	46.72	58.39	..	54.05	57.58	52.70	100.00	43.50	50.90	58.64	..	..	60.10	62.50	40.62	47.86	57.20	..	57.70	27.40	26.75

TABLE XXX.

Comparative Rates of Mortality (100q_x) at quinquennial ages, as deduced from the results of the 1881, 1891, 1901, 1911, 1921 and 1931 Censuses respectively, in the several Provinces specified and over the combined area, with corresponding values for England.

FEMALE LIVES.

Age.	Bengal.						Bihar and Orissa.	Bombay.						Burma.				O. P. and Hyderabad.		Madras.							
	1881.	1891.	1901.	1911.	1921.			1931.	1881.	1891.	1901.	1911.	1921.		1931.	1901.	1911.	1921.	1931.	1881.	1931.	1881.	1891.	1901.	1911.	1921.	1931.
					Hindus.	Mahomedans.							Hin-	Maho-														du-	medans.
0	24.12	25.36	26.05	29.76	..	..	23.36	23.23	20.29	23.19	25.85	29.59	..	..	23.45	19.06	22.07	..	20.30	24.29	22.76	24.60	23.19	23.60	25.70	..	21.46
5	2.08	2.80	3.15	2.90	2.81	3.43	1.93	1.42	2.22	2.53	2.85	2.48	3.38	3.35	2.06	1.89	1.42	2.00	1.23	2.22	1.24	2.50	2.53	2.45	2.34	2.04	1.12
10	1.08	1.39	1.71	1.44	1.55	1.93	1.07	.60	1.16	1.25	1.39	.96	1.88	1.84	1.08	.85	.53	1.08	.52	1.16	.63	1.27	1.25	1.21	1.34	1.25	.50
15	1.70	1.67	1.84	1.59	1.61	2.09	1.42	1.15	1.81	1.45	1.61	.94	1.45	1.30	1.30	1.17	.66	1.09	.99	1.81	1.20	1.92	1.44	1.32	1.24	1.27	.94
20	2.05	2.01	2.11	1.92	1.78	2.31	2.01	1.84	2.22	1.59	1.62	1.56	1.69	1.60	1.71	1.66	1.12	1.16	1.59	2.24	1.83	2.35	1.59	1.44	1.25	1.40	1.49
25	2.13	2.25	2.50	2.11	1.94	2.49	2.52	2.26	2.40	1.68	1.72	2.18	2.04	2.00	2.02	1.97	1.58	1.57	1.96	2.42	2.24	2.47	1.68	1.58	1.37	1.59	1.85
30	2.19	2.50	2.74	2.36	2.29	2.83	3.00	2.51	2.55	1.80	1.93	2.68	2.45	2.42	2.28	2.11	1.93	1.82	2.18	2.59	2.53	2.57	1.77	1.78	1.64	1.92	2.17
35	2.26	2.75	2.75	2.70	2.74	3.26	3.45	2.72	2.69	2.00	2.39	3.09	3.00	2.99	2.56	2.10	2.02	1.94	2.35	2.78	2.77	2.65	1.93	2.05	2.05	2.32	2.51
40	2.40	3.01	2.72	3.16	3.31	3.79	3.88	3.02	2.82	2.31	2.99	3.48	3.60	3.59	2.92	1.96	2.09	2.06	2.56	2.97	3.02	2.75	2.11	2.57	2.60	2.85	2.94
45	2.61	3.28	2.89	3.05	3.85	4.30	4.25	3.53	3.04	2.69	3.63	3.93	4.17	4.11	3.31	1.94	2.31	2.44	2.78	3.21	3.23	2.85	2.29	3.23	3.01	3.25	3.38
50	2.96	3.65	3.28	4.20	4.42	4.81	4.60	4.23	3.46	3.27	4.29	4.50	4.77	4.73	3.82	2.20	2.66	2.95	3.07	3.62	3.47	3.10	2.55	3.88	3.48	3.71	3.88
55	3.65	4.18	3.98	4.92	5.02	5.32	4.94	5.14	4.35	4.11	5.24	5.23	5.33	4.97	4.48	2.59	3.12	3.51	3.50	4.55	3.84	3.74	3.04	4.48	4.03	4.25	4.47
60	5.11	5.27	5.12	6.09	5.76	5.97	5.46	6.32	5.95	5.45	6.40	6.21	6.33	5.78	5.47	3.25	4.36	4.28	4.27	6.21	4.45	5.07	4.08	5.16	4.75	4.97	5.30
65	7.48	7.00	7.18	8.11	6.87	6.98	6.49	8.03	8.56	7.42	8.36	7.66	6.83	6.56	7.02	4.44	6.41	5.45	5.72	8.96	5.70	7.24	5.75	6.52	5.81	6.12	6.68
70	11.21	9.58	10.66	11.63	..	..	8.57	10.58	12.65	10.29	11.79	9.80	..	..	9.54	6.87	9.20	..	8.40	13.19	8.05	10.66	8.24	9.26	7.53	..	8.99
75	16.84	13.44	16.13	17.71	..	..	12.65	14.77	18.76	14.41	17.07	13.29	..	..	13.88	10.89	13.41	..	12.98	19.54	12.43	16.11	11.96	13.78	10.47	..	13.24
80	24.74	19.19	24.29	28.21	..	..	20.98	20.98	27.54	20.60	24.88	19.60	..	..	21.54	17.18	19.62	..	20.22	28.79	22.59	24.33	17.57	20.47	16.19	..	21.02
85	36.00	27.78	35.71	44.74	..	..	34.95	30.65	43.85	29.60	35.80	31.08	..	..	35.02	26.45	28.49	..	30.05	43.66	38.80	35.02	25.92	29.39	27.08	..	32.84
90	57.14	40.60	50.34	65.69	..	..	57.14	47.03	100.00	43.28	49.90	48.67	..	..	58.14	39.11	40.43	..	42.49	100.00	55.01	60.00	38.38	40.29	45.64	..	48.78

TABLE XXX—(contd.)

Comparative Rates of Mortality (100q,) at quinquennial ages, as deduced from the results of the 1881, 1891, 1901, 1911, 1921 and 1931 Censuses respectively, in the several Provinces specified and over the combined area, with corresponding values for England.

FEMALE LIVES.

Age.	Punjab.				Rajpu- tana and Ajmer Merwara.	Sind & N.-W. F. Pro- vinces.	United Provinces.						All India.						England.		
	1881.	1891.	1921.	1931.			1881.	1891.	1901.	1911.	1921.	1931.	1881.	1891.	1901.	1911.	1921.	1931.	1911.	1921.	
											Hindus. Maho- medans.										
0	24.12	23.19	..	23.65	24.26	25.66	24.29	23.19	27.28	29.75	..	..	25.38	24.26	23.99	25.88	28.46	..	23.23	9.77	6.94
5	2.08	2.53	3.17	2.02	1.81	1.65	2.22	2.53	2.02	2.79	2.40	2.57	2.14	2.20	2.63	2.91	2.62	2.78	1.65	.48	.42
10	1.06	1.25	1.80	1.04	.82	1.24	1.16	1.27	1.35	1.28	1.25	1.40	.98	1.14	1.31	1.49	1.20	1.55	.81	.20	.18
15	1.60	1.43	1.90	1.29	1.13	1.50	1.75	1.60	1.18	1.29	1.55	1.56	1.23	1.75	1.56	1.48	1.34	1.57	1.15	.24	.23
20	1.94	1.53	2.05	1.75	1.66	1.88	2.16	1.04	1.37	1.80	1.81	1.81	1.76	2.14	1.81	1.72	1.70	1.73	1.76	.29	.31
25	2.12	1.67	2.19	2.13	2.09	2.30	2.38	2.21	1.76	2.41	2.03	2.02	2.20	2.27	2.01	2.00	2.00	1.92	2.16	.34	.35
30	2.25	1.83	2.53	2.44	2.51	3.00	2.53	2.46	2.07	2.80	2.38	2.36	2.56	2.37	2.21	2.24	2.31	2.24	2.51	.41	.39
35	2.35	2.07	2.89	2.70	2.94	3.86	2.65	2.75	2.44	3.11	2.84	2.76	2.86	2.47	2.46	2.46	2.66	2.72	2.93	.52	.45
40	2.45	2.36	3.40	2.91	3.43	4.59	2.79	3.04	2.87	3.40	3.38	3.27	3.17	2.59	2.71	2.77	3.08	3.26	3.45	.66	.53
45	2.59	2.66	3.88	3.01	3.95	5.22	3.05	3.32	3.39	3.04	3.91	3.82	3.45	2.79	2.99	3.21	3.53	3.81	3.90	.85	.67
50	2.83	3.04	4.36	3.32	4.53	5.74	3.53	3.71	4.05	4.50	4.08	4.44	3.78	3.15	3.37	3.76	4.06	4.40	4.31	1.14	.92
55	3.37	3.57	4.88	3.84	5.27	6.19	4.51	4.33	4.87	5.27	5.51	5.17	4.21	3.89	3.07	4.49	4.74	5.01	4.75	1.61	1.32
60	4.58	4.35	5.53	4.67	6.26	6.95	6.23	5.47	6.12	6.34	6.56	6.14	4.96	5.35	5.05	5.59	5.78	5.77	5.43	2.31	1.90
65	6.53	5.61	6.58	6.00	7.75	8.38	9.08	7.29	8.15	7.86	8.12	7.70	6.31	7.73	6.77	7.50	7.44	6.99	6.66	3.34	2.99
70	9.56	7.57	..	82.47	10.33	11.67	13.47	10.00	11.40	10.02	..	..	8.75	11.42	9.32	10.67	10.12	..	8.88	5.26	4.65
75	14.30	10.50	..	12.38	14.63	18.85	19.98	14.07	16.44	13.36	..	..	13.90	17.02	13.13	15.79	14.60	..	13.01	8.08	7.59
80	21.00	14.87	..	19.48	22.35	32.03	29.43	20.16	23.94	19.41	..	..	22.24	24.93	18.83	23.24	22.49	..	20.66	12.42	11.77
85	31.13	21.37	..	32.75	35.85	53.13	41.67	29.30	34.40	32.95	..	..	33.77	36.84	27.36	33.26	36.28	..	34.76	17.34	17.47
90	48.84	31.16	..	51.82	56.14	..	100.00	42.93	48.22	58.60	..	..	48.50	63.63	40.06	45.23	59.07	..	56.67	23.83	23.85

TABLE XXXI.

Comparative Expectations of Life at decennial ages, as deduced from the results of the 1881, 1891, 1901, 1911 and 1931 Censuses respectively, in the several Provinces specified and over the combined area, with corresponding values for England.

MALE LIVES.

Age.	Bengal.					Bihar and Orissa.					Bombay.					Burma.			O. P. and Hyderabad.	
	1881.	1891.	1901.	1911.	1931.	1881.	1891.	1901.	1911.	1931.	1881.	1891.	1901.	1911.	1931.	1901.	1911.	1931.	1881.	1931.
0	24.50	22.78	21.57	21.47	24.01	28.88	23.04	20.12	22.77	22.52	27.84	30.29	31.48	30.61	22.83	28.0				
10	25.04	23.85	22.95	22.54	23.08	27.59	22.87	27.20	24.62	23.33	26.72	29.39	29.88	29.55	22.46	27.9				
20	26.58	27.77	27.50	27.10	27.08	29.97	27.38	30.87	28.39	26.43	29.01	33.28	32.82	32.49	26.92	30.22				
30	24.62	22.51	22.64	22.15	21.89	23.55	22.71	24.07	22.27	21.32	23.70	27.68	27.30	26.28	22.20	24.42				
40	19.43	17.98	18.28	17.56	17.11	17.93	18.01	18.94	16.90	17.23	18.43	22.58	22.04	20.90	17.55	19.42				
50	14.25	13.83	13.93	13.39	13.62	13.36	13.17	13.88	12.48	13.51	13.73	17.45	16.51	16.04	12.85	15.18				
60	9.42	9.89	9.52	9.27	10.16	9.39	8.65	9.55	8.73	9.94	9.55	12.18	11.00	11.04	8.43	10.57				
70	5.49	6.35	5.61	5.40	6.38	5.95	5.01	6.05	5.38	6.55	5.89	7.37	6.66	6.52	4.85	5.77				
80	2.86	3.59	2.86	2.49	2.92	3.08	2.51	3.39	2.81	3.48	2.95	3.84	3.61	3.28	2.42	2.67				
90	1.00	1.09	1.07	.95	1.00	1.20	.70	1.65	1.07	1.41	1.00	1.75	1.77	1.02	.50	1.22				

Age.	Madras.					Punjab.					Rajputana & Ajmer-Merwara.		Sind & North-West Frontier Provinces.	United Provinces.				
	1881.	1891.	1901.	1911.	1931.	1881.	1891.	1901.	1911.	1931.	1931.	1931.	1881.	1891.	1901.	1911.	1931.	
0	22.35	26.92	26.21	25.92	28.71	24.80	26.58	23.18	21.23	28.05	23.00	25.43	23.10	24.45	25.30	21.21	24.58	
10	22.92	28.70	28.93	27.78	27.61	25.57	28.07	25.45	21.38	28.07	23.60	24.47	22.97	24.10	25.25	21.44	25.45	
20	27.86	32.55	30.43	31.80	30.60	29.02	31.76	29.59	20.12	31.22	27.41	27.70	27.38	27.75	28.43	25.27	29.06	
30	23.59	26.67	24.24	25.35	24.36	24.96	25.00	24.54	21.60	25.45	21.45	21.77	22.63	22.35	22.01	20.89	23.11	
40	19.06	21.06	18.60	20.06	19.17	20.05	20.22	19.99	17.55	20.13	16.95	17.10	17.46	17.74	16.76	17.18	17.96	
50	14.28	15.91	14.05	15.74	14.79	15.07	15.55	15.43	14.15	15.09	13.10	13.43	12.91	13.55	12.64	13.47	13.61	
60	9.00	11.06	10.10	11.70	10.55	10.25	11.41	10.70	10.63	10.22	9.35	9.74	8.36	9.63	8.92	9.84	9.64	
70	5.66	6.94	6.27	7.68	6.45	6.19	7.60	6.39	6.53	5.98	5.80	5.57	4.78	6.15	5.50	6.50	5.98	
80	2.92	3.85	3.35	3.98	3.12	3.32	4.48	3.28	3.11	3.91	2.92	2.73	2.41	3.43	2.96	3.42	2.98	
90	1.00	1.32	1.56	1.50	1.13	1.20	2.26	1.38	1.13	1.19	1.00	1.07	.50	1.60	1.23	1.11	.71	

Age.	All India.					England.		
	1881.	1891.	1901.	1911.	1931.	1901.	1911.	1921.
0	23.07	24.59	23.63	22.59	26.91	44.07	46.04	55.02
10	24.00	25.46	24.73	23.36	26.38	49.65	52.35	44.64
20	28.55	29.24	28.59	27.46	29.57	41.04	43.67	45.78
30	23.80	23.66	22.00	22.45	23.60	33.08	35.29	37.40
40	18.90	18.75	17.91	18.01	18.00	25.65	27.27	29.19
50	13.93	14.28	13.59	13.97	14.31	18.89	19.85	21.36
60	9.25	10.12	9.53	10.00	10.25	12.90	13.63	14.36
70	5.44	6.48	5.80	6.19	6.35	8.02	8.23	8.75
80	2.87	3.65	3.07	3.06	3.13	4.40	4.64	4.93
90	1.00	1.09	1.23	1.15	1.12	2.32	2.37	2.82

TABLE XXXII.

Comparative Expectations of Life at decennial ages, as deduced from the results of the 1881, 1891, 1901, 1911 and 1931 Censuses respectively, in the several Provinces specified and over the combined area, with corresponding values for England.

FEMALE LIVES.

Age.	Bengal.					Bihar & Orissa.		Bombay.					Burma.			Central Provinces and Hyderabad.	
	1881.	1891.	1901.	1911.	1931.	1931.	1881.	1891.	1901.	1911.	1931.	1901.	1911.	1931.	1881.	1931.	
0	26.51	23.73	22.51	21.58	24.80	26.90	24.89	27.07	24.05	22.80	26.37	32.21	32.61	31.00	24.65	28.21	
10	34.48	32.76	32.03	32.44	31.31	33.78	32.26	36.15	33.69	33.50	34.11	38.92	40.22	37.23	31.84	34.79	
20	29.47	27.76	27.55	27.20	25.27	27.07	27.20	30.92	28.52	26.54	28.48	32.98	32.67	30.40	26.72	28.33	
30	25.34	23.62	23.86	22.45	20.98	22.54	23.27	25.69	22.98	21.57	23.66	28.96	27.21	25.76	22.69	24.08	
40	20.60	19.43	19.99	17.91	17.61	18.11	19.00	20.31	17.78	17.60	19.15	24.62	22.24	21.33	18.50	20.24	
50	15.33	15.16	15.14	13.67	14.51	13.72	14.10	15.07	13.37	13.81	14.79	19.00	16.75	16.64	13.75	16.19	
60	9.97	10.65	10.18	9.40	10.95	9.75	9.15	10.24	9.30	10.13	10.48	13.16	11.15	11.63	8.90	11.60	
70	5.69	6.68	5.87	5.43	6.85	6.21	5.19	6.33	5.58	6.62	6.46	7.77	6.72	6.89	5.03	6.88	
80	2.90	3.70	2.95	2.48	3.22	3.40	2.55	3.47	2.92	3.40	3.17	3.96	3.03	3.40	2.46	2.95	
90	1.07	1.59	1.31	.95	1.10	1.53	.50	1.59	1.20	1.42	1.11	1.83	1.77	1.68	.50	1.25	

Age.	Madras.					Punjab.			Rajputana and Ajmer-Merwara.	Sind and North-West Frontier Provinces.	United Provinces.				
	1881.	1891.	1901.	1911.	1931.	1881.	1891.	1931.	1931.	1931.	1881.	1891.	1901.	1911.	1931.
0	24.18	27.99	27.13	27.65	30.04	26.85	27.02	26.57	25.96	23.28	24.94	25.25	23.93	21.60	25.09
10	32.39	37.78	36.27	37.62	36.17	35.05	37.13	34.80	33.45	29.87	32.35	32.97	34.90	31.94	33.97
20	27.77	32.78	30.65	32.02	29.05	29.88	31.97	28.88	26.78	23.81	27.18	27.71	28.89	25.88	27.75
30	24.24	27.90	25.06	26.01	23.83	25.77	26.87	24.44	21.74	18.65	23.13	23.31	23.33	21.42	23.24
40	20.20	22.78	19.56	20.73	19.22	21.35	21.89	20.49	17.47	15.07	18.73	19.15	18.38	17.51	19.32
50	15.37	17.41	15.03	16.28	14.99	16.28	17.03	16.14	13.62	12.25	13.75	14.85	13.82	13.69	15.37
60	10.17	11.89	10.86	12.00	10.81	10.90	12.33	11.48	9.87	9.05	8.81	10.36	9.52	9.00	11.00
70	5.88	7.28	6.60	7.79	6.69	6.43	8.01	7.03	6.19	5.24	4.94	6.45	5.74	6.58	6.5
80	2.96	3.97	3.51	4.00	3.29	3.37	4.63	3.43	3.09	2.16	2.38	3.54	3.02	3.43	3.1
90	.93	1.85	1.77	1.50	1.34	1.30	2.30	1.31	1.15	..	.50	1.65	1.50	1.06	1.41

Age.	All India.					England.		
	1881.	1891.	1901.	1911.	1931.	1901.	1911.	1921.
0	25.58	25.54	23.90	23.31	26.56	47.70	50.02	59.58
10	33.42	34.40	33.86	33.74	33.61	51.98	55.02	67.53
20	28.44	29.28	28.64	27.06	27.08	43.45	46.30	48.73
30	24.48	24.69	23.82	22.99	22.30	35.43	37.84	40.26
40	20.03	20.20	19.12	18.49	18.23	27.81	29.65	31.86
50	14.96	15.59	14.50	14.28	14.65	20.63	21.87	23.69
60	9.79	10.87	10.02	10.11	10.81	14.08	14.81	16.22
70	5.67	6.80	5.98	6.22	6.74	8.74	9.13	9.95
80	2.88	3.76	3.12	3.06	3.25	4.84	5.10	5.56
90	.91	1.75	1.64	1.10	1.18	2.68	2.55	3.13

TABLE XXXIII.

Foreign Countries—Males—Annual rate of Mortality per thousand.

Taken from the published Life Tables of various countries, based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia.	Denmark.	England.	France.	Germany.	Holland.	India.	Italy.	Japan.	Norway.	Sweden.	Switzerland.	United States.
	1901-1910.	1906-1910.	1901-1910.	1898-1903.	1901-1910.	1900-1909.	1901-1910.	1901-1910.	1898-1903.	1901-1910.	1901-1910.	1901-1910.	1901-1910.
(1) Males.	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0	95.10	120.67	144.34	103.26	202.34	140.46	280.98	167.71	156.86	81.45	92.55	138.40	127.38
5	2.81	2.85	5.42	6.35	5.28	4.96	27.50	7.68	7.87	4.38	5.02	4.13	5.24
10	1.79	1.81	1.82	3.03	2.44	2.26	12.50	2.26	3.31	2.98	3.22	2.25	2.61
15	2.55	2.48	2.61	3.75	2.77	2.60	13.20	4.12	4.75	4.08	3.22	2.70	3.19
20	3.70	3.86	3.78	6.99	5.04	5.07	16.90	6.19	8.30	9.07	6.41	5.16	5.46
25	4.48	4.04	4.54	7.52	5.13	4.92	20.30	6.85	8.38	8.78	6.28	5.56	6.22
30	5.19	4.47	5.66	7.86	5.56	4.75	23.50	6.67	7.87	7.57	6.04	6.20	7.31
35	6.33	5.28	7.32	9.42	6.97	5.37	27.80	7.06	8.69	7.35	6.37	7.54	9.14
40	8.16	6.89	9.31	11.04	9.22	6.79	32.30	8.48	10.40	7.78	7.57	9.83	10.40
45	10.83	9.38	12.23	13.63	12.44	8.98	37.20	10.31	13.28	8.92	9.25	13.08	13.10
50	13.95	11.87	16.57	17.01	16.93	11.77	42.80	13.45	17.75	11.11	11.24	17.88	15.28
55	18.16	17.07	23.08	21.53	23.57	16.86	49.90	17.73	24.48	14.16	15.26	24.85	21.38
60	25.84	23.89	32.62	30.84	32.60	24.29	59.80	26.62	35.06	19.14	20.66	35.43	29.90
65	38.59	34.03	45.57	44.90	47.06	37.20	75.50	39.83	51.21	28.80	30.04	50.42	42.92
70	61.62	53.63	67.08	68.32	69.36	57.43	101.70	64.49	74.45	42.76	46.40	78.93	59.90
75	96.10	80.79	100.62	108.70	106.40	89.21	148.00	102.62	107.50	66.91	74.60	108.89	90.15
80	137.95	131.97	141.63	167.80	157.87	137.00	228.70	169.78	155.80	106.34	120.81	166.92	133.66
85	197.01	191.64	203.15	230.50	231.60	204.00	366.30	251.60	225.80	164.09	192.27	232.16	195.04
90	277.36	290.48	295.66	276.80	320.02	290.00	545.50	358.74	327.20	235.78	286.09	317.20	261.48
95	381.11	..	360.66	341.50	413.99	600.00	..	517.41	474.00	329.32	398.02	425.31	339.81
100	525.36	..	449.69	460.00	496.88	..	..	..	686.90	453.00	495.00	675.97	436.52

TABLE XXXIV.

Foreign Countries—Females—Annual rate of Mortality per thousand.

Taken from the published Life Tables of various countries based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia.	Denmark.	England.	France.	Germany.	Holland.	India.	Italy.	Japan.	Norway.	Sweden.	Switzerland.	United States.
	1901-1910.	1906-1910.	1901-1910.	1898-1903.	1901-1910.	1900-1909.	1901-1910.	1901-1910.	1898-1903.	1901-1910.	1901-1910.	1901-1910.	1901-1910.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>Females.</i>													
0	97.53	97.71	117.43	136.49	170.48	117.69	284.60	152.11	140.92	66.79	75.98	112.58	105.51
5	2.58	2.57	5.53	6.49	5.31	4.63	26.20	8.50	8.10	4.28	5.16	4.06	5.00
10	1.59	2.08	1.99	3.28	2.56	2.28	12.90	2.90	3.77	3.19	3.25	2.26	2.36
15	2.19	2.91	2.58	4.47	3.02	3.21	13.40	4.89	6.38	4.58	4.19	3.81	3.09
20	3.29	3.78	3.25	6.27	4.22	3.84	17.00	6.48	9.64	6.13	5.26	5.40	4.90
25	4.30	4.44	3.86	7.35	5.37	4.48	20.00	7.33	9.92	6.66	5.96	6.18	5.91
30	5.19	4.87	4.84	7.59	5.97	5.17	23.10	7.58	9.98	6.93	6.12	6.63	6.87
35	6.17	5.50	6.17	8.20	6.86	5.97	26.60	7.89	10.67	7.43	6.50	7.22	7.77
40	7.18	6.23	7.66	8.79	7.71	7.10	30.80	8.54	11.38	7.73	7.00	8.22	8.54
45	8.07	7.34	9.70	10.03	8.54	7.64	35.30	8.80	11.49	8.06	7.68	9.07	10.27
50	9.56	8.97	12.67	12.44	11.26	10.09	40.60	10.66	13.80	9.46	9.11	12.34	12.78
55	12.77	11.87	17.98	16.32	16.19	13.37	47.40	14.44	18.52	11.94	11.96	17.53	18.08
60	19.20	17.44	25.39	24.36	24.73	20.75	57.80	23.26	26.50	16.11	16.60	27.01	25.53
65	29.98	28.20	35.34	36.64	39.60	32.36	74.40	37.54	39.87	24.12	24.92	43.27	37.33
70	47.77	46.18	56.43	58.50	62.06	51.74	101.20	64.07	60.72	37.13	40.32	67.14	54.72
75	77.79	72.06	86.43	94.54	98.31	81.62	146.00	103.74	92.00	60.72	67.02	104.03	81.13
80	113.33	119.06	124.29	146.70	146.50	127.80	224.90	168.42	137.20	96.29	109.48	154.71	122.14
85	164.59	170.35	182.03	206.70	217.39	188.30	362.80	247.27	204.50	150.31	173.55	220.16	178.61
90	242.21	257.06	257.81	240.60	295.66	270.00	590.70	356.92	304.80	218.48	252.73	309.20	246.87
95	341.45	..	330.96	275.70	368.57	560.00	..	521.98	454.40	311.60	360.75	402.96	324.90
100	500.73	..	405.44	329.00	420.77	1000.00	..	..	677.30	396.00	440.00	590.07	393.81

TABLE XXXV.

Foreign Countries—Males—Number of survivors out of 100,000 born alive.

Taken from the published Life Tables of various countries based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia. 1901-1910.	Denmark, 1906-1910.	England, 1901-1910.	France, 1898-1903.	Germany, 1901-1910.	Holland, 1900-1909.	India, 1901-1910.	Italy, 1901-1910.	Japan, 1898-1903.	Norway, 1901-1910.	Sweden, 1901-1910.	Switzerland, 1901-1910.	United States, 1901-1910.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Males.													
0	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
5	87,585	85,229	79,398	77,692	74,211	80,243	55,308	72,816	76,887	88,366	86,491	82,409	82,195
10	86,622	84,240	78,083	75,944	72,827	78,850	50,212	71,325	74,891	86,769	84,762	81,201	80,605
15	85,789	83,461	77,297	74,818	72,007	78,010	47,213	70,264	78,602	85,475	83,538	80,335	79,544
20	84,493	82,205	76,113	72,948	70,647	76,612	43,833	68,579	71,310	82,817	81,638	78,797	77,957
25	82,802	80,523	74,546	70,230	68,881	74,684	39,973	66,303	68,304	79,068	79,037	76,718	75,679
30	80,844	78,862	72,741	67,653	67,092	72,907	35,831	64,108	65,596	75,866	76,619	74,506	73,222
35	78,607	76,988	70,472	64,839	65,104	71,155	31,533	61,962	62,976	73,104	74,381	72,060	70,342
40	75,887	74,773	67,668	61,641	62,598	69,090	27,136	59,669	60,101	70,408	71,897	69,100	66,996
45	72,479	71,879	64,230	58,033	59,405	66,532	22,803	56,962	56,743	67,579	69,050	65,364	63,304
50	68,221	68,284	59,903	53,818	55,340	63,265	18,658	53,799	52,629	64,356	65,702	60,692	58,963
55	63,107	63,730	54,435	49,004	50,186	59,107	14,787	49,838	47,523	60,507	61,801	54,703	54,075
60	56,782	57,639	47,564	43,199	43,807	53,551	11,229	44,902	41,160	55,862	56,548	47,298	47,701
65	48,670	50,114	39,278	35,998	36,079	46,287	8,002	39,198	33,384	49,827	50,040	38,402	39,996
70	38,275	40,684	29,898	27,465	27,136	36,866	5,124	29,835	24,519	41,911	41,680	28,306	31,050
75	25,962	29,370	19,754	17,815	17,586	25,800	2,736	19,762	15,570	32,206	31,227	18,014	21,547
80	14,330	17,333	10,608	8,774	8,987	14,681	1,032	10,079	7,964	21,083	19,350	8,928	12,295
85	5,995	7,373	4,349	3,037	3,212	6,085	202	3,245	2,918	10,610	8,732	3,088	5,214
90	1,652	1,968	1,117	728	683	1,636	11	580	631	3,656	2,380	645	1,492
95	244	..	149	122	74	111	..	38	57	747	332	75	208
100	15	..	18	11	4	..	..	..	1	72	20	2	25

TABLE XXXVI.

Foreign Countries—Females—Number of survivors out of 100,000 born alive.

Taken from the published Life Tables of various countries based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia. 1901-1910.	Denmark. 1906-1910.	England. 1901-1910.	France. 1898-1903.	Germany. 1901-1910.	Holland. 1900-1909.	India. 1901-1910.	Italy. 1901-1910.	Japan. 1898-1903.	Norway. 1901-1910.	Sweden. 1901-1910.	Switzerland. 1901-1910.	United States. 1901-1910.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Females.													
0	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
5	89,285	87,558	82,178	80,490	77,334	82,690	56,608	73,935	78,339	80,922	88,285	85,054	84,668
10	88,395	86,566	80,756	78,616	75,845	81,314	51,450	72,136	76,245	88,308	86,509	83,760	83,143
15	87,619	85,596	79,898	77,248	74,887	80,341	48,304	70,830	74,568	86,726	85,049	82,686	82,129
20	86,459	84,180	78,756	75,246	73,564	78,937	44,828	68,891	71,652	84,459	83,053	80,778	80,581
25	84,875	82,500	77,391	72,732	71,849	77,326	40,901	66,545	68,186	81,788	80,771	78,489	78,437
30	82,909	80,598	75,779	70,068	69,848	75,501	36,745	64,103	64,874	79,064	78,382	76,025	76,009
35	80,618	78,565	73,769	67,377	67,079	73,433	32,471	61,679	61,632	76,279	76,007	73,456	73,295
40	78,001	76,341	71,308	64,583	65,283	71,109	28,139	59,215	58,308	73,449	73,496	70,706	70,383
45	75,103	73,818	68,359	61,661	62,717	68,556	23,839	56,673	55,065	70,607	70,878	67,766	67,235
50	71,945	70,990	64,742	58,385	59,812	65,733	19,714	54,007	51,794	67,660	68,005	64,362	63,539
55	68,199	67,428	60,179	54,452	55,984	62,092	15,813	50,894	47,898	64,224	64,639	59,931	59,053
60	63,247	62,958	54,157	49,441	50,780	57,299	12,165	46,638	42,998	60,032	60,387	53,897	53,104
65	56,256	56,545	46,716	42,694	43,540	50,471	8,747	40,310	36,608	54,552	54,733	45,607	45,654
70	46,793	47,405	37,646	34,053	34,078	41,243	5,637	31,742	28,745	47,135	46,943	34,922	36,512
75	34,479	35,651	26,418	23,454	23,006	29,770	3,022	20,997	19,745	37,350	36,453	22,944	26,163
80	21,356	22,300	15,545	12,789	12,348	17,659	1,159	10,667	11,106	25,413	23,715	11,903	15,831
85	10,527	10,437	7,094	5,037	4,752	7,818	231	3,499	4,585	13,698	11,564	4,396	7,265
90	3,566	3,309	2,158	1,452	1,131	2,317	12	642	1,148	5,195	3,654	1,023	2,307
95	687	--	393	334	157	245	..	42	122	1,181	653	129	450
100	56	--	43	59	13	..	..	..	3	144	55	5	51

TABLE XXXVII.

Foreign Countries—Males—Complete expectation of life in years.

Taken from the published Life Tables of various countries based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia. 1901—1910.	Denmark. 1906—1910.	England. 1901—1910.	France. 1898—1903.	Germany. 1901—1910.	Holland. 1900—1909.	India. 1901—1910.	Italy. 1901—1910.	Japan. 1898—1903.	Norway. 1901—1910.	Sweden. 1901—1910.	Switzerland. 1901—1910.	United States. 1901—1910.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>Males.</i>													
0	55.20	54.9	48.53	45.74	44.82	51.0	22.59	44.24	43.97	54.84	54.53	49.25	49.32
5	57.91	59.4	55.90	53.57	55.15	58.3	35.01	55.32	51.90	58.92	57.90	54.52	54.82
10	53.53	55.1	51.81	49.75	51.16	54.3	33.36	51.44	48.23	52.92	54.03	50.34	50.86
15	49.03	50.5	47.31	45.45	46.71	49.8	30.32	47.17	44.02	48.69	40.79	45.86	46.50
20	44.74	46.3	43.01	41.53	42.56	45.7	27.46	43.27	40.35	45.16	45.88	41.70	42.39
25	40.60	42.2	38.86	39.03	38.59	41.8	24.86	39.66	37.02	42.18	42.31	37.76	38.59
30	36.52	38.0	34.76	34.35	34.55	37.8	22.44	35.94	33.44	38.86	38.57	33.80	34.80
35	32.49	33.9	30.79	30.71	30.53	33.6	20.16	32.09	29.73	35.24	34.08	29.87	31.12
40	28.56	29.7	26.96	27.15	26.64	29.5	18.02	28.23	26.03	31.49	30.77	26.03	27.55
45	24.78	25.9	23.27	23.64	22.94	25.6	15.97	24.45	22.42	27.70	26.93	22.37	24.01
50	21.16	22.1	19.76	20.26	19.43	21.8	13.97	20.73	18.97	23.96	23.17	18.90	20.59
55	17.67	18.5	16.48	16.95	16.16	18.1	11.99	17.18	15.73	20.32	19.54	15.68	17.21
60	14.35	15.2	13.49	13.81	13.14	14.7	10.00	13.78	12.76	16.79	16.06	12.73	14.17
65	11.31	12.1	10.80	10.96	10.40	11.6	8.04	10.74	10.14	13.51	12.81	10.09	11.40
70	8.67	9.3	8.39	8.42	7.99	8.9	6.17	8.02	7.89	10.57	9.85	7.78	8.96
75	6.58	6.9	6.41	6.34	5.97	6.7	4.47	5.82	6.00	7.98	7.29	5.81	6.79
80	4.96	5.1	4.86	4.67	4.38	4.9	3.04	4.06	4.44	5.86	5.22	4.27	5.07
85	3.65	3.7	3.53	3.91	3.18	3.5	1.94	2.90	3.19	4.26	3.66	3.18	3.79
90	2.64	2.6	2.56	3.29	2.35	2.2	1.23	2.01	2.22	3.11	2.60	2.38	2.90
95	1.88	..	2.07	2.66	1.80	1.0	..	1.29	1.48	2.24	1.89	1.63	2.21
100	1.18	..	1.53	1.93	1.50	..	..	..	0.50	1.50	1.45	1.00	1.66

TABLE XXXVIII.

Foreign Countries—Females—Complete expectation of life in years.

Taken from the published Life Tables of various countries based on their official population and Death Statistics and exhibited here in tabular form so that a comparison may be made at each age.

Age.	Australia. 1901—1910.	Denmark. 1906—1910.	England. 1901—1910.	France. 1898—1903.	Germany. 1901—1910.	Holland. 1900—1909.	India. 1901—1910.	Italy. 1901—1910.	Japan. 1898—1903.	Norway. 1901—1910.	Sweden. 1901—1910.	Switzerland. 1901—1919.	United States 1901—1910.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>Females.</i>													
0	58.84	57.9	52.38	49.13	48.33	53.4	23.31	44.83	44.85	57.72	56.98	52.15	52.54
5	60.80	61.1	58.53	55.75	57.27	59.4	35.40	55.20	51.97	59.06	59.40	56.15	56.89
10	56.39	56.7	54.53	52.03	53.35	55.4	33.74	51.53	48.34	55.09	55.58	51.98	52.89
15	51.86	52.4	50.08	47.90	49.00	51.0	30.78	47.43	44.36	51.05	51.48	47.62	48.51
20	47.52	48.2	45.77	44.02	44.84	46.9	27.96	43.69	41.06	47.35	47.66	43.69	44.39
25	43.36	44.1	41.54	40.51	40.84	42.8	25.40	40.14	38.02	43.81	43.93	39.89	40.53
30	39.33	40.1	37.36	36.93	36.94	38.8	22.99	36.58	34.84	40.24	40.20	36.10	36.75
35	35.37	36.1	33.31	33.29	33.04	34.8	20.69	32.92	31.54	36.61	36.38	32.27	33.01
40	31.47	32.0	29.37	29.60	29.16	30.8	18.49	29.18	28.19	32.93	32.53	28.43	29.28
45	27.59	28.1	25.53	25.86	25.25	26.9	16.38	25.38	24.71	29.15	28.64	24.55	25.53
50	23.69	24.1	21.81	22.14	21.35	22.9	14.28	21.47	21.11	25.31	24.74	20.71	21.86
55	19.85	20.2	18.27	18.52	17.64	19.1	12.20	17.65	17.61	21.53	20.90	17.05	18.33
60	16.20	16.5	15.01	15.08	14.17	15.5	10.11	14.02	14.32	17.85	17.19	13.67	15.09
65	12.88	13.0	11.99	11.97	11.09	12.3	8.10	10.81	11.35	14.38	13.69	10.67	12.13
70	9.96	10.0	9.25	9.21	8.45	9.4	6.22	8.02	8.77	11.23	10.53	8.15	9.52
75	7.59	7.5	7.10	7.00	6.30	7.0	4.52	5.83	6.61	8.49	7.81	6.09	7.29
80	5.73	5.5	5.36	5.38	4.65	5.2	3.06	4.11	4.85	6.29	5.64	4.51	5.43
85	4.19	4.0	3.94	4.39	3.40	3.7	1.93	2.94	3.45	4.57	4.02	3.34	4.05
90	2.99	2.9	2.94	3.84	2.59	2.4	1.10	2.01	2.36	3.31	2.91	2.45	3.05
95	2.10	..	2.32	3.33	2.10	1.1	..	1.31	1.55	2.43	2.10	1.76	2.37
100	1.24	..	1.80	2.59	1.87	..	..	..	.83	1.81	1.70	1.10	1.90

TABLE-A.
LIFE TABLE—ALL INDIA.

Males.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	24,874	24.87	85,443	2,690,881	28.01
1	75,126	6,895	9.18	71,352	2,605,438	34.68
2	68,230	3,850	5.64	66,174	2,534,088	37.14
3	64,380	2,524	3.92	63,037	2,467,912	38.33
4	61,856	1,605	2.74	60,954	2,404,875	38.88
5	60,161	1,159	1.93	59,551	2,343,921	38.96
6	59,002	853	1.45	58,576	2,284,370	38.72
7	58,149	669	1.15	57,814	2,225,794	38.28
8	57,480	539	.94	57,211	2,167,980	37.72
9	56,941	474	.83	56,704	2,110,769	37.07
10	56,467	447	.79	56,243	2,054,086	36.38
11	56,020	452	.81	55,794	1,997,822	35.66
12	55,568	485	.84	55,336	1,942,028	34.95
13	55,103	484	.88	54,861	1,886,698	34.24
14	54,619	507	.93	54,365	1,831,831	33.54
15	54,112	532	.98	53,846	1,777,468	32.85
16	53,580	558	1.04	53,301	1,723,629	32.17
17	53,022	583	1.10	52,731	1,670,319	31.50
18	52,439	607	1.16	52,135	1,617,588	30.85
19	51,832	629	1.21	51,518	1,565,453	30.20
20	51,203	649	1.27	50,878	1,513,935	29.57
21	50,554	668	1.32	50,220	1,463,057	28.94
22	49,886	684	1.37	49,544	1,412,837	28.33
23	49,202	700	1.42	48,852	1,363,293	27.71
24	48,502	715	1.47	48,145	1,314,441	27.10
25	47,787	730	1.53	47,422	1,266,299	26.50
26	47,057	747	1.59	46,683	1,218,874	25.90
27	46,310	767	1.66	45,927	1,172,191	25.31
28	45,543	792	1.74	45,147	1,126,264	24.73
29	44,751	820	1.83	44,341	1,081,117	24.16
30	43,931	850	1.93	43,506	1,036,776	23.60
31	43,081	876	2.03	42,643	993,270	23.06
32	42,206	897	2.13	41,758	950,627	22.52
33	41,309	915	2.23	40,851	908,869	22.00
34	40,394	933	2.31	39,923	868,018	21.49
35	39,461	950	2.41	38,986	828,090	20.99
36	38,511	965	2.51	38,028	789,104	20.49
37	37,546	980	2.61	37,056	751,076	20.00
38	36,566	995	2.72	36,069	714,020	19.53
39	35,571	1,008	2.83	35,067	677,951	19.06
40	34,563	1,017	2.94	34,054	642,884	18.60
41	33,546	1,023	3.05	33,035	608,830	18.15
42	32,523	1,026	3.15	32,010	575,795	17.70
43	31,497	1,029	3.27	30,982	543,785	17.26
44	30,463	1,029	3.38	29,954	512,803	16.83
45	29,439	1,027	3.49	28,925	482,849	16.40
46	28,412	1,025	3.61	27,900	453,924	15.98
47	27,387	1,020	3.72	26,877	426,024	15.56
48	26,367	1,013	3.84	25,860	399,147	15.14
49	25,354	1,006	3.97	24,851	373,287	14.72
50	24,348	998	4.10	23,849	348,436	14.31
51	23,350	988	4.23	22,866	324,587	13.90
52	22,362	975	4.36	21,875	301,731	13.49
53	21,387	962	4.50	20,906	279,856	13.09
54	20,425	949	4.65	19,950	258,950	12.68
55	19,476	936	4.81	19,008	239,000	12.27
56	18,540	923	4.98	18,079	219,992	11.87
57	17,617	909	5.16	17,162	201,913	11.46
58	16,708	895	5.36	16,261	184,751	11.06
59	15,813	880	5.57	15,373	168,490	10.66
60	14,933	864	5.79	14,501	153,117	10.26
61	14,069	848	6.03	13,645	138,616	9.85
62	13,221	832	6.29	12,805	124,971	9.45
63	12,389	816	6.59	11,981	112,166	9.05
64	11,573	800	6.91	11,173	100,185	8.66
65	10,773	783	7.27	10,381	89,012	8.26
66	9,990	766	7.67	9,607	78,631	7.87
67	9,224	748	8.11	8,850	69,024	7.48
68	8,476	730	8.61	8,111	60,174	7.10
69	7,746	710	9.17	7,391	52,063	6.72
70	7,036	687	9.76	6,693	44,672	6.35
71	6,349	665	10.47	6,016	37,979	5.98
72	5,684	640	11.26	5,364	31,963	5.62
73	5,044	613	12.16	4,738	26,599	5.27
74	4,431	583	13.16	4,139	21,861	4.93
75	3,848	549	14.27	3,574	17,722	4.61
76	3,299	512	15.53	3,043	14,143	4.29
77	2,787	470	16.86	2,552	11,105	3.98
78	2,317	425	18.34	2,104	8,553	3.69
79	1,892	378	19.98	1,703	6,449	3.41
80	1,514	330	21.80	1,349	4,746	3.13
81	1,184	283	23.90	1,043	3,397	2.87
82	901	233	26.43	782	2,354	2.61
83	663	185	28.41	565	1,572	2.37
84	468	133	32.48	392	1,007	2.15
85	318	114	36.08	269	615	1.95
86	202	80	39.44	183	365	1.76
87	122	53	43.29	96	194	1.59
88	69	33	47.61	52	98	1.43
89	36	19	52.41	27	46	1.28
90	17	10	57.70	12	19	1.12
91	7	4	63.46	5	7	1.00
92	3	2	69.70	2	3	.87
93	1	1	76.48	1	1	.75

TABLE-B.
LIFE TABLE—ALL INDIA.
Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,234	23.23	86,437	2,656,400	26.66
1	76,766	6,639	8.65	73,114	2,569,903	33.48
2	70,127	3,551	5.06	68,222	2,406,849	35.00
3	66,576	2,262	3.40	65,368	2,328,627	36.48
4	64,314	1,497	2.33	63,519	2,363,259	36.75
5	62,817	1,038	1.65	62,271	2,290,740	36.61
6	61,779	773	1.25	61,393	2,237,469	36.22
7	61,008	616	1.01	60,698	2,176,076	35.67
8	60,390	531	.88	60,125	2,115,378	35.03
9	59,859	490	.82	59,514	2,055,253	34.33
10	59,369	481	.81	59,128	1,995,639	33.61
11	58,888	494	.84	58,641	1,936,511	32.88
12	58,394	511	.88	58,139	1,877,870	32.16
13	57,883	540	.93	57,613	1,819,731	31.44
14	57,343	588	1.02	57,050	1,762,118	30.73
15	56,757	655	1.15	56,429	1,705,068	30.04
16	56,102	731	1.30	55,737	1,648,639	29.39
17	55,371	795	1.44	54,973	1,592,902	28.77
18	54,576	849	1.56	54,152	1,537,929	28.18
19	53,727	894	1.66	53,280	1,483,777	27.62
20	52,833	931	1.76	52,387	1,430,407	27.08
21	51,902	961	1.85	51,422	1,378,130	26.55
22	50,941	985	1.93	50,448	1,326,708	26.04
23	49,956	1,004	2.01	49,454	1,276,260	25.55
24	48,952	1,020	2.08	48,442	1,226,806	25.06
25	47,932	1,033	2.16	47,416	1,178,364	24.58
26	46,899	1,044	2.23	46,377	1,130,948	24.11
27	45,855	1,053	2.30	45,328	1,084,671	23.65
28	44,802	1,060	2.37	44,272	1,039,243	23.20
29	43,742	1,067	2.44	43,209	994,971	22.75
30	42,675	1,073	2.51	42,138	951,762	22.30
31	41,602	1,078	2.59	41,063	909,624	21.86
32	40,524	1,082	2.67	39,983	868,561	21.43
33	39,442	1,086	2.75	38,899	828,578	21.01
34	38,356	1,090	2.84	37,811	789,679	20.59
35	37,266	1,093	2.93	36,720	751,868	20.18
36	36,173	1,096	3.03	35,625	715,148	19.77
37	35,077	1,098	3.13	34,528	679,523	19.37
38	33,979	1,101	3.24	33,429	644,995	18.98
39	32,878	1,100	3.35	32,328	611,566	18.60
40	31,778	1,098	3.45	31,230	579,238	18.23
41	30,682	1,087	3.54	30,138	548,008	17.86
42	29,595	1,076	3.64	29,057	517,870	17.50
43	28,519	1,063	3.73	27,987	488,813	17.14
44	27,450	1,047	3.81	26,933	460,826	16.78
45	26,409	1,029	3.90	25,894	433,803	16.43
46	25,380	1,010	3.98	24,875	407,999	16.08
47	24,370	990	4.06	23,875	383,124	15.72
48	23,380	969	4.14	22,896	359,249	15.37
49	22,411	947	4.23	21,937	336,353	15.01
50	21,464	925	4.31	21,002	314,416	14.65
51	20,539	903	4.40	20,087	293,414	14.29
52	19,636	880	4.48	19,196	273,327	13.92
53	18,756	857	4.57	18,328	254,131	13.55
54	17,899	834	4.65	17,482	235,803	13.17
55	17,065	811	4.75	16,659	218,321	12.79
56	16,254	790	4.86	15,859	201,662	12.41
57	15,464	769	4.97	15,080	185,803	12.02
58	14,695	751	5.11	14,319	170,723	11.62
59	13,944	734	5.26	13,577	156,404	11.22
60	13,210	718	5.43	12,851	142,827	10.81
61	12,492	703	5.63	12,141	129,976	10.40
62	11,789	689	5.84	11,444	117,835	10.00
63	11,100	676	6.09	10,762	106,391	9.58
64	10,424	663	6.36	10,093	95,629	9.17
65	9,761	650	6.66	9,436	85,536	8.76
66	9,111	639	7.01	8,791	76,100	8.35
67	8,472	627	7.40	8,159	67,309	7.94
68	7,845	615	7.84	7,537	59,150	7.54
69	7,230	603	8.33	6,920	51,613	7.14
70	6,627	589	8.88	6,333	44,684	6.74
71	6,038	574	9.51	5,781	38,353	6.35
72	5,464	559	10.23	5,185	32,601	5.97
73	4,905	542	11.04	4,634	27,416	5.59
74	4,363	522	11.96	4,102	22,782	5.22
75	3,841	500	13.01	3,591	18,680	4.86
76	3,341	474	14.18	3,104	15,080	4.52
77	2,867	445	15.53	2,644	11,985	4.18
78	2,422	414	17.10	2,215	9,341	3.86
79	2,008	377	18.78	1,820	7,126	3.55
80	1,631	337	20.66	1,462	5,306	3.25
81	1,294	296	22.85	1,146	3,844	2.97
82	998	253	25.36	872	2,698	2.70
83	745	210	28.18	640	1,820	2.45
84	535	168	31.31	451	1,188	2.22
85	367	128	34.76	393	735	2.00
86	239	92	38.51	193	432	1.81
87	147	53	42.68	115	239	1.63
88	84	39	46.97	65	124	1.48
89	45	23	51.66	33	59	1.31
90	22	12	60.07	10	26	1.18
91	10	6	61.09	7	10	1.00
92	4	3	67.63	3	3	.75
93	1	1	73.67	..	..	..

TABLE—C.
LIFE TABLE—BENGAL, ASSAM AND SIKKIM.

Males.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after-life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	24,066	24.06	85,937	2,491,271	24.01
1	75,044	6,954	9.27	71,248	2,405,874	32.08
2	68,090	3,960	5.82	65,078	2,334,026	34.29
3	64,130	2,635	4.11	62,732	2,268,848	35.38
4	61,405	1,826	2.97	60,532	2,205,916	35.87
5	59,669	1,323	2.22	58,976	2,146,384	35.95
6	58,346	1,008	1.73	57,842	2,096,408	35.76
7	57,338	812	1.42	56,932	2,028,666	35.38
8	56,526	690	1.22	56,181	1,971,634	34.88
9	55,836	616	1.10	55,528	1,915,453	34.30
10	55,220	572	1.04	54,934	1,859,925	33.68
11	54,648	550	1.01	54,373	1,804,991	33.03
12	54,098	546	1.01	53,825	1,750,618	32.36
13	53,552	552	1.03	53,276	1,696,793	31.68
14	53,000	564	1.06	52,718	1,643,517	31.01
15	52,436	580	1.11	52,146	1,590,789	30.34
16	51,856	599	1.15	51,557	1,538,653	29.67
17	51,257	620	1.21	50,947	1,487,096	29.01
18	50,637	640	1.26	50,317	1,436,149	28.36
19	49,997	660	1.32	49,667	1,385,832	27.72
20	49,337	681	1.38	48,996	1,336,165	27.08
21	48,656	703	1.45	48,305	1,287,169	26.45
22	47,953	728	1.52	47,589	1,238,864	25.83
23	47,225	757	1.60	46,846	1,191,275	25.23
24	46,468	791	1.70	46,073	1,144,429	24.63
25	45,677	829	1.81	45,262	1,098,356	24.05
26	44,848	867	1.93	44,415	1,053,094	23.48
27	43,981	903	2.05	43,529	1,008,679	22.93
28	43,078	936	2.17	42,610	965,150	22.40
29	42,142	966	2.29	41,659	922,540	21.89
30	41,176	992	2.41	40,680	880,881	21.39
31	40,184	1,017	2.53	39,676	840,201	20.91
32	39,167	1,039	2.65	38,647	800,525	20.44
33	38,128	1,057	2.77	37,600	761,878	19.98
34	37,071	1,073	2.89	36,534	724,278	19.54
35	35,998	1,087	3.02	35,455	687,744	19.11
36	34,911	1,097	3.14	34,362	652,289	18.68
37	33,814	1,106	3.27	33,261	617,927	18.27
38	32,708	1,111	3.40	32,153	584,666	17.88
39	31,597	1,114	3.52	31,040	552,513	17.49
40	30,483	1,113	3.65	29,926	521,473	17.11
41	29,370	1,108	3.77	28,816	491,547	16.74
42	28,262	1,100	3.89	27,712	462,731	16.37
43	27,163	1,090	4.01	26,617	435,019	16.02
44	26,072	1,078	4.13	25,534	408,402	15.68
45	24,996	1,061	4.25	24,466	382,888	15.33
46	23,935	1,044	4.36	23,413	358,402	14.97
47	22,891	1,023	4.46	22,380	334,039	14.63
48	21,869	1,000	4.57	21,369	312,609	14.29
49	20,869	978	4.69	20,380	291,240	13.96
50	19,891	956	4.81	19,413	270,860	13.63
51	18,935	934	4.93	18,468	251,447	13.28
52	18,001	910	5.06	17,546	232,979	12.94
53	17,091	886	5.18	16,648	215,433	12.61
54	16,205	860	5.31	15,776	198,785	12.27
55	15,345	833	5.43	14,923	183,010	11.93
56	14,512	808	5.55	14,109	168,082	11.58
57	13,706	780	5.69	13,316	153,973	11.23
58	12,926	754	5.83	12,549	140,657	10.88
59	12,173	729	5.99	11,808	128,108	10.53
60	11,443	706	6.17	11,090	116,300	10.16
61	10,737	684	6.37	10,395	105,210	9.80
62	10,053	662	6.59	9,723	94,815	9.43
63	9,391	640	6.82	9,071	85,093	9.09
64	8,751	618	7.06	8,442	76,022	8.66
65	8,133	598	7.35	7,834	67,580	8.31
66	7,535	578	7.67	7,246	59,746	7.93
67	6,957	558	8.02	6,678	52,500	7.55
68	6,399	538	8.41	6,130	45,822	7.16
69	5,861	520	8.87	5,601	39,692	6.77
70	5,341	503	9.42	5,089	34,091	6.38
71	4,838	486	10.05	4,595	29,002	5.99
72	4,352	469	10.78	4,118	24,407	5.61
73	3,883	453	11.67	3,656	20,289	5.23
74	3,430	437	12.74	3,212	16,633	4.85
75	2,993	421	14.07	2,783	13,421	4.48
76	2,572	401	15.59	2,372	10,639	4.14
77	2,171	374	17.23	1,984	8,267	3.81
78	1,797	342	19.03	1,626	6,283	3.50
79	1,455	307	21.10	1,301	4,657	3.20
80	1,148	269	23.43	1,014	3,358	2.92
81	879	220	26.05	764	2,342	2.66
82	650	188	28.92	556	1,578	2.33
83	463	148	32.03	388	1,022	2.21
84	314	110	35.03	259	634	2.02
85	204	78	38.43	185	375	1.84
86	128	53	42.03	100	210	1.67
87	73	33	45.85	56	110	1.51
88	40	20	49.88	30	54	1.36
89	20	11	54.12	15	24	1.20
90	9	5	58.67	6	9	1.00
91	4	3	63.24	3	3	.78
92	1	1	68.12	..	..	..

TABLE-D.
LIFE TABLE—BENGAL, ASSAM AND SIKKIM.

Females.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,350	23.36	86,324	2,479,720	24.80
1	76,644	6,438	8.40	73,126	2,393,396	31.23
2	70,206	3,036	5.18	68,205	2,320,270	33.05
3	68,570	2,405	3.61	65,292	2,252,905	33.83
4	64,165	1,655	2.58	63,293	2,180,713	34.08
5	62,510	1,209	1.93	61,880	2,123,420	33.97
6	61,301	950	1.55	60,828	2,061,540	33.63
7	60,351	783	1.30	59,960	2,000,714	33.16
8	59,508	696	1.17	59,220	1,940,754	32.58
9	58,872	649	1.11	58,547	1,881,531	31.96
10	58,223	624	1.07	57,911	1,822,987	31.31
11	57,599	628	1.09	57,285	1,765,076	30.64
12	56,971	652	1.14	56,645	1,707,791	29.99
13	56,319	688	1.22	55,975	1,651,146	29.32
14	55,631	733	1.32	55,265	1,595,171	28.67
15	54,898	782	1.42	54,507	1,539,908	28.05
16	54,116	833	1.54	53,699	1,485,399	27.45
17	53,283	884	1.66	52,841	1,431,700	26.87
18	52,399	932	1.78	51,933	1,378,859	26.31
19	51,467	975	1.90	50,980	1,326,926	25.78
20	50,492	1,013	2.01	49,985	1,275,946	25.27
21	49,479	1,045	2.11	48,957	1,225,961	24.87
22	48,434	1,073	2.21	47,897	1,177,004	24.30
23	47,351	1,098	2.32	46,812	1,129,107	23.84
24	46,233	1,120	2.42	45,703	1,082,285	23.39
25	45,143	1,138	2.52	44,574	1,036,592	22.96
26	44,005	1,152	2.62	43,420	992,018	22.54
27	42,853	1,164	2.72	42,271	948,589	22.14
28	41,689	1,172	2.81	41,103	906,318	21.74
29	40,517	1,178	2.91	39,928	865,215	21.35
30	39,339	1,180	3.00	38,749	825,287	20.98
31	38,159	1,180	3.09	37,569	786,538	20.61
32	36,979	1,177	3.18	36,391	748,969	20.25
33	35,802	1,171	3.27	35,216	712,578	19.90
34	34,631	1,163	3.36	34,050	677,362	19.56
35	33,468	1,153	3.45	32,891	643,312	19.22
36	32,315	1,141	3.53	31,745	610,421	18.89
37	31,174	1,128	3.62	30,610	578,676	18.56
38	30,046	1,114	3.71	29,489	548,066	18.24
39	28,932	1,093	3.80	28,383	518,577	17.92
40	27,834	1,080	3.88	27,294	490,194	17.61
41	26,754	1,060	3.96	26,224	462,900	17.30
42	25,691	1,038	4.04	25,175	436,676	17.00
43	24,656	1,014	4.11	24,140	411,501	16.69
44	23,642	989	4.18	23,147	387,352	16.38
45	22,653	963	4.25	22,172	364,205	16.08
46	21,690	937	4.32	21,221	342,033	15.77
47	20,753	911	4.39	20,298	320,812	15.46
48	19,842	885	4.46	19,399	300,514	15.15
49	18,957	859	4.53	18,528	281,115	14.83
50	18,098	833	4.60	17,681	262,587	14.51
51	17,265	808	4.67	16,862	244,906	14.19
52	16,459	779	4.73	16,070	228,044	13.86
53	15,680	752	4.80	15,304	211,974	13.52
54	14,928	727	4.87	14,564	196,670	13.17
55	14,201	702	4.94	13,850	182,106	12.82
56	13,499	678	5.02	13,160	168,256	12.40
57	12,821	655	5.11	12,494	155,096	12.10
58	12,166	634	5.21	11,849	142,602	11.72
59	11,532	614	5.32	11,225	130,753	11.34
60	10,918	596	5.46	10,620	119,528	10.95
61	10,322	580	5.62	10,032	108,908	10.55
62	9,742	564	5.79	9,460	98,870	10.15
63	9,178	550	6.00	8,903	89,416	9.74
64	8,628	537	6.22	8,359	80,513	9.33
65	8,091	525	6.49	7,829	72,154	8.92
66	7,568	514	6.79	7,309	64,325	8.50
67	7,052	504	7.15	6,800	57,018	8.09
68	6,548	498	7.57	6,300	50,216	7.67
69	6,052	487	8.05	5,808	43,916	7.26
70	5,565	477	8.57	5,327	38,108	6.85
71	5,088	467	9.19	4,854	32,781	6.44
72	4,621	466	9.87	4,393	27,927	6.04
73	4,165	445	10.68	3,943	23,534	5.65
74	3,720	432	11.61	3,504	19,591	5.27
75	3,288	416	12.65	3,080	16,087	4.89
76	2,872	399	13.88	2,672	13,007	4.53
77	2,473	378	15.29	2,284	10,335	4.18
78	2,095	354	16.90	1,918	8,051	3.84
79	1,741	327	18.78	1,578	6,133	3.52
80	1,414	296	20.93	1,266	4,553	3.22
81	1,118	261	23.35	987	3,289	2.94
82	857	222	25.90	740	2,392	2.69
83	635	182	28.66	544	1,550	2.45
84	453	144	31.79	381	1,012	2.23
85	309	108	34.95	255	631	2.04
86	201	76	37.81	163	378	1.87
87	125	50	40.00	100	213	1.70
88	75	33	44.00	59	113	1.51
89	42	21	50.00	31	54	1.29
90	21	12	57.14	15	24	1.10
91	9	6	66.67	6	8	0.89
92	3	2	70.84	2	2	0.77
93	1	1	97.00	1	1	0.67

TABLE-E.
LIFE TABLE—BIHAR AND ORISSA.

Males.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time at age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,745	23.75	86,144	2,888,060	28.88
1	76,255	6,830	8.96	72,504	2,801,916	36.74
2	69,425	3,681	5.30	67,448	2,729,412	39.31
3	65,744	2,294	3.49	64,513	2,661,986	40.49
4	63,450	1,453	2.29	62,672	2,597,453	40.84
5	61,997	935	1.51	61,496	2,534,781	40.89
6	61,062	619	1.01	60,753	2,473,283	40.60
7	60,443	434	.72	60,226	2,412,530	39.91
8	60,009	331	.55	59,843	2,352,304	39.30
9	59,678	282	.47	59,537	2,292,481	38.41
10	59,396	266	.45	59,263	2,232,924	37.59
11	59,120	275	.46	58,993	2,173,661	36.76
12	58,855	303	.51	58,703	2,114,688	35.93
13	58,562	341	.58	58,382	2,055,965	35.11
14	58,211	384	.66	58,019	1,997,583	34.32
15	57,827	429	.74	57,612	1,939,564	33.54
16	57,398	473	.82	57,162	1,881,952	32.79
17	56,925	516	.91	56,687	1,824,790	32.06
18	56,409	554	.98	56,132	1,768,123	31.24
19	55,855	585	1.05	55,562	1,711,991	30.65
20	55,270	611	1.11	54,965	1,656,429	29.97
21	54,659	634	1.16	54,342	1,601,464	29.30
22	54,025	655	1.21	53,697	1,547,122	28.64
23	53,370	674	1.26	53,033	1,493,425	27.98
24	52,696	692	1.31	52,350	1,440,392	27.33
25	52,004	709	1.36	51,650	1,388,042	26.69
26	51,295	726	1.42	50,932	1,336,392	26.06
27	50,569	744	1.47	50,197	1,285,480	25.43
28	49,825	763	1.53	49,443	1,235,283	24.79
29	49,062	783	1.60	48,671	1,185,820	24.17
30	48,279	803	1.66	47,877	1,137,149	23.55
31	47,476	827	1.74	47,063	1,089,272	22.94
32	46,649	854	1.83	46,222	1,042,209	22.34
33	45,795	882	1.93	45,354	995,987	21.75
34	44,913	913	2.03	44,456	950,633	21.17
35	44,000	945	2.15	43,528	906,177	20.60
36	43,065	978	2.27	42,566	862,649	20.04
37	42,077	1,012	2.41	41,571	820,083	19.49
38	41,065	1,045	2.54	40,542	778,512	18.96
39	40,020	1,072	2.68	39,484	737,970	18.44
40	38,948	1,095	2.81	38,401	698,466	17.92
41	37,853	1,115	2.95	37,295	660,035	17.44
42	36,738	1,134	3.09	36,172	622,790	16.96
43	35,604	1,151	3.23	35,029	586,618	16.48
44	34,453	1,165	3.38	33,870	551,589	16.01
45	33,288	1,172	3.52	32,702	517,719	15.55
46	32,116	1,179	3.67	31,527	485,017	15.10
47	30,937	1,182	3.82	30,346	453,490	14.66
48	29,755	1,184	3.98	29,163	423,144	14.22
49	28,571	1,185	4.15	27,978	393,981	13.79
50	27,388	1,184	4.32	26,794	366,003	13.35
51	26,202	1,179	4.50	25,613	339,209	12.95
52	25,023	1,172	4.68	24,437	313,696	12.53
53	23,851	1,164	4.88	23,269	289,159	12.12
54	22,687	1,153	5.08	22,110	265,890	11.72
55	21,534	1,140	5.30	20,964	243,780	11.32
56	20,394	1,126	5.52	19,831	222,816	11.22
57	19,268	1,110	5.76	18,713	202,985	10.83
58	18,158	1,093	6.02	17,612	184,273	10.15
59	17,065	1,075	6.30	16,527	166,660	9.77
60	16,990	1,056	6.60	15,462	150,133	9.39
61	14,934	1,035	6.93	14,417	134,671	9.02
62	13,899	1,011	7.28	13,393	120,254	8.65
63	12,888	986	7.65	12,395	106,881	8.29
64	11,902	959	8.06	11,423	94,466	7.94
65	10,943	931	8.51	10,477	83,043	7.59
66	10,012	901	9.00	9,562	72,566	7.25
67	9,111	868	9.53	8,677	63,004	6.92
68	8,243	831	10.08	7,827	54,327	6.59
69	7,412	792	10.68	7,016	46,500	6.27
70	6,620	749	11.32	6,246	39,484	5.96
71	5,871	704	11.99	5,519	33,233	5.66
72	5,167	656	12.70	4,839	27,719	5.36
73	4,511	606	13.44	4,208	22,860	5.07
74	3,905	555	14.22	3,627	18,673	4.78
75	3,350	504	15.04	3,088	15,045	4.49
76	2,848	458	16.08	2,617	11,947	4.20
77	2,388	414	17.35	2,181	9,330	3.91
78	1,974	372	18.85	1,788	7,149	3.62
79	1,602	330	20.57	1,437	5,361	3.35
80	1,272	287	22.56	1,189	3,924	3.08
81	985	243	24.67	863	2,795	2.84
82	742	200	26.95	642	1,932	2.60
83	542	161	29.71	462	1,290	2.33
84	381	124	32.55	319	828	2.17
85	257	82	35.63	211	609	1.95
86	165	64	38.93	133	298	1.81
87	101	43	42.45	79	165	1.63
88	58	27	46.20	45	86	1.45
89	31	16	50.18	23	41	1.32
90	15	8	54.33	11	18	1.20
91	7	4	58.81	5	7	1.00
92	3	2	63.46	2	2	.69
93	1	1	68.34	1	1	.48

TABLE-F.
LIFE TABLE—BIHAR AND ORISSA.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time, age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,235	23.23	86,481	2,689,787	26.90
1	76,775	6,879	8.96	72,983	2,603,306	33.91
2	69,886	3,594	5.14	67,959	2,530,323	36.20
3	66,392	2,197	3.31	65,121	2,462,364	37.14
4	64,105	1,373	2.14	63,370	2,397,243	37.40
5	62,732	899	1.42	62,259	2,333,873	37.20
6	61,843	612	.99	61,537	2,271,614	36.73
7	61,231	457	.75	61,003	2,210,077	36.09
8	60,774	379	.62	60,584	2,149,074	35.36
9	60,395	354	.59	60,213	2,088,400	34.58
10	60,041	301	.60	59,861	2,028,272	33.78
11	59,680	303	.66	59,484	1,968,411	32.98
12	59,288	445	.75	59,065	1,908,927	32.20
13	58,843	511	.87	58,588	1,849,803	31.44
14	58,332	585	1.00	58,039	1,791,274	30.71
15	57,747	662	1.15	57,418	1,733,235	30.01
16	57,085	739	1.29	56,718	1,675,819	29.36
17	56,346	812	1.44	55,940	1,619,103	28.74
18	55,534	880	1.58	55,094	1,563,183	28.15
19	54,654	939	1.72	54,184	1,508,069	27.59
20	53,715	988	1.84	53,221	1,453,885	27.07
21	52,727	1,024	1.94	52,215	1,400,664	26.58
22	51,703	1,052	2.04	51,177	1,348,449	26.08
23	50,651	1,074	2.12	50,114	1,297,273	25.61
24	49,577	1,099	2.20	49,033	1,247,158	25.16
25	48,483	1,098	2.26	47,939	1,198,126	24.71
26	47,390	1,101	2.32	46,839	1,150,186	24.27
27	46,289	1,100	2.38	45,739	1,103,347	23.84
28	45,189	1,097	2.43	44,641	1,057,608	23.40
29	44,092	1,090	2.47	43,547	1,012,967	22.97
30	43,002	1,081	2.51	42,461	969,420	22.54
31	41,921	1,071	2.56	41,386	926,959	22.11
32	40,850	1,060	2.59	40,320	885,573	21.68
33	39,790	1,048	2.63	39,266	845,253	21.24
34	38,742	1,038	2.67	38,224	805,087	20.80
35	37,706	1,024	2.73	37,194	767,763	20.36
36	36,682	1,012	2.76	36,178	730,569	19.92
37	35,670	1,002	2.81	35,169	694,393	19.47
38	34,668	995	2.87	34,170	659,224	19.02
39	33,673	989	2.94	33,179	625,054	18.56
40	32,684	986	3.02	32,191	591,875	18.11
41	31,699	984	3.10	31,206	559,684	17.66
42	30,714	982	3.20	30,223	528,478	17.21
43	29,732	980	3.30	29,242	498,255	16.76
44	28,752	979	3.40	28,263	469,013	16.31
45	27,773	979	3.53	27,284	440,751	15.87
46	26,794	978	3.65	26,305	413,467	15.43
47	25,818	978	3.78	25,328	387,162	15.00
48	24,840	974	3.92	24,353	361,834	14.57
49	23,865	971	4.07	23,380	337,481	14.14
50	22,895	968	4.23	22,411	314,101	13.72
51	21,927	964	4.40	21,445	291,690	13.30
52	20,963	959	4.57	20,484	270,245	12.89
53	20,005	951	4.75	19,530	249,761	12.48
54	19,054	942	4.94	18,583	230,231	12.08
55	18,112	931	5.14	17,646	211,648	11.69
56	17,181	918	5.34	16,722	194,002	11.29
57	16,263	905	5.56	15,811	177,280	10.90
58	15,358	890	5.80	14,913	161,469	10.51
59	14,468	875	6.04	14,030	146,556	10.13
60	13,593	859	6.32	13,164	132,626	9.75
61	12,734	843	6.62	12,312	119,362	9.37
62	11,891	824	6.93	11,479	107,050	9.00
63	11,067	803	7.27	10,665	95,671	8.64
64	10,262	784	7.64	9,870	84,906	8.27
65	9,478	761	8.03	9,097	75,036	7.92
66	8,717	738	8.47	8,348	65,939	7.56
67	7,979	712	8.92	7,623	57,591	7.22
68	7,267	685	9.43	6,925	49,968	6.88
69	6,582	657	9.99	6,253	43,043	6.54
70	5,925	627	10.58	5,612	36,790	6.21
71	5,298	597	11.28	4,999	31,178	5.89
72	4,701	566	12.03	4,418	26,179	5.57
73	4,135	533	12.88	3,869	21,701	5.26
74	3,603	496	13.78	3,355	17,892	4.97
75	3,107	459	14.77	2,878	14,537	4.68
76	2,648	420	15.85	2,438	11,659	4.40
77	2,228	379	17.00	2,038	9,221	4.14
78	1,849	337	18.24	1,681	7,183	3.88
79	1,512	296	19.55	1,364	5,502	3.64
80	1,216	255	20.98	1,088	4,138	3.40
81	961	217	22.53	853	3,050	3.17
82	744	180	24.25	654	2,197	2.95
83	564	148	26.18	490	1,543	2.74
84	416	119	28.28	357	1,053	2.53
85	298	91	30.65	252	690	2.34
86	207	60	33.28	173	444	2.14
87	138	50	36.21	113	271	1.96
88	88	35	39.46	70	158	1.80
89	53	23	43.06	42	83	1.66
90	30	14	47.03	23	46	1.53
91	16	8	51.41	12	23	1.44
92	8	4	56.22	6	11	1.39
93	4	2	61.49	3	6	1.25
94	3	1	67.24	1	3	1.00
95		1	73.89			

TABLE-C.
LIFE TABLE—BOMBAY.

Males.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time at age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,850	23.85	86,086	2,783,652	27.84
1	76,150	6,919	9.09	72,368	2,697,566	35.42
2	69,231	3,809	5.50	67,169	2,625,193	37.02
3	65,362	2,470	3.78	64,037	2,558,039	39.14
4	62,892	1,580	2.52	62,052	2,494,062	39.66
5	61,306	1,094	1.78	60,724	2,431,950	39.67
6	60,212	745	1.24	59,840	2,371,226	39.33
7	59,467	533	0.90	59,198	2,311,386	39.87
8	58,929	423	0.72	58,717	2,252,188	38.22
9	58,506	365	0.62	58,324	2,193,471	37.49
10	58,141	350	0.60	57,966	2,135,147	36.72
11	57,701	302	0.53	57,610	2,077,181	35.94
12	57,429	386	0.67	57,236	2,019,571	35.17
13	57,043	425	0.75	56,830	1,962,335	34.40
14	56,618	474	0.84	56,381	1,905,505	33.66
15	56,144	516	0.92	55,896	1,849,124	32.94
16	55,628	554	1.00	55,351	1,793,238	32.24
17	55,074	591	1.07	54,779	1,737,887	31.56
18	54,483	621	1.14	54,172	1,683,108	30.89
19	53,862	650	1.21	53,537	1,628,936	30.24
20	53,212	677	1.27	52,874	1,575,399	29.61
21	52,535	700	1.33	52,185	1,522,525	28.98
22	51,835	719	1.39	51,475	1,470,340	28.37
23	51,116	739	1.45	50,747	1,418,865	27.76
24	50,377	758	1.50	49,998	1,368,118	27.16
25	49,619	776	1.56	49,231	1,318,120	26.56
26	48,843	793	1.62	48,446	1,268,839	25.98
27	48,050	810	1.69	47,645	1,220,443	25.40
28	47,240	826	1.75	46,827	1,172,798	24.83
29	46,414	842	1.81	45,993	1,125,971	24.26
30	45,572	858	1.88	45,143	1,079,978	23.70
31	44,714	874	1.95	44,277	1,034,835	23.14
32	43,840	890	2.03	43,395	990,558	22.59
33	42,950	905	2.11	42,498	947,163	22.05
34	42,045	920	2.19	41,585	904,665	21.52
35	41,125	935	2.27	40,657	863,080	20.99
36	40,190	949	2.36	39,718	822,423	20.46
37	39,241	963	2.45	38,759	782,707	19.95
38	38,278	976	2.55	37,790	743,048	19.44
39	37,303	989	2.65	36,808	704,158	18.93
40	36,313	1,001	2.76	35,812	669,350	18.43
41	35,312	1,011	2.86	34,807	633,538	17.94
42	34,301	1,019	2.97	33,791	598,731	17.46
43	33,282	1,025	3.08	32,770	564,940	16.97
44	32,257	1,029	3.19	31,742	532,170	16.50
45	31,228	1,033	3.31	30,712	500,428	16.02
46	30,195	1,037	3.43	29,678	469,716	15.56
47	29,158	1,041	3.57	28,638	440,040	15.09
48	28,117	1,045	3.73	27,594	411,402	14.63
49	27,072	1,048	3.87	26,548	383,808	14.18
50	26,024	1,051	4.04	25,499	357,260	13.73
51	24,973	1,052	4.21	24,447	331,761	13.28
52	23,921	1,053	4.40	23,394	307,314	12.85
53	22,868	1,053	4.61	22,342	283,920	12.42
54	21,815	1,049	4.81	21,290	261,578	11.99
55	20,766	1,043	5.03	20,245	240,288	11.57
56	19,723	1,036	5.25	19,205	220,043	11.16
57	18,687	1,026	5.49	18,174	200,838	10.75
58	17,661	1,015	5.75	17,153	182,664	10.34
59	16,646	1,003	6.03	16,145	165,511	9.94
60	15,643	989	6.32	15,148	149,366	9.53
61	14,654	973	6.64	14,168	134,218	9.16
62	13,681	955	6.98	13,203	120,050	8.77
63	12,726	935	7.35	12,259	106,847	8.40
64	11,791	913	7.74	11,334	94,588	8.02
65	10,878	889	8.17	10,434	83,264	7.65
66	9,989	863	8.64	9,557	72,820	7.29
67	9,126	835	9.15	8,709	63,263	6.93
68	8,291	805	9.70	7,888	54,554	6.58
69	7,486	772	10.31	7,100	46,666	6.23
70	6,714	739	11.00	6,345	39,566	5.89
71	5,976	703	11.77	5,623	33,221	5.56
72	5,273	665	12.61	4,940	27,598	5.23
73	4,607	624	13.55	4,295	22,658	4.82
74	3,983	581	14.58	3,692	18,363	4.41
75	3,402	534	15.71	3,135	14,671	4.01
76	2,868	486	16.96	2,625	11,436	3.62
77	2,382	437	18.36	2,164	8,511	3.24
78	1,945	387	19.92	1,751	6,747	2.87
79	1,553	337	21.65	1,390	4,996	2.51
80	1,221	288	23.58	1,077	3,606	2.16
81	933	240	25.77	813	2,529	1.81
82	693	196	28.22	595	1,716	1.46
83	497	164	31.00	420	1,121	1.11
84	343	117	34.12	284	701	0.76
85	226	85	37.62	184	417	0.41
86	141	59	41.54	111	233	0.23
87	82	38	45.92	63	122	0.12
88	44	22	50.79	33	59	0.05
89	22	12	56.18	16	26	0.02
90	10	6	62.13	7	10	0.01
91	4	3	69.67	3	3	0.00
92	1	1	75.85	1	1	0.00

TABLE-H:
LIFE TABLE—BOMBAY.

Females.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time at age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,460	23.46	86,270	2,637,235	26.37
1	76,550	6,482	8.47	73,013	2,559,965	33.32
2	70,068	3,708	5.29	68,092	2,477,952	35.36
3	66,360	2,482	3.74	65,045	2,409,860	36.31
4	63,878	1,735	2.72	62,965	2,344,815	36.71
5	62,143	1,279	2.06	61,476	2,281,850	36.72
6	60,864	1,001	1.64	60,304	2,220,374	36.48
7	59,863	826	1.38	59,450	2,160,010	36.08
8	59,037	719	1.22	58,877	2,100,560	35.58
9	58,318	653	1.13	57,989	2,041,883	35.01
10	57,660	625	1.08	57,348	1,983,894	34.41
11	57,035	615	1.08	56,727	1,926,546	33.78
12	56,420	624	1.11	56,108	1,869,819	33.14
13	55,796	645	1.16	55,474	1,813,711	32.51
14	55,151	675	1.22	54,813	1,758,237	31.88
15	54,478	710	1.30	54,121	1,703,424	31.27
16	53,768	746	1.39	53,393	1,649,303	30.68
17	53,020	782	1.48	52,629	1,595,910	30.10
18	52,239	815	1.56	51,831	1,543,281	29.54
19	51,423	844	1.64	51,001	1,491,450	29.00
20	50,579	867	1.71	50,145	1,440,449	28.48
21	49,712	885	1.78	49,270	1,390,304	27.97
22	48,827	898	1.84	48,378	1,341,034	27.47
23	47,929	911	1.90	47,473	1,292,656	26.97
24	47,018	921	1.95	46,558	1,245,183	26.48
25	46,097	929	2.02	45,633	1,198,625	26.00
26	45,168	935	2.07	44,701	1,152,993	25.53
27	44,233	939	2.12	43,763	1,108,292	25.06
28	43,294	941	2.17	42,824	1,064,529	24.59
29	42,353	943	2.23	41,881	1,021,705	24.12
30	41,410	944	2.28	40,938	979,824	23.66
31	40,466	944	2.33	39,994	938,886	23.20
32	39,522	944	2.39	39,050	898,892	22.74
33	38,578	913	2.41	38,107	859,842	22.29
34	37,635	942	2.50	37,164	821,735	21.83
35	36,693	941	2.56	36,222	784,571	21.38
36	35,752	940	2.63	35,283	748,349	20.93
37	34,812	939	2.70	34,343	713,067	20.48
38	33,873	937	2.77	33,404	678,724	20.04
39	32,936	936	2.84	32,468	645,320	19.59
40	32,000	934	2.92	31,533	612,852	19.15
41	31,066	929	2.99	30,602	581,319	18.71
42	30,137	924	3.07	29,675	550,717	18.27
43	29,213	920	3.15	28,753	521,042	17.84
44	28,293	913	3.23	27,830	492,289	17.40
45	27,380	907	3.31	26,927	464,453	16.96
46	26,473	900	3.40	26,023	437,526	16.53
47	25,573	893	3.49	25,126	411,503	16.09
48	24,680	886	3.59	24,237	386,377	15.66
49	23,794	880	3.70	23,354	362,140	15.22
50	22,914	875	3.82	22,477	338,786	14.79
51	22,039	869	3.94	21,604	316,309	14.35
52	21,170	860	4.06	20,740	294,705	13.92
53	20,310	852	4.20	19,884	273,965	13.49
54	19,458	844	4.34	19,038	254,081	13.06
55	18,614	835	4.48	18,197	235,045	12.63
56	17,779	826	4.65	17,366	216,848	12.20
57	16,953	817	4.82	16,544	199,482	11.77
58	16,136	810	5.02	15,731	182,938	11.34
59	15,326	802	5.23	14,925	167,207	10.91
60	14,524	794	5.47	14,127	152,282	10.48
61	13,730	787	5.73	13,337	138,155	10.06
62	12,943	778	6.01	12,554	124,818	9.64
63	12,165	769	6.32	11,780	112,264	9.23
64	11,396	759	6.66	11,017	100,484	8.83
65	10,637	747	7.02	10,263	89,467	8.41
66	9,890	735	7.43	9,523	79,204	8.01
67	9,155	722	7.89	8,794	69,681	7.61
68	8,433	707	8.38	8,079	60,887	7.22
69	7,726	690	8.93	7,381	52,808	6.84
70	7,036	671	9.54	6,701	45,427	6.46
71	6,365	650	10.21	6,040	38,726	6.08
72	5,715	629	11.01	5,400	32,686	5.73
73	5,086	604	11.88	4,784	27,286	5.36
74	4,482	574	12.80	4,195	22,502	5.02
75	3,908	542	13.88	3,637	18,307	4.68
76	3,366	507	15.07	3,113	14,670	4.36
77	2,859	470	16.43	2,624	11,557	4.04
78	2,389	430	18.00	2,174	8,933	3.74
79	1,959	385	19.68	1,789	6,759	3.45
80	1,574	339	21.54	1,406	4,993	3.17
81	1,235	293	23.71	1,088	3,588	2.91
82	942	247	26.18	819	2,500	2.65
83	695	200	28.82	595	1,681	2.42
84	495	157	31.79	416	1,088	2.19
85	338	118	35.02	279	670	1.98
86	220	80	39.03	177	391	1.78
87	134	58	43.06	105	214	1.60
88	76	36	47.58	58	109	1.43
89	40	21	52.61	30	61	1.28
90	19	11	58.14	13	21	1.11
91	8	6	64.18	6	8	1.00
92	3	2	70.72	2	2	.87
93	1	1	77.77	..	..	..

TABLE-I.
LIFE TABLE—BURMA.

Males.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	22,300	22.30	87,026	3,060,866	30.61
1	77,700	6,707	8.63	74,025	2,973,840	38.57
2	70,993	3,690	5.20	69,015	2,899,815	40.85
3	67,303	2,351	3.49	66,046	2,830,800	42.06
4	64,952	1,523	2.35	64,140	2,674,754	42.67
5	63,429	1,008	1.59	62,893	2,700,614	42.88
6	62,421	688	1.10	62,058	2,637,721	42.26
7	61,733	497	.81	61,149	2,575,665	41.72
8	61,236	391	.64	61,040	2,514,516	41.06
9	60,845	338	.56	60,676	2,453,476	40.32
10	60,607	324	.54	60,345	2,392,800	39.55
11	60,183	352	.58	60,007	2,332,455	38.76
12	59,831	387	.65	59,638	2,272,448	37.98
13	59,444	427	.72	59,230	2,212,810	37.23
14	59,017	472	.80	58,781	2,153,580	36.49
15	58,545	512	.87	58,289	2,094,799	35.78
16	58,033	547	.94	57,759	2,036,510	35.09
17	57,486	577	1.00	57,198	1,978,751	34.42
18	56,909	602	1.06	56,608	1,921,553	33.77
19	56,307	622	1.10	55,996	1,864,945	33.12
20	55,685	637	1.14	55,367	1,808,949	32.49
21	55,048	650	1.18	54,723	1,753,582	31.86
22	54,398	660	1.21	54,068	1,698,859	31.23
23	53,738	668	1.24	53,404	1,644,791	30.61
24	53,070	673	1.27	52,734	1,591,387	29.99
25	52,397	679	1.30	52,057	1,538,653	29.37
26	51,718	687	1.33	51,375	1,486,596	28.74
27	51,031	697	1.37	50,682	1,435,221	28.12
28	50,334	710	1.41	49,979	1,384,539	27.51
29	49,624	725	1.46	49,261	1,334,560	26.89
30	48,899	745	1.52	48,527	1,285,299	26.28
31	48,154	770	1.60	47,769	1,236,772	25.68
32	47,384	802	1.69	46,983	1,189,003	25.09
33	46,582	839	1.80	46,162	1,142,020	24.52
34	45,743	875	1.91	45,306	1,095,858	23.90
35	44,868	908	2.02	44,414	1,050,552	23.41
36	43,960	938	2.13	43,491	1,006,138	22.89
37	43,022	963	2.24	42,540	962,647	22.38
38	42,059	981	2.33	41,569	920,107	21.88
39	41,078	993	2.42	40,582	878,538	21.39
40	40,085	1,000	2.49	39,585	837,956	20.90
41	39,085	995	2.55	38,587	798,371	20.43
42	38,090	990	2.60	37,595	759,784	19.95
43	37,100	985	2.66	36,608	722,189	19.47
44	36,115	980	2.71	35,625	685,581	18.98
45	35,135	975	2.78	34,647	649,956	18.50
46	34,160	970	2.84	33,675	615,309	18.01
47	33,190	964	2.90	32,708	581,634	17.52
48	32,226	957	2.97	31,748	548,926	17.03
49	31,269	951	3.04	30,793	517,178	16.54
50	30,318	947	3.12	29,845	486,385	16.04
51	29,371	944	3.21	28,899	456,540	15.54
52	28,427	942	3.31	27,956	427,641	15.04
53	27,485	941	3.42	27,014	399,685	14.54
54	26,544	940	3.54	26,074	372,671	14.04
55	25,604	941	3.68	25,134	346,597	13.54
56	24,663	943	3.82	24,191	321,463	13.03
57	23,720	946	3.99	23,247	297,272	12.53
58	22,774	951	4.18	22,299	274,025	12.03
59	21,823	957	4.39	21,345	251,726	11.53
60	20,866	965	4.62	20,383	230,381	11.04
61	19,901	974	4.89	19,414	209,998	10.55
62	18,927	984	5.20	18,435	190,584	10.07
63	17,943	994	5.54	17,446	172,149	9.59
64	16,949	1,005	5.93	16,447	154,703	9.13
65	15,944	1,014	6.36	15,437	138,256	8.67
66	14,930	1,009	6.76	14,425	122,819	8.23
67	13,921	1,004	7.21	13,419	108,394	7.79
68	12,917	1,001	7.75	12,417	94,975	7.35
69	11,916	998	8.38	11,417	82,558	6.93
70	10,918	992	9.09	10,422	71,141	6.52
71	9,926	982	9.89	9,435	60,719	6.12
72	8,944	964	10.78	8,462	51,284	5.73
73	7,980	939	11.77	7,510	42,823	5.37
74	7,041	906	12.87	6,588	35,312	5.02
75	6,135	863	14.07	5,704	28,724	4.68
76	5,272	811	15.38	4,866	23,020	4.37
77	4,461	749	16.79	4,067	18,154	4.07
78	3,712	679	18.30	3,372	14,067	3.79
79	3,033	607	20.02	2,730	10,695	3.53
80	2,426	523	21.74	2,162	7,965	3.28
81	1,898	447	23.57	1,674	5,803	3.06
82	1,451	370	25.50	1,266	4,129	2.85
83	1,081	298	27.53	932	2,863	2.65
84	783	232	29.66	667	1,931	2.47
85	561	176	31.90	463	1,264	2.29
86	375	129	34.34	311	801	2.14
87	246	90	36.89	201	490	1.99
88	156	61	39.23	125	289	1.85
89	95	40	41.89	75	164	1.73
90	55	25	44.64	43	89	1.62
91	30	14	47.60	23	46	1.53
92	16	8	50.48	12	23	1.44
93	8	4	53.53	6	11	1.33
94	4	2	56.70	3	6	1.25
95	2	1	59.97	2	3	1.00
96	1	1	63.25	..	..	..

TABLE—J.
LIFE TABLE—BURMA.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	20,300	20.30	88,207	3,000,000	31.00
1	79,700	6,187	7.76	76,205	3,011,783	37.79
2	73,513	3,275	4.45	71,750	2,935,488	38.98
3	70,238	2,017	2.87	69,154	2,863,738	40.77
4	68,221	1,265	1.86	67,543	2,794,584	40.96
5	66,956	822	1.23	66,519	2,727,041	40.73
6	66,134	567	.86	65,848	2,660,522	40.23
7	65,567	424	.65	65,353	2,594,674	39.57
8	65,143	352	.54	64,967	2,529,319	38.83
9	64,791	329	.51	64,626	2,464,352	38.04
10	64,462	335	.52	64,295	2,399,726	37.23
11	64,127	365	.57	63,945	2,335,431	36.42
12	63,762	414	.65	63,550	2,271,480	35.62
13	63,348	478	.75	63,110	2,207,936	34.85
14	62,872	546	.87	62,590	2,144,826	34.11
15	62,320	619	.99	62,017	2,082,227	33.41
16	61,707	692	1.12	61,361	2,020,210	32.74
17	61,015	762	1.25	60,634	1,958,849	32.10
18	60,253	827	1.37	59,840	1,898,215	31.50
19	59,426	894	1.49	58,984	1,838,375	30.94
20	58,542	933	1.59	58,070	1,779,391	30.40
21	57,609	970	1.68	57,124	1,721,315	29.89
22	56,639	999	1.76	56,140	1,664,191	29.38
23	55,640	1,023	1.84	55,129	1,608,051	28.90
24	54,618	1,039	1.90	54,099	1,552,922	28.43
25	53,579	1,051	1.96	53,053	1,498,823	27.97
26	52,528	1,057	2.01	51,999	1,445,770	27.52
27	51,471	1,060	2.06	50,941	1,393,771	27.08
28	50,411	1,060	2.10	49,881	1,342,830	26.64
29	49,351	1,057	2.14	48,823	1,292,949	26.20
30	48,294	1,052	2.18	47,769	1,244,126	25.76
31	47,242	1,046	2.21	46,719	1,196,358	25.32
32	46,196	1,038	2.25	45,677	1,149,639	24.89
33	45,158	1,030	2.28	44,643	1,103,962	24.45
34	44,128	1,022	2.33	43,617	1,059,319	24.01
35	43,106	1,014	2.35	42,599	1,015,702	23.58
36	42,092	1,006	2.39	41,589	973,103	23.12
37	41,086	999	2.43	40,587	931,514	22.67
38	40,087	991	2.47	39,592	890,927	22.23
39	39,096	984	2.51	38,604	851,335	21.78
40	38,112	977	2.56	37,624	812,731	21.33
41	37,135	967	2.60	36,646	775,107	20.87
42	36,168	958	2.65	35,684	738,461	20.42
43	35,210	949	2.69	34,736	702,777	19.96
44	34,261	938	2.74	33,792	668,041	19.50
45	33,323	927	2.78	32,860	634,249	19.03
46	32,396	917	2.83	31,938	601,389	18.56
47	31,479	906	2.87	31,026	569,451	18.09
48	30,573	897	2.93	30,125	538,425	17.61
49	29,676	889	3.00	29,232	508,300	17.13
50	28,787	883	3.07	28,346	479,068	16.64
51	27,904	877	3.14	27,466	450,722	16.15
52	27,027	871	3.22	26,591	423,256	15.66
53	26,156	865	3.31	25,723	396,685	15.17
54	25,291	859	3.40	24,862	370,942	14.67
55	24,432	855	3.50	24,005	346,080	14.17
56	23,577	852	3.61	23,151	322,075	13.66
57	22,725	850	3.74	22,300	298,924	13.15
58	21,875	852	3.89	21,440	276,624	12.65
59	21,023	855	4.07	20,596	255,175	12.14
60	20,168	861	4.27	19,738	234,579	11.63
61	19,307	868	4.49	18,873	214,841	11.13
62	18,439	874	4.74	18,002	195,968	10.63
63	17,565	883	5.03	17,124	177,966	10.13
64	16,682	893	5.35	16,235	160,842	9.64
65	15,789	904	5.72	15,337	144,607	9.16
66	14,885	914	6.14	14,428	129,270	8.69
67	13,971	922	6.60	13,510	114,842	8.22
68	13,049	929	7.12	12,585	101,333	7.77
69	12,120	935	7.71	11,653	88,747	7.32
70	11,185	939	8.40	10,715	77,094	6.89
71	10,246	933	9.11	9,770	66,379	6.48
72	9,313	923	9.90	8,852	56,600	6.08
73	8,390	907	10.82	7,937	47,748	5.69
74	7,483	887	11.85	7,039	39,811	5.32
75	6,596	857	12.98	6,168	32,772	4.97
76	5,739	816	14.23	5,331	26,604	4.64
77	4,923	768	15.57	4,540	21,273	4.32
78	4,157	707	17.02	3,804	16,733	4.03
79	3,450	641	18.57	3,130	12,929	3.75
80	2,809	568	20.22	2,525	9,799	3.49
81	2,241	493	21.98	1,995	7,274	3.25
82	1,748	417	23.84	1,540	5,279	3.02
83	1,331	344	25.81	1,169	3,739	2.81
84	987	275	27.88	860	2,580	2.61
85	712	214	30.05	605	1,730	2.43
86	498	161	32.33	417	1,125	2.26
87	337	117	34.72	270	708	2.10
88	220	82	37.20	179	420	1.95
89	138	55	39.80	111	250	1.81
90	83	35	42.49	66	139	1.68
91	48	22	45.20	37	73	1.53
92	26	13	48.10	20	30	1.39
93	13	7	51.20	9	16	1.23
94	6	3	54.20	5	7	1.17
95	3	2	57.43	2	2	1.07
96	1	1	60.74	..	..	..

TABLE-K.
LIFE TABLE—CENTRAL PROVINCES, BERAR AND HYDERABAD.

Males.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time at age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100 000	24,805	24.80	85,440	2,809,528	28.10
1	75,105	6,915	9.21	71,302	2,724,088	28.27
2	68,190	3,682	5.40	66,209	2,632,783	28.00
3	64,508	2,280	3.53	63,284	2,586,577	40.10
4	62,228	1,437	2.31	61,459	2,523,293	40.65
5	60,791	928	1.53	60,296	2,461,834	40.80
6	59,863	626	1.05	59,850	2,401,538	40.12
7	59,237	455	.77	59,010	2,341,988	39.54
8	58,782	367	.62	58,598	2,282,978	38.84
9	58,415	330	.56	58,250	2,224,390	38.08
10	58,085	325	.56	57,923	2,166,130	37.26
11	57,760	343	.59	57,588	2,108,207	36.50
12	57,417	378	.66	57,228	2,050,619	35.71
13	57,039	422	.74	56,828	1,993,301	34.95
14	56,617	469	.83	56,383	1,936,583	34.20
15	56,148	515	.92	55,890	1,880,180	33.49
16	55,633	560	1.01	55,353	1,824,290	32.79
17	55,073	603	1.09	54,772	1,768,937	32.12
18	54,470	639	1.17	54,150	1,714,165	31.47
19	53,831	669	1.24	53,497	1,660,015	30.84
20	53,162	693	1.30	52,815	1,606,518	30.22
21	52,469	714	1.36	52,112	1,553,703	29.61
22	51,755	730	1.41	51,390	1,501,591	29.01
23	51,025	745	1.46	50,653	1,450,201	28.42
24	50,280	759	1.51	49,900	1,399,548	27.84
25	49,521	773	1.56	49,135	1,349,648	27.26
26	48,748	787	1.61	48,354	1,300,513	26.68
27	47,961	799	1.67	47,562	1,252,159	26.11
28	47,162	812	1.72	46,756	1,204,597	25.54
29	46,350	825	1.78	45,937	1,157,841	24.98
30	45,525	842	1.85	45,104	1,111,904	24.42
31	44,683	859	1.92	44,254	1,066,800	23.87
32	43,824	880	2.01	43,394	1,022,646	23.33
33	42,944	902	2.10	42,493	979,162	22.80
34	42,042	925	2.20	41,579	936,669	22.28
35	41,117	951	2.31	40,642	895,090	21.77
36	40,166	977	2.43	39,677	854,448	21.27
37	39,189	999	2.55	38,690	814,771	20.79
38	38,190	1,019	2.67	37,680	776,081	20.32
39	37,171	1,034	2.78	36,654	738,401	19.88
40	36,137	1,044	2.89	35,615	701,747	19.43
41	35,093	1,050	2.99	34,568	666,133	18.93
42	34,043	1,052	3.09	33,517	631,564	18.55
43	32,991	1,050	3.18	32,466	598,047	18.13
44	31,941	1,044	3.27	31,419	565,581	17.71
45	30,897	1,036	3.35	30,379	534,163	17.29
46	29,861	1,025	3.43	29,349	503,783	16.87
47	28,836	1,011	3.51	28,330	474,434	16.45
48	27,825	996	3.58	27,327	446,104	16.03
49	26,829	981	3.66	26,339	418,777	15.61
50	25,848	965	3.73	25,365	392,438	15.18
51	24,883	948	3.81	24,409	367,073	14.75
52	23,935	930	3.89	23,470	342,664	14.32
53	23,005	91	3.96	22,550	319,194	13.87
54	22,094	892	4.04	21,648	296,644	13.43
55	21,202	874	4.12	20,765	274,996	12.97
56	20,328	857	4.22	19,899	254,231	12.51
57	19,471	841	4.33	19,051	234,333	12.03
58	18,630	826	4.43	18,217	215,281	11.56
59	17,804	813	4.57	17,397	197,064	11.07
60	16,991	804	4.73	16,589	179,667	10.57
61	16,187	789	4.94	15,788	163,078	10.07
62	15,388	790	5.19	14,988	147,290	9.57
63	14,589	802	5.50	14,188	132,302	9.07
64	13,787	810	5.88	13,382	118,114	8.57
65	12,977	822	6.34	12,568	104,732	8.07
66	12,156	826	6.88	11,737	92,166	7.58
67	11,319	851	7.52	10,894	80,429	7.11
68	10,468	865	8.26	10,035	69,535	6.64
69	9,603	876	9.13	9,165	59,500	6.20
70	8,727	883	10.11	8,286	50,335	5.77
71	7,844	880	11.22	7,404	42,049	5.36
72	6,964	868	12.46	6,530	34,645	4.97
73	6,086	843	13.82	5,674	28,115	4.61
74	5,253	804	15.31	4,831	22,441	4.27
75	4,449	753	16.92	4,073	17,590	3.96
76	3,696	690	18.66	3,351	13,517	3.66
77	3,006	617	20.52	2,697	10,166	3.33
78	2,389	538	22.50	2,120	7,469	3.13
79	1,851	456	24.62	1,623	5,349	2.89
80	1,395	375	26.85	1,208	3,728	2.67
81	1,020	298	29.21	871	2,518	2.47
82	722	229	31.70	607	1,647	2.28
83	493	169	34.31	409	1,040	2.11
84	324	120	37.05	264	631	1.95
85	204	81	39.91	163	367	1.80
86	123	53	42.90	97	204	1.66
87	70	32	46.01	64	107	1.53
88	38	19	49.24	28	63	1.39
89	19	10	52.61	14	25	1.24
90	9	5	56.09	7	11	1.22
91	4	2	59.70	3	4	1.00
92	2	1	63.44	1	1	.60
93	1	1	67.30	..	..	..

TABLE—L.
LIFE TABLE—CENTRAL PROVINCES, BERAR AND HYDERABAD.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	22,758	22.76	86,702	2,820,506	28.21
1	77,242	6,398	8.28	73,722	2,733,804	35.39
2	70,844	3,378	4.77	69,019	2,660,082	37.55
3	67,466	2,029	3.01	66,372	2,591,083	38.41
4	65,437	1,243	1.90	64,770	2,524,691	38.58
5	64,194	794	1.24	63,772	2,459,921	38.32
6	63,400	549	.87	63,125	2,396,149	37.79
7	62,851	421	.67	62,641	2,333,024	37.12
8	62,430	368	.59	62,246	2,270,383	36.37
9	62,062	303	.48	61,880	2,208,137	35.58
10	61,699	266	.43	61,566	2,146,257	34.79
11	61,313	430	.70	61,098	2,084,751	34.00
12	60,883	490	.81	60,638	2,023,653	33.24
13	60,393	561	.93	60,113	1,963,015	32.50
14	59,832	636	1.06	59,514	1,902,902	31.80
15	59,198	711	1.20	58,840	1,843,388	31.14
16	58,485	784	1.34	58,093	1,784,548	30.51
17	57,701	853	1.48	57,275	1,726,455	29.92
18	56,848	914	1.61	56,391	1,669,180	29.36
19	55,934	966	1.73	55,451	1,612,789	28.83
20	54,968	1,007	1.83	54,464	1,557,338	28.33
21	53,961	1,040	1.93	53,441	1,502,874	27.85
22	52,921	1,065	2.01	52,399	1,449,433	27.39
23	51,856	1,086	2.09	51,313	1,397,044	26.94
24	50,770	1,102	2.17	50,219	1,345,731	26.51
25	49,668	1,113	2.24	49,111	1,295,512	26.08
26	48,555	1,120	2.31	47,995	1,246,401	25.67
27	47,435	1,123	2.37	46,874	1,198,406	25.26
28	46,312	1,123	2.43	45,750	1,151,532	24.86
29	45,189	1,120	2.48	44,629	1,105,782	24.47
30	44,069	1,116	2.53	43,511	1,061,163	24.08
31	42,953	1,109	2.58	42,399	1,017,642	23.69
32	41,844	1,100	2.63	41,284	975,243	23.31
33	40,744	1,090	2.68	40,199	933,949	22.92
34	39,654	1,080	2.72	39,114	893,750	22.54
35	38,574	1,069	2.77	38,039	854,636	22.16
36	37,505	1,058	2.82	36,976	816,597	21.77
37	37,447	1,046	2.87	35,924	779,621	21.39
38	35,401	1,034	2.92	34,884	743,697	21.01
39	34,367	1,021	2.97	33,857	708,813	20.62
40	33,346	1,008	3.02	32,842	674,956	20.24
41	32,338	994	3.07	31,841	642,114	19.86
42	31,344	979	3.12	30,854	610,273	19.47
43	30,365	962	3.17	29,884	579,419	19.08
44	29,403	942	3.20	28,932	549,535	18.69
45	28,461	920	3.23	28,001	520,603	18.29
46	27,541	900	3.27	27,091	492,602	17.89
47	26,641	880	3.30	26,201	465,511	17.47
48	25,761	862	3.35	25,330	439,310	17.05
49	24,899	847	3.40	24,476	413,080	16.63
50	24,052	834	3.47	23,635	389,504	16.19
51	23,218	821	3.54	22,807	366,869	15.76
52	22,397	806	3.61	21,993	343,062	15.32
53	21,589	795	3.68	21,192	321,069	14.87
54	20,794	782	3.76	20,403	299,877	14.42
55	20,012	769	3.84	19,627	279,474	13.97
56	19,243	756	3.93	18,865	259,847	13.50
57	18,487	744	4.02	18,115	240,982	13.04
58	17,743	735	4.14	17,376	222,867	12.56
59	17,008	728	4.28	16,644	205,491	12.08
60	16,280	724	4.45	15,918	188,847	11.60
61	15,556	722	4.64	15,195	172,929	11.12
62	14,834	722	4.87	14,473	157,734	10.63
63	14,112	721	5.11	13,751	143,261	10.15
64	13,391	721	5.38	13,031	129,510	9.67
65	12,670	722	5.70	12,309	116,479	9.19
66	11,948	724	6.06	11,586	104,170	8.72
67	11,224	727	6.48	10,860	92,584	8.25
68	10,497	729	6.94	10,133	81,724	7.79
69	9,768	730	7.47	9,403	71,591	7.33
70	9,038	728	8.05	8,674	62,188	6.88
71	8,310	724	8.71	7,948	53,514	6.44
72	7,585	717	9.45	7,227	45,566	6.01
73	6,869	707	10.29	6,516	38,339	5.58
74	6,102	695	11.28	5,814	31,823	5.16
75	5,487	679	12.43	5,128	26,009	4.76
76	4,788	660	13.78	4,458	20,981	4.36
77	4,128	636	15.41	3,810	16,423	3.98
78	3,492	607	17.38	3,188	12,013	3.61
79	2,885	570	19.77	2,600	8,425	3.27
80	2,315	523	22.59	2,054	6,825	2.95
81	1,792	463	25.83	1,560	4,771	2.66
82	1,329	386	29.08	1,136	3,211	2.42
83	943	305	32.32	791	2,075	2.20
84	638	227	35.50	524	1,284	2.01
85	411	159	38.80	332	760	1.85
86	263	106	42.04	199	428	1.70
87	146	66	45.29	113	229	1.57
88	80	30	48.53	60	116	1.45
89	41	21	51.77	31	56	1.37
90	20	11	55.01	14	25	1.25
91	9	5	58.26	7	11	1.22
92	4	2	61.50	3	4	1.00
93	2	1	64.74	1	1	.50
94	1	1	67.98	..	..	..

TABLE—M.
LIFE TABLE—MADRAS.

Males.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,550	23.55	88,225	2,870,764	28.71
1	76,450	6,830	8.95	73,031	2,782,539	30.40
2	69,611	3,738	5.37	67,742	2,709,598	32.02
3	65,873	2,361	3.58	64,092	2,641,766	40.10
4	63,512	1,528	2.41	62,748	2,577,074	40.68
5	61,984	1,019	1.64	61,475	2,514,328	40.68
6	60,965	714	1.17	60,608	2,452,851	40.23
7	60,251	582	0.97	59,960	2,392,243	39.71
8	59,669	448	0.75	59,448	2,332,283	39.09
9	59,223	359	0.61	59,043	2,272,837	38.38
10	58,864	338	0.58	58,670	2,213,794	37.61
11	58,476	396	0.68	58,278	2,155,124	36.86
12	58,080	418	0.72	57,871	2,096,846	36.10
13	57,662	449	0.78	57,438	2,038,975	35.36
14	57,213	485	0.85	56,970	1,981,537	34.63
15	56,728	518	0.91	56,469	1,924,567	33.93
16	56,210	549	0.98	55,936	1,868,098	33.23
17	55,661	580	1.04	55,371	1,812,162	32.56
18	55,081	603	1.10	54,779	1,756,791	31.90
19	54,473	621	1.14	54,168	1,702,012	31.24
20	53,857	634	1.18	53,540	1,647,844	30.60
21	53,223	646	1.21	52,900	1,594,304	29.96
22	52,577	657	1.25	52,248	1,541,404	29.32
23	51,920	666	1.28	51,587	1,489,156	28.68
24	51,254	679	1.32	50,915	1,437,569	28.05
25	50,575	694	1.37	50,228	1,386,654	27.43
26	49,881	709	1.42	49,526	1,336,426	26.79
27	49,172	729	1.48	48,808	1,286,900	26.17
28	48,443	753	1.56	48,066	1,238,092	25.56
29	47,690	782	1.64	47,299	1,190,026	24.96
30	46,908	813	1.73	46,502	1,142,727	24.36
31	46,095	847	1.84	45,671	1,096,225	23.78
32	45,248	881	1.95	44,808	1,050,554	23.22
33	44,367	910	2.05	43,912	1,005,748	22.67
34	43,457	938	2.16	42,988	961,834	22.13
35	42,519	968	2.28	42,035	918,846	21.61
36	41,551	989	2.38	41,056	876,811	21.10
37	40,562	1,006	2.48	40,059	835,765	20.60
38	39,556	1,024	2.60	39,044	795,696	20.12
39	38,532	1,040	2.70	38,012	756,652	19.64
40	37,492	1,052	2.81	36,966	718,640	19.17
41	36,440	1,063	2.92	35,909	681,674	18.71
42	35,377	1,067	3.02	34,843	645,765	18.25
43	34,310	1,071	3.12	33,775	610,922	17.81
44	33,239	1,072	3.23	32,703	577,147	17.36
45	32,167	1,072	3.33	31,631	544,444	16.93
46	31,095	1,070	3.44	30,560	512,813	16.49
47	30,025	1,067	3.55	29,491	482,253	16.06
48	28,958	1,063	3.67	28,427	452,762	15.64
49	27,895	1,057	3.79	27,366	424,335	15.21
50	26,838	1,048	3.90	26,314	396,969	14.79
51	25,790	1,037	4.02	25,272	370,655	14.37
52	24,753	1,024	4.14	24,241	345,393	13.95
53	23,729	1,007	4.24	23,225	321,142	13.53
54	22,722	991	4.36	22,227	297,917	13.11
55	21,731	977	4.50	21,243	275,690	12.69
56	20,754	967	4.66	20,271	254,448	12.26
57	19,787	955	4.83	19,309	234,177	11.84
58	18,832	944	5.01	18,360	214,868	11.41
59	17,888	932	5.21	17,422	196,508	10.99
60	16,956	921	5.43	16,496	179,086	10.56
61	16,035	909	5.67	15,580	162,590	10.14
62	15,126	896	5.92	14,678	147,010	9.72
63	14,230	885	6.22	13,788	132,332	9.30
64	13,345	872	6.53	12,909	118,544	8.88
65	12,473	857	6.87	12,044	105,635	8.47
66	11,616	843	7.26	11,195	93,591	8.06
67	10,773	829	7.70	10,358	82,396	7.65
68	9,944	812	8.17	9,538	72,039	7.24
69	9,133	797	8.73	8,734	62,500	6.84
70	8,335	781	9.37	7,944	53,766	6.45
71	7,554	763	10.10	7,173	45,823	6.07
72	6,791	741	10.91	6,420	38,049	5.69
73	6,050	719	11.88	5,691	32,229	5.33
74	5,331	688	12.91	4,987	26,538	4.96
75	4,643	648	13.96	4,319	21,551	4.63
76	3,995	611	15.30	3,689	17,232	4.31
77	3,384	563	16.63	3,103	13,543	4.00
78	2,822	513	18.17	2,568	10,440	3.70
79	2,309	459	19.90	2,079	7,874	3.41
80	1,850	405	21.89	1,648	5,795	3.13
81	1,445	348	24.10	1,271	4,147	2.87
82	1,097	292	26.68	951	2,876	2.63
83	806	236	29.32	687	1,925	2.39
84	569	184	32.30	477	1,238	2.18
85	385	137	35.53	316	761	1.96
86	248	97	39.09	200	445	1.79
87	161	65	42.78	118	245	1.63
88	86	40	46.75	68	127	1.48
89	48	23	50.99	35	61	1.33
90	23	13	55.48	16	26	1.13
91	10	6	60.22	7	10	1.00
92	4	3	65.23	3	3	.78
93	1	1	70.46	..	..	..

TABLE-N.
LIFE TABLE—MADRAS.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	21,458	21.46	89,272	3,003,486	30.04
1	78,544	6,198	7.89	75,445	2,914,214	37.10
2	72,346	3,188	4.40	70,763	2,833,769	39.24
3	69,100	1,893	2.74	68,214	2,768,016	40.02
4	67,267	1,143	1.70	66,805	2,699,802	40.14
5	66,124	743	1.12	65,763	2,633,107	39.82
6	65,381	514	.79	65,124	2,667,354	39.27
7	64,807	385	.59	64,674	2,602,230	38.57
8	64,482	323	.50	64,321	2,437,658	37.80
9	64,159	317	.50	64,000	2,373,235	36.99
10	63,842	323	.50	63,681	2,309,235	36.17
11	63,519	345	.54	63,348	2,245,554	35.35
12	63,174	381	.60	62,984	2,182,208	34.54
13	62,793	444	.71	62,571	2,119,224	33.75
14	62,349	510	.82	62,094	2,056,653	32.99
15	61,839	579	.94	61,540	1,994,559	32.25
16	61,260	649	1.06	60,936	1,933,010	31.55
17	60,611	714	1.18	60,254	1,872,074	30.89
18	59,897	772	1.29	59,511	1,811,820	30.25
19	59,125	822	1.39	58,714	1,752,309	29.64
20	58,303	871	1.49	57,867	1,693,595	29.05
21	57,432	903	1.57	56,981	1,635,728	28.48
22	56,529	929	1.64	56,064	1,578,747	27.87
23	55,600	952	1.71	55,124	1,522,683	27.39
24	54,648	974	1.78	54,161	1,467,559	26.85
25	53,674	990	1.85	53,179	1,413,398	26.33
26	52,684	1,005	1.91	52,182	1,360,219	25.82
27	51,679	1,022	1.98	51,168	1,308,037	25.31
28	50,657	1,034	2.04	50,140	1,256,869	24.81
29	49,623	1,045	2.11	49,100	1,206,729	24.32
30	48,578	1,054	2.17	48,051	1,157,629	23.83
31	47,524	1,062	2.24	46,993	1,109,578	23.35
32	46,462	1,070	2.30	45,927	1,062,585	22.87
33	45,392	1,076	2.37	44,854	1,016,658	22.40
34	44,316	1,081	2.44	43,776	971,804	21.93
35	43,235	1,086	2.51	42,692	928,028	21.47
36	42,149	1,092	2.59	41,603	885,338	21.01
37	41,057	1,097	2.67	40,508	843,733	20.55
38	39,960	1,102	2.76	39,409	803,225	20.10
39	38,858	1,108	2.85	38,305	763,818	19.66
40	37,752	1,108	2.94	37,198	725,611	19.22
41	36,644	1,109	3.04	36,090	688,313	18.78
42	35,535	1,109	3.12	34,980	652,223	18.35
43	34,426	1,102	3.20	33,875	617,243	17.93
44	33,324	1,095	3.29	32,777	583,368	17.51
45	32,229	1,088	3.38	31,685	550,591	17.08
46	31,141	1,080	3.47	30,601	518,906	16.66
47	30,061	1,072	3.57	29,525	488,305	16.24
48	28,989	1,063	3.67	28,457	458,780	15.83
49	27,926	1,054	3.77	27,399	430,323	15.41
50	26,872	1,043	3.88	26,351	402,924	14.99
51	25,829	1,032	4.00	25,313	376,573	14.58
52	24,797	1,018	4.11	24,288	351,260	14.17
53	23,779	1,003	4.22	23,277	326,972	13.76
54	22,778	988	4.34	22,282	303,695	13.33
55	21,788	973	4.47	21,302	281,413	12.92
56	20,815	959	4.61	20,335	260,111	12.50
57	19,866	945	4.76	19,384	239,778	12.08
58	18,911	931	4.92	18,445	220,392	11.65
59	17,989	918	5.11	17,521	201,947	11.23
60	17,062	905	5.30	16,610	184,426	10.81
61	16,157	893	5.53	15,710	167,816	10.39
62	15,264	881	5.77	14,824	152,106	9.97
63	14,383	869	6.04	13,948	137,282	9.54
64	13,514	857	6.34	13,086	123,334	9.13
65	12,657	845	6.68	12,234	110,248	8.71
66	11,812	833	7.05	11,396	98,014	8.30
67	10,979	819	7.46	10,569	86,618	7.89
68	10,160	804	7.91	9,757	76,049	7.49
69	9,354	788	8.42	8,960	66,292	7.09
70	8,566	770	8.99	8,181	57,332	6.69
71	7,799	751	9.63	7,421	49,151	6.30
72	7,045	730	10.36	6,680	41,730	5.92
73	6,315	707	11.20	5,961	35,050	5.55
74	5,608	682	12.16	5,267	29,089	5.10
75	4,926	652	13.24	4,600	23,822	4.84
76	4,274	618	14.46	3,965	19,222	4.50
77	3,656	578	15.81	3,367	15,257	4.17
78	3,078	533	17.32	2,812	11,890	3.86
79	2,545	485	19.06	2,302	9,078	3.57
80	2,060	433	21.02	1,844	6,776	3.29
81	1,627	377	23.17	1,438	4,932	3.03
82	1,250	318	25.44	1,091	3,494	2.80
83	932	258	27.68	803	2,403	2.58
84	674	202	29.97	573	1,606	2.38
85	472	155	32.84	395	1,033	2.19
86	317	113	35.65	260	638	2.01
87	204	78	38.24	165	378	1.85
88	126	52	41.27	100	213	1.67
89	74	34	45.95	58	113	1.53
90	41	20	48.78	30	55	1.34
91	20	11	55.00	15	25	1.25
92	9	5	56.53	6	10	1.11
93	4	2	60.51	3	4	1.00
94	2	1	64.67	1	1	.50
95	1	1	68.99	..	..	..

TABLE-O.
LIFE TABLE—PUNJAB:

Males.

Age.	Living at age x.	Dying between ages x and x + 1.	Mortality per cent.	Living between ages x and x + 1.	Living above age x.	Mean after life-time at age x.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,975	23.98	86,009	2,804,650	28.05
1	76,025	6,950	9.14	72,233	2,718,641	35.76
2	69,075	3,064	5.74	66,960	2,646,408	38.31
3	65,111	2,620	4.02	63,719	2,579,448	39.62
4	62,491	1,784	2.86	61,547	2,515,729	40.26
5	60,707	1,255	2.07	60,046	2,454,182	40.43
6	59,452	913	1.54	58,995	2,394,136	40.27
7	58,539	697	1.19	58,191	2,335,141	39.89
8	57,842	563	.97	57,560	2,276,950	39.26
9	57,279	482	.84	57,038	2,219,390	38.75
10	56,797	437	.77	56,579	2,162,352	38.47
11	56,390	418	.74	56,151	2,105,773	37.36
12	55,942	422	.75	55,731	2,049,622	36.04
13	55,520	441	.79	55,299	1,993,891	35.91
14	55,079	467	.85	54,846	1,938,592	35.29
15	54,612	498	.91	54,363	1,883,746	34.49
16	54,114	530	.98	53,849	1,829,383	33.81
17	53,584	563	1.05	53,302	1,775,534	33.14
18	53,021	594	1.12	52,724	1,722,232	32.48
19	52,427	622	1.19	52,116	1,669,508	31.84
20	51,805	647	1.25	51,482	1,617,392	31.23
21	51,158	689	1.31	50,823	1,565,910	30.61
22	50,489	689	1.36	50,145	1,515,087	30.01
23	49,800	707	1.42	49,446	1,464,942	29.42
24	49,093	723	1.47	48,732	1,415,496	28.83
25	48,370	738	1.53	48,001	1,366,764	28.26
26	47,632	751	1.56	47,257	1,318,763	27.69
27	46,881	762	1.63	46,500	1,271,506	27.12
28	46,119	773	1.68	45,733	1,225,006	26.56
29	45,346	783	1.73	44,954	1,179,273	26.01
30	44,563	793	1.78	44,167	1,134,319	25.45
31	43,770	802	1.83	43,369	1,090,152	24.91
32	42,968	811	1.89	42,562	1,046,783	24.36
33	42,157	820	1.95	41,747	1,004,221	23.82
34	41,337	829	2.01	40,923	962,474	23.28
35	40,508	838	2.07	40,089	921,551	22.75
36	39,670	846	2.13	39,247	881,452	22.22
37	38,824	854	2.20	38,397	842,215	21.69
38	37,970	862	2.27	37,539	803,818	21.17
39	37,108	870	2.34	36,673	766,279	20.65
40	36,238	878	2.42	35,799	729,606	20.13
41	35,360	885	2.50	34,918	693,807	19.62
42	34,475	891	2.58	34,029	658,889	19.11
43	33,584	895	2.67	33,137	624,860	18.61
44	32,689	897	2.74	32,241	591,723	18.10
45	31,792	898	2.82	31,343	559,482	17.60
46	30,894	899	2.91	30,445	528,139	17.10
47	29,995	901	3.00	29,544	497,694	16.59
48	29,094	903	3.11	28,643	468,150	16.09
49	28,191	905	3.21	27,739	439,507	15.59
50	27,286	907	3.32	26,833	411,768	15.09
51	26,379	910	3.45	25,924	384,935	14.59
52	25,469	913	3.58	25,013	359,011	14.10
53	24,556	916	3.73	24,098	333,998	13.60
54	23,640	919	3.89	23,180	309,900	13.11
55	22,721	922	4.06	22,260	286,720	12.62
56	21,799	926	4.25	21,336	264,460	12.13
57	20,873	930	4.46	20,408	243,124	11.65
58	19,943	935	4.69	19,476	222,716	11.17
59	19,008	942	4.96	18,537	203,240	10.69
60	18,066	947	5.24	17,593	184,703	10.22
61	17,119	951	5.56	16,644	167,110	9.76
62	16,168	953	5.89	15,691	150,466	9.31
63	15,215	955	6.28	14,738	134,775	8.86
64	14,260	956	6.70	13,782	120,037	8.43
65	13,304	954	7.17	12,827	106,255	7.99
66	12,350	950	7.69	11,875	93,428	7.57
67	11,400	942	8.26	10,929	81,553	7.15
68	10,458	929	8.88	9,984	70,624	6.75
69	9,529	912	9.57	9,073	60,630	6.36
70	8,617	891	10.34	8,172	51,557	5.98
71	7,726	864	11.18	7,294	43,385	5.62
72	6,852	832	12.13	6,446	36,091	5.26
73	6,030	794	13.17	5,633	29,645	4.92
74	5,236	751	14.34	4,860	24,012	4.59
75	4,485	701	15.63	4,135	19,132	4.27
76	3,784	645	17.05	3,461	15,017	3.97
77	3,139	595	18.62	2,847	11,556	3.68
78	2,554	520	20.35	2,294	8,709	3.41
79	2,034	452	22.24	1,808	6,415	3.15
80	1,582	384	24.30	1,390	4,697	2.91
81	1,198	318	26.53	1,039	3,217	2.69
82	860	255	28.92	753	2,178	2.48
83	625	197	31.48	527	1,423	2.28
84	438	146	34.31	355	698	2.10
85	289	105	37.10	229	543	1.93
86	177	71	40.16	142	314	1.77
87	106	46	43.38	83	172	1.62
88	60	28	46.77	46	89	1.48
89	32	16	50.33	24	43	1.34
90	16	9	54.06	12	19	1.19
91	7	4	57.94	5	7	1.09
92	3	2	63.00	2	2	.97
93	1	1	66.22	..	..	..

TABLE-P.
LIFE TABLE—PUNJAB.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	23,663	23.65	86,146	2,657,223	26.57
1	76,347	6,501	8.51	72,798	2,571,077	33.68
2	69,846	3,703	5.30	67,871	2,493,279	35.77
3	66,143	2,484	3.72	64,836	2,430,408	36.74
4	63,679	1,713	2.69	62,777	2,365,572	37.16
5	61,966	1,264	2.02	61,311	2,302,796	37.16
6	60,712	973	1.60	60,226	2,241,484	36.92
7	59,739	798	1.34	59,340	2,181,258	36.51
8	58,941	692	1.17	58,595	2,121,918	36.00
9	58,249	631	1.08	57,933	2,063,323	35.42
10	57,618	600	1.04	57,318	2,005,390	34.80
11	57,018	592	1.04	56,722	1,948,072	34.17
12	56,426	604	1.07	56,124	1,891,350	33.52
13	55,822	625	1.13	55,510	1,835,220	32.88
14	55,197	660	1.20	54,857	1,779,716	32.24
15	54,537	703	1.29	54,185	1,724,849	31.63
16	53,834	748	1.39	53,460	1,670,664	31.03
17	53,086	788	1.48	52,692	1,617,204	30.46
18	52,298	824	1.58	51,880	1,564,512	29.92
19	51,474	857	1.66	51,046	1,512,626	29.39
20	50,617	888	1.75	50,173	1,461,680	28.88
21	49,729	912	1.83	49,273	1,411,407	28.38
22	48,817	932	1.91	48,351	1,362,134	27.90
23	47,885	950	1.98	47,410	1,313,783	27.44
24	46,935	965	2.06	46,452	1,266,373	26.98
25	45,970	978	2.13	45,481	1,219,921	26.54
26	44,992	986	2.19	44,499	1,174,440	26.10
27	44,006	993	2.26	43,510	1,129,941	25.68
28	43,013	997	2.32	42,514	1,086,431	25.26
29	42,016	999	2.38	41,517	1,043,917	24.85
30	41,017	999	2.44	40,517	1,002,400	24.44
31	40,018	997	2.49	39,520	961,883	24.04
32	39,021	993	2.54	38,524	922,363	23.64
33	38,028	987	2.60	37,535	883,839	23.24
34	37,041	980	2.65	36,551	846,304	22.85
35	36,061	972	2.70	35,575	809,753	22.46
36	35,089	962	2.74	34,608	774,178	22.06
37	34,127	952	2.79	33,651	739,570	21.67
38	33,175	940	2.83	32,705	705,919	21.28
39	32,235	927	2.87	31,771	673,214	20.89
40	31,308	912	2.91	30,852	641,443	20.49
41	30,396	894	2.94	29,949	610,591	20.09
42	29,502	875	2.98	29,065	580,642	19.68
43	28,627	855	2.99	28,199	551,577	19.27
44	27,772	833	3.00	27,358	523,378	18.85
45	26,939	811	3.01	26,533	496,022	18.41
46	26,128	796	3.05	25,730	469,489	17.97
47	25,332	786	3.10	24,939	443,759	17.52
48	24,546	777	3.17	24,168	418,820	17.06
49	23,769	770	3.24	23,394	394,662	16.60
50	22,999	763	3.32	22,617	371,278	16.14
51	22,236	757	3.40	21,858	348,661	15.68
52	21,479	752	3.50	21,103	326,803	15.22
53	20,727	747	3.60	20,353	305,700	14.75
54	19,980	742	3.71	19,609	285,347	14.28
55	19,238	739	3.84	18,869	265,738	13.81
56	18,499	736	3.98	18,131	246,869	13.34
57	17,763	733	4.13	17,398	228,738	12.88
58	17,030	731	4.29	16,665	211,342	12.41
59	16,299	729	4.47	15,934	194,677	11.94
60	15,570	727	4.67	15,207	178,743	11.48
61	14,843	726	4.89	14,490	163,536	11.02
62	14,117	724	5.13	13,755	149,056	10.56
63	13,393	722	5.39	13,032	135,301	10.10
64	12,671	720	5.68	12,311	122,209	9.65
65	11,951	717	6.00	11,592	109,958	9.20
66	11,234	713	6.35	10,878	98,366	8.76
67	10,521	709	6.74	10,166	87,488	8.32
68	9,812	704	7.17	9,460	77,322	7.88
69	9,108	699	7.67	8,758	67,862	7.45
70	8,409	693	8.24	8,063	59,104	7.03
71	7,716	685	8.88	7,373	51,041	6.61
72	7,031	676	9.61	6,695	43,668	6.21
73	6,355	665	10.46	6,023	36,978	5.82
74	5,690	648	11.39	5,368	30,952	5.44
75	5,042	624	12.38	4,730	25,686	5.07
76	4,418	595	13.46	4,120	20,856	4.72
77	3,823	563	14.72	3,542	16,738	4.38
78	3,260	527	16.18	2,996	13,194	4.05
79	2,733	485	17.74	2,491	10,198	3.73
80	2,248	438	19.48	2,029	7,707	3.43
81	1,810	390	21.52	1,615	5,678	3.14
82	1,420	339	23.87	1,250	4,003	2.88
83	1,081	287	26.53	928	2,812	2.60
84	794	234	29.49	677	1,875	2.36
85	560	183	32.76	468	1,198	2.14
86	377	137	36.32	300	730	1.94
87	240	96	40.20	192	421	1.75
88	144	63	44.07	112	229	1.59
89	81	39	47.95	62	117	1.44
90	42	22	51.82	31	65	1.31
91	20	11	55.70	14	24	1.20
92	9	5	59.57	7	10	1.11
93	4	3	63.45	3	5	1.05
94	1	1	67.32	..	..	..

TABLE-Q.
LIFE TABLE—RAJPUTANA.

Males.

Age.	Living at age x .	Dying between ages x and $x+1$.	Mortality per cent.	Living between ages x and $x+1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	27,385	27.39	83,869	2,360,438	23.60
1	72,615	6,894	9.49	68,854	2,278,559	31.35
2	65,721	3,956	6.02	63,615	2,207,705	33.59
3	61,785	2,678	4.33	60,350	2,144,090	34.71
4	59,089	1,897	3.21	58,093	2,083,740	35.28
5	57,192	1,415	2.47	56,455	2,025,647	35.42
6	55,777	1,114	2.00	55,220	1,969,192	35.30
7	54,663	925	1.69	54,201	1,913,973	35.01
8	53,738	806	1.50	53,335	1,859,171	34.61
9	52,932	729	1.38	52,567	1,806,438	34.13
10	52,203	678	1.30	51,864	1,753,869	33.60
11	51,525	644	1.25	51,203	1,702,005	33.03
12	50,881	624	1.23	50,569	1,650,802	32.44
13	50,257	611	1.22	49,952	1,600,233	31.84
14	49,646	603	1.21	49,344	1,550,281	31.23
15	49,043	597	1.22	48,745	1,500,937	30.60
16	48,448	592	1.22	48,150	1,452,192	29.98
17	47,854	591	1.23	47,558	1,404,042	29.34
18	47,263	591	1.25	46,968	1,356,484	28.70
19	46,672	591	1.27	46,376	1,309,516	28.06
20	46,081	585	1.29	45,784	1,263,140	27.41
21	45,486	603	1.33	45,184	1,217,356	26.76
22	44,883	619	1.38	44,574	1,172,172	26.12
23	44,264	642	1.45	43,943	1,127,598	25.47
24	43,622	671	1.54	43,268	1,083,655	24.84
25	42,951	718	1.67	42,592	1,040,369	24.22
26	42,233	765	1.81	41,851	997,777	23.63
27	41,468	804	1.94	41,058	955,926	23.05
28	40,664	841	2.07	40,243	914,800	22.50
29	39,823	878	2.20	39,384	874,617	21.96
30	38,945	906	2.33	38,492	835,233	21.45
31	38,039	930	2.44	37,574	796,741	20.95
32	37,109	954	2.57	36,632	759,167	20.46
33	36,155	971	2.69	35,670	722,535	19.98
34	35,184	987	2.81	34,690	686,865	19.53
35	34,197	999	2.92	33,698	652,175	19.07
36	33,198	1,010	3.04	32,693	618,477	18.63
37	32,188	1,016	3.16	31,680	585,784	18.20
38	31,172	1,021	3.28	30,661	554,104	17.78
39	30,151	1,023	3.39	29,640	523,443	17.36
40	29,128	1,022	3.51	28,617	493,803	16.95
41	28,106	1,019	3.63	27,596	465,186	16.55
42	27,087	1,014	3.74	26,580	437,590	16.15
43	26,073	1,008	3.87	25,569	411,010	15.76
44	25,065	997	3.98	24,567	385,441	15.38
45	24,068	988	4.10	23,575	360,874	14.99
46	23,082	972	4.21	22,590	337,299	14.61
47	22,110	957	4.33	21,631	314,703	14.23
48	21,153	941	4.45	20,683	293,072	13.85
49	20,212	925	4.58	19,749	272,389	13.48
50	19,287	909	4.71	18,833	252,640	13.10
51	18,378	893	4.85	17,932	233,807	12.72
52	17,486	876	5.00	17,048	215,873	12.35
53	16,611	858	5.17	16,182	198,837	11.97
54	15,753	840	5.33	15,333	182,645	11.59
55	14,913	822	5.51	14,502	167,312	11.22
56	14,091	804	5.71	13,680	152,810	10.84
57	13,287	786	5.92	12,894	139,121	10.47
58	12,501	768	6.14	12,117	126,227	10.10
59	11,733	749	6.38	11,359	114,110	9.73
60	10,984	730	6.65	10,610	102,751	9.35
61	10,254	711	6.93	9,898	92,133	8.99
62	9,543	693	7.25	9,197	82,234	8.63
63	8,851	673	7.60	8,515	73,037	8.25
64	8,178	654	8.00	7,851	64,522	7.89
65	7,524	634	8.43	7,207	56,671	7.53
66	6,890	611	8.87	6,584	49,464	7.18
67	6,270	587	9.35	5,986	42,880	6.83
68	5,662	564	9.91	5,410	36,894	6.48
69	5,128	540	10.53	4,858	31,484	6.14
70	4,588	515	11.22	4,330	26,626	5.80
71	4,073	488	11.98	3,829	22,296	5.47
72	3,585	461	12.86	3,355	18,467	5.15
73	3,124	432	13.82	2,903	15,112	4.84
74	2,692	400	14.87	2,492	12,294	4.53
75	2,292	368	16.05	2,108	9,712	4.24
76	1,924	334	17.35	1,757	7,604	3.95
77	1,590	299	18.80	1,440	5,847	3.68
78	1,291	263	20.40	1,160	4,407	3.41
79	1,028	228	22.18	914	3,217	3.16
80	800	193	24.15	703	2,333	2.92
81	607	160	26.33	527	1,630	2.69
82	447	128	28.72	383	1,103	2.47
83	319	100	31.35	269	720	2.26
84	219	75	34.23	182	451	2.06
85	144	54	37.37	117	269	1.87
86	90	37	40.80	71	152	1.69
87	53	24	44.51	41	81	1.53
88	29	14	48.54	25	40	1.38
89	18	8	53.89	11	18	1.20
90	7	4	57.59	6	7	1.00
91	3	2	62.63	3	3	.87
92	1	1	65.04	..	..	..

TABLE—R
LIFE TABLE—RAJPUTANA.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	24,256	24.26	85,761	2,595,598	25.96
1	76,744	6,424	8.48	72,230	2,509,837	33.14
2	69,320	3,593	5.18	67,399	2,437,607	35.16
3	65,727	2,341	3.56	64,481	2,370,209	36.06
4	63,386	1,580	2.49	62,550	2,305,727	36.38
5	61,806	1,116	1.81	61,220	2,243,177	36.29
6	60,690	834	1.37	60,273	2,181,957	35.95
7	59,856	680	1.10	59,526	2,121,084	35.45
8	59,196	657	0.94	58,918	2,062,158	34.84
9	58,639	501	0.86	58,388	2,003,240	34.16
10	58,138	477	0.82	57,900	1,944,852	33.45
11	57,681	477	0.83	57,422	1,886,952	32.72
12	57,184	497	0.87	56,936	1,829,530	31.99
13	56,687	532	0.94	56,421	1,772,594	31.27
14	56,155	576	1.03	55,867	1,716,173	30.56
15	55,579	625	1.13	55,266	1,660,306	29.87
16	54,954	678	1.23	54,615	1,605,040	29.21
17	54,376	729	1.34	53,912	1,550,425	28.57
18	53,847	777	1.45	53,158	1,496,513	27.95
19	53,270	822	1.56	52,359	1,443,355	27.35
20	51,948	881	1.66	51,518	1,390,996	26.78
21	51,067	893	1.75	50,640	1,339,478	26.22
22	50,194	921	1.84	49,734	1,288,838	25.68
23	49,273	948	1.92	48,799	1,239,104	25.15
24	48,325	971	2.01	47,839	1,190,303	24.63
25	47,354	992	2.09	46,858	1,142,466	24.13
26	46,362	1,009	2.18	45,858	1,095,608	23.63
27	45,353	1,024	2.26	44,841	1,049,750	23.15
28	44,329	1,038	2.34	43,810	1,004,909	22.67
29	43,291	1,049	2.42	42,766	961,098	22.20
30	42,242	1,059	2.51	41,713	918,333	21.74
31	41,183	1,066	2.59	40,650	876,620	21.29
32	40,117	1,072	2.67	39,581	835,970	20.84
33	39,045	1,077	2.76	38,506	796,389	20.40
34	37,968	1,081	2.85	37,428	757,833	19.96
35	36,887	1,084	2.94	36,345	720,456	19.53
36	35,803	1,086	3.03	35,260	684,110	19.11
37	34,717	1,087	3.13	34,173	648,850	18.69
38	33,630	1,088	3.23	33,087	614,677	18.28
39	32,544	1,083	3.33	32,003	581,590	17.87
40	31,461	1,079	3.43	30,921	549,587	17.47
41	30,382	1,072	3.53	29,846	518,666	17.07
42	29,310	1,065	3.63	28,778	488,820	16.68
43	28,245	1,056	3.74	27,717	460,042	16.29
44	27,189	1,046	3.85	26,666	432,325	15.90
45	26,143	1,034	3.95	25,626	405,659	15.52
46	25,109	1,020	4.06	24,599	380,033	15.14
47	24,069	1,005	4.17	23,586	355,434	14.76
48	23,044	990	4.29	22,589	331,848	14.38
49	22,034	974	4.41	21,607	309,259	14.00
50	21,120	957	4.53	20,642	287,652	13.63
51	20,103	940	4.66	19,693	267,070	13.24
52	19,223	923	4.80	18,761	247,317	12.87
53	18,300	906	4.95	17,847	228,556	12.49
54	17,394	888	5.11	16,950	210,709	12.11
55	16,606	870	5.27	16,071	193,759	11.74
56	15,836	851	5.44	15,211	177,688	11.36
57	14,785	832	5.63	14,369	162,477	10.99
58	13,953	813	5.83	13,548	148,108	10.61
59	13,140	793	6.03	12,744	134,562	10.24
60	12,347	773	6.26	11,960	121,818	9.87
61	11,574	753	6.51	11,198	109,858	9.49
62	10,821	733	6.77	10,454	98,680	9.12
63	10,088	713	7.07	9,732	88,206	8.74
64	9,375	693	7.39	9,028	78,474	8.37
65	8,682	673	7.75	8,346	69,446	8.00
66	8,009	653	8.15	7,682	61,100	7.63
67	7,356	633	8.61	7,040	53,418	7.26
68	6,723	613	9.12	6,416	46,378	6.90
69	6,110	592	9.69	5,814	39,962	6.54
70	5,518	570	10.33	5,233	34,148	6.19
71	4,948	546	11.03	4,675	28,915	5.84
72	4,402	519	11.79	4,143	24,240	5.51
73	3,883	490	12.62	3,638	20,097	5.18
74	3,393	460	13.56	3,163	16,459	4.85
75	2,933	429	14.63	2,718	13,296	4.53
76	2,504	396	15.81	2,306	10,578	4.22
77	2,108	362	17.17	1,927	8,272	3.93
78	1,746	327	18.73	1,583	6,343	3.63
79	1,419	291	20.48	1,273	4,762	3.38
80	1,128	252	22.35	1,002	3,480	3.09
81	876	215	24.53	769	2,487	2.84
82	661	178	26.99	572	1,718	2.60
83	483	143	29.04	411	1,146	2.37
84	340	111	32.61	285	735	2.16
85	229	82	35.85	188	450	1.97
86	147	58	39.38	118	262	1.78
87	89	38	43.15	70	144	1.63
88	51	24	47.21	39	74	1.45
89	27	14	51.64	20	35	1.30
90	13	7	53.14	9	15	1.15
91	6	4	61.02	4	6	1.00
92	2	1	66.16	2	2	1.00
93	1	1	71.69	..	..	..

TABLE-S.

LIFE TABLE—N. W. F. P., SIND AND BALUCHISTAN.

Males.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	26,013	26.01	86,994	2,542,761	25.43
1	73,987	6,912	9.34	70,531	2,455,767	33.19
2	67,075	3,805	5.67	65,172	2,385,236	35.66
3	63,270	2,426	3.83	62,057	2,320,064	36.67
4	60,844	1,608	2.64	60,040	2,258,007	37.11
5	59,236	1,117	1.89	58,678	2,197,967	37.11
6	58,119	826	1.42	57,706	2,139,289	36.81
7	57,293	678	1.18	56,954	2,081,583	36.33
8	56,615	598	1.06	56,316	2,024,829	35.76
9	56,017	533	.95	55,750	1,968,313	35.14
10	55,484	498	.90	55,235	1,912,563	34.47
11	54,986	468	.89	54,742	1,857,328	33.78
12	54,498	402	.82	54,247	1,802,586	33.08
13	53,996	321	.66	53,736	1,748,339	32.38
14	53,475	251	1.03	53,199	1,694,603	31.69
15	52,924	178	1.09	52,635	1,641,404	31.01
16	52,346	102	1.15	52,045	1,588,769	30.35
17	51,744	624	1.21	51,432	1,536,724	29.70
18	51,120	643	1.26	50,799	1,485,292	29.06
19	50,477	659	1.33	50,147	1,434,493	28.42
20	49,818	673	1.35	49,482	1,384,345	27.79
21	49,146	684	1.39	48,904	1,334,864	27.18
22	48,462	697	1.43	48,114	1,286,060	26.54
23	47,765	711	1.49	47,409	1,237,946	25.92
24	47,054	726	1.54	46,691	1,190,537	25.30
25	46,328	746	1.61	45,955	1,143,846	24.69
26	45,582	767	1.68	45,199	1,097,891	24.09
27	44,815	792	1.77	44,419	1,052,692	23.49
28	44,023	824	1.87	43,611	1,009,273	22.90
29	43,199	854	1.99	42,772	964,662	22.33
30	42,345	894	2.11	41,898	921,800	21.77
31	41,451	934	2.25	40,984	879,992	21.23
32	40,517	971	2.40	40,031	839,068	20.71
33	39,546	1,004	2.54	39,044	798,977	20.20
34	38,542	1,033	2.68	38,026	759,933	19.72
35	37,509	1,068	2.82	36,980	721,907	19.25
36	36,451	1,078	2.96	35,912	684,927	18.79
37	35,373	1,097	3.10	34,824	649,015	18.35
38	34,278	1,113	3.25	33,720	614,191	17.92
39	33,163	1,123	3.39	32,601	580,471	17.50
40	32,040	1,129	3.52	31,476	547,870	17.10
41	30,911	1,131	3.66	30,345	516,394	16.71
42	29,780	1,129	3.79	29,216	486,049	16.32
43	28,651	1,123	3.92	28,089	456,833	15.94
44	27,528	1,114	4.05	26,971	428,744	15.57
45	26,414	1,102	4.17	25,863	401,773	15.21
46	25,312	1,088	4.29	24,769	375,910	14.86
47	24,226	1,068	4.41	23,692	351,141	14.49
48	23,158	1,048	4.53	22,634	327,449	14.14
49	22,110	1,027	4.65	21,597	304,815	13.79
50	21,083	1,004	4.76	20,581	283,218	13.43
51	20,079	980	4.88	19,589	262,637	13.08
52	19,099	955	5.00	18,621	243,048	12.73
53	18,144	929	5.12	17,680	224,427	12.37
54	17,215	902	5.24	16,764	206,747	12.01
55	16,313	874	5.36	15,876	189,983	11.65
56	15,439	846	5.48	15,016	174,107	11.28
57	14,593	818	5.61	14,182	159,091	10.90
58	13,771	791	5.74	13,375	144,909	10.52
59	12,980	765	5.89	12,598	131,534	10.13
60	12,215	740	6.06	11,845	118,936	9.74
61	11,475	717	6.25	11,118	107,091	9.33
62	10,762	694	6.49	10,415	95,973	8.92
63	10,068	672	6.68	9,733	85,558	8.50
64	9,396	655	6.98	9,069	75,826	8.07
65	8,741	644	7.37	8,419	66,767	7.64
66	8,097	639	7.89	7,777	58,338	7.20
67	7,458	635	8.51	7,141	50,661	6.78
68	6,823	631	9.25	6,507	43,420	6.36
69	6,192	625	10.09	5,889	36,913	5.96
70	5,567	615	11.05	5,269	31,033	5.57
71	4,952	601	12.14	4,652	25,774	5.20
72	4,351	579	13.30	4,061	21,122	4.85
73	3,772	552	14.63	3,496	17,061	4.52
74	3,220	518	16.09	2,961	13,565	4.21
75	2,703	476	17.63	2,464	10,604	3.92
76	2,226	426	19.14	2,013	8,140	3.66
77	1,800	374	20.78	1,613	6,127	3.40
78	1,426	322	22.58	1,265	4,514	3.17
79	1,104	270	24.46	969	3,249	2.94
80	834	221	26.50	724	2,280	2.73
81	613	175	28.55	525	1,558	2.54
82	433	136	30.96	370	1,031	2.35
83	302	100	33.21	252	661	2.19
84	202	73	36.07	166	409	2.03
85	130	50	38.24	105	243	1.87
86	80	33	40.92	64	138	1.73
87	47	21	43.70	38	74	1.57
88	26	12	46.59	20	38	1.45
89	14	7	49.59	11	18	1.29
90	7	4	53.70	5	7	1.07
91	3	2	65.91	2	2	.83
92	1	1	69.13	..	..	..

TABLE-T.

LIFE TABLE—N. W. F. P., SIND AND BALUCHISTAN.

Females.

Age.	Living at age x .	Dying between ages x and $x + 1$.	Mortality per cent.	Living between ages x and $x + 1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	25,663	25.66	84,891	2,328,185	23.28
1	74,337	6,469	8.70	70,808	2,243,294	30.18
2	67,898	3,558	5.24	66,429	2,172,486	32.01
3	64,310	2,086	3.24	63,217	2,100,057	32.75
4	62,224	1,514	2.43	61,407	2,042,840	32.83
5	60,710	999	1.65	60,211	1,981,373	32.84
6	59,711	878	1.47	59,272	1,921,162	32.17
7	58,833	810	1.38	58,428	1,861,890	31.65
8	58,023	760	1.31	57,643	1,803,462	31.08
9	57,263	723	1.26	56,901	1,745,819	30.49
10	56,540	700	1.24	56,190	1,688,918	29.87
11	55,840	690	1.24	55,495	1,632,728	29.24
12	55,160	705	1.28	54,798	1,577,233	28.60
13	54,445	730	1.34	54,080	1,522,435	27.96
14	53,715	760	1.42	53,335	1,468,355	27.34
15	52,955	790	1.50	52,560	1,415,020	26.72
16	52,165	818	1.57	51,756	1,362,460	26.12
17	51,347	846	1.65	50,924	1,310,704	25.53
18	50,501	871	1.72	50,065	1,259,780	24.95
19	49,630	894	1.80	49,183	1,209,715	24.37
20	48,736	916	1.88	48,278	1,160,532	23.81
21	47,820	936	1.96	47,352	1,112,254	23.26
22	46,884	955	2.04	46,407	1,064,902	22.71
23	45,929	974	2.12	45,442	1,018,495	22.18
24	44,955	992	2.21	44,459	973,053	21.65
25	43,963	1,010	2.30	43,458	928,564	21.12
26	42,953	1,029	2.40	42,438	885,136	20.61
27	41,924	1,049	2.50	41,400	842,698	20.10
28	40,875	1,074	2.63	40,338	801,238	19.60
29	39,801	1,109	2.77	39,240	760,900	19.12
30	38,692	1,161	3.00	38,112	721,714	18.65
31	37,531	1,215	3.24	36,923	683,602	18.21
32	36,316	1,260	3.44	35,691	646,679	17.81
33	35,066	1,263	3.60	34,435	610,988	17.42
34	33,803	1,267	3.75	33,169	576,553	17.06
35	32,536	1,263	3.88	31,905	543,384	16.70
36	31,273	1,257	4.02	30,644	511,479	16.36
37	30,016	1,249	4.16	29,392	480,835	16.02
38	28,767	1,238	4.30	28,148	451,443	15.69
39	27,529	1,225	4.45	26,916	423,295	15.38
40	26,304	1,207	4.59	25,701	396,379	15.07
41	25,097	1,185	4.72	24,504	370,678	14.77
42	23,912	1,160	4.85	23,332	346,174	14.48
43	22,752	1,133	4.98	22,186	322,842	14.19
44	21,619	1,103	5.10	21,067	300,656	13.91
45	20,516	1,071	5.22	19,986	279,689	13.63
46	19,455	1,038	5.34	18,931	259,903	13.34
47	18,407	1,004	5.45	17,905	240,672	13.08
48	17,403	968	5.58	16,919	222,767	12.80
49	16,435	930	5.68	15,970	205,848	12.52
50	15,505	890	5.74	15,060	189,878	12.25
51	14,615	851	5.82	14,189	174,818	11.98
52	13,764	813	5.91	13,358	160,629	11.71
53	12,951	776	6.09	12,563	147,271	11.45
54	12,176	741	6.09	11,804	134,708	11.18
55	11,434	708	6.19	11,080	122,904	10.92
56	10,726	677	6.31	10,388	111,824	10.67
57	10,049	647	6.44	9,725	101,430	10.42
58	9,402	619	6.58	9,093	91,711	10.17
59	8,783	593	6.75	8,486	82,618	9.92
60	8,190	569	6.95	7,906	74,132	9.67
61	7,621	547	7.18	7,347	66,226	9.42
62	7,074	524	7.41	6,812	58,879	9.17
63	6,550	503	7.68	6,299	52,067	8.92
64	6,047	484	8.00	5,805	45,708	8.67
65	5,563	466	8.38	5,330	39,963	8.42
66	5,097	449	8.81	4,872	34,633	8.17
67	4,648	435	9.36	4,431	29,761	7.92
68	4,213	421	9.99	4,002	25,330	7.67
69	3,792	408	10.76	3,588	21,328	7.42
70	3,384	395	11.67	3,187	17,740	7.17
71	2,989	381	12.75	2,798	14,553	6.92
72	2,608	364	13.96	2,426	11,755	6.67
73	2,244	345	15.37	2,072	9,329	6.42
74	1,899	323	17.01	1,737	7,257	6.17
75	1,576	297	18.85	1,428	5,520	5.92
76	1,279	267	20.88	1,145	4,092	5.67
77	1,012	236	23.32	894	2,947	5.42
78	776	201	25.99	676	2,053	5.17
79	575	166	28.87	492	1,377	4.92
80	409	131	32.03	343	885	4.67
81	278	99	35.61	229	542	4.42
82	179	71	39.66	143	313	4.17
83	108	47	43.52	85	170	3.92
84	61	29	47.54	46	85	3.67
85	32	17	53.13	24	39	3.42
86	16	9	60.34	10	15	3.17
87	6	4	70.12	4	5	2.92
88	2	2	75.87	1	1	2.67

TABLE-U.
LIFE TABLE—UNITED PROVINCES.

Males.

Age.	Living at age x .	Dying between ages x and $x+1$.	Mortality per cent.	Living between ages x and $x+1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	27,856	27.86	83,578	2,455,930	24.55
1	72,144	6,910	9.58	68,378	2,372,354	22.63
2	65,234	3,085	6.11	63,112	2,303,976	21.32
3	61,249	2,674	4.37	59,832	2,240,864	20.69
4	58,575	1,860	3.18	57,594	2,181,032	20.23
5	56,715	1,345	2.37	56,010	2,123,438	20.44
6	55,370	1,017	1.84	54,862	2,067,428	20.34
7	54,353	808	1.49	53,949	2,012,566	20.03
8	53,545	677	1.26	53,206	1,958,817	19.68
9	52,868	596	1.13	52,570	1,905,411	19.04
10	52,272	547	1.05	51,999	1,852,841	18.45
11	51,725	522	1.01	51,464	1,800,842	18.82
12	51,203	517	1.01	50,944	1,749,378	18.17
13	50,686	522	1.03	50,425	1,698,434	17.51
14	50,164	534	1.06	49,897	1,648,009	16.85
15	49,630	550	1.11	49,355	1,598,112	16.20
16	49,080	568	1.16	48,796	1,548,757	15.56
17	48,512	587	1.21	48,219	1,499,961	14.92
18	47,925	605	1.26	47,622	1,451,742	14.29
19	47,320	618	1.31	47,011	1,404,120	13.67
20	46,702	627	1.34	46,389	1,357,109	13.06
21	46,075	637	1.38	45,758	1,310,720	12.45
22	45,438	646	1.42	45,115	1,264,964	11.84
23	44,792	656	1.46	44,464	1,219,849	11.23
24	44,136	666	1.51	43,803	1,175,385	10.63
25	43,470	678	1.56	43,131	1,131,582	10.03
26	42,792	691	1.61	42,447	1,088,451	9.44
27	42,101	707	1.68	41,747	1,046,004	8.85
28	41,394	722	1.74	41,033	1,004,257	8.26
29	40,672	740	1.82	40,302	963,224	7.68
30	39,932	763	1.91	39,551	922,922	7.11
31	39,169	782	2.00	38,778	883,371	6.55
32	38,387	805	2.10	37,984	844,593	6.00
33	37,582	825	2.20	37,170	806,609	5.46
34	36,757	845	2.30	36,334	769,439	4.93
35	35,912	864	2.40	35,489	733,105	4.41
36	35,048	881	2.51	34,608	697,625	3.90
37	34,167	898	2.63	33,718	663,017	3.41
38	33,269	914	2.75	32,812	629,299	2.92
39	32,355	927	2.87	31,891	596,487	2.44
40	31,428	939	2.99	30,959	564,596	1.96
41	30,489	948	3.11	30,015	533,637	1.50
42	29,541	954	3.23	29,064	503,622	1.06
43	28,587	959	3.35	28,107	474,558	0.60
44	27,623	961	3.48	27,148	446,451	0.16
45	26,667	962	3.61	26,186	419,303	0.72
46	25,705	961	3.74	25,224	393,117	1.29
47	24,744	957	3.87	24,266	367,893	1.87
48	23,787	953	4.01	23,310	343,627	2.45
49	22,834	948	4.15	22,360	320,317	3.03
50	21,880	942	4.30	21,415	297,957	3.61
51	20,944	934	4.46	20,477	276,542	4.20
52	20,010	925	4.62	19,548	256,065	4.80
53	19,085	915	4.79	18,627	236,517	5.39
54	18,170	903	4.97	17,719	217,890	5.99
55	17,267	891	5.16	16,821	200,171	6.59
56	16,376	879	5.37	15,937	183,350	7.20
57	15,497	864	5.58	15,065	167,413	7.80
58	14,633	849	5.80	14,208	152,348	8.41
59	13,784	835	6.06	13,367	138,140	9.03
60	12,949	820	6.34	12,539	124,773	9.64
61	12,129	804	6.63	11,727	112,234	10.25
62	11,325	786	6.94	10,932	100,507	10.87
63	10,539	767	7.28	10,155	89,575	11.50
64	9,772	747	7.65	9,399	79,420	12.13
65	9,025	727	8.05	8,661	70,021	12.76
66	8,298	705	8.50	7,946	61,390	13.39
67	7,593	681	9.07	7,252	53,414	14.03
68	6,912	657	9.61	6,584	46,162	14.68
69	6,255	633	10.12	5,939	39,578	15.33
70	5,622	606	10.77	5,319	33,640	15.98
71	5,018	577	11.51	4,728	28,321	16.65
72	4,439	547	12.33	4,165	23,593	17.31
73	3,892	516	13.25	3,634	19,428	17.99
74	3,376	483	14.27	3,135	15,794	18.68
75	2,894	445	15.37	2,672	12,659	19.37
76	2,449	407	16.61	2,245	9,987	20.08
77	2,042	367	18.00	1,859	7,742	20.79
78	1,675	327	19.55	1,511	5,883	21.51
79	1,348	287	21.26	1,205	4,372	22.24
80	1,061	248	23.18	938	3,167	22.98
81	815	207	25.36	711	2,299	23.73
82	608	169	27.84	524	1,518	24.50
83	430	134	30.48	372	994	25.26
84	305	102	33.58	254	623	26.04
85	203	76	37.30	165	368	26.81
86	127	53	41.80	100	203	27.60
87	74	35	47.23	67	103	28.39
88	39	21	53.59	23	46	29.18
89	18	11	60.88	12	18	30.00
90	7	5	69.10	4	6	30.71
91	2	2	78.25	1	1	31.50

TABLE-V.
LIFE TABLE—UNITED PROVINCES.

Females.

Age.	Living at age x .	Dying between ages x and $x+1$.	Mortality per cent.	Living between ages x and $x+1$.	Living above age x .	Mean after life-time at age x .
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	100,000	25,389	25.39	85,113	2,509,376	25.09
1	74,611	6,855	9.19	70,864	2,424,263	32.49
2	97,768	3,864	5.70	65,694	2,353,399	34.73
3	63,892	2,560	4.01	62,533	2,287,705	35.81
4	61,332	1,764	2.88	60,401	2,225,172	36.28
5	59,568	1,272	2.14	58,908	2,164,771	36.34
6	58,298	967	1.66	57,813	2,105,889	36.12
7	57,329	773	1.35	56,942	2,048,056	35.72
8	56,558	652	1.15	56,230	1,991,114	35.21
9	55,904	582	1.04	55,613	1,934,884	34.61
10	55,322	544	.98	55,050	1,879,271	33.97
11	54,778	533	.97	54,512	1,824,221	33.30
12	54,245	543	1.00	53,973	1,769,709	32.62
13	53,702	568	1.06	53,418	1,715,736	31.95
14	53,134	604	1.14	52,833	1,662,319	31.29
15	52,530	647	1.23	52,207	1,609,486	30.64
16	51,883	693	1.33	51,536	1,557,279	30.02
17	51,190	740	1.45	50,820	1,505,743	29.41
18	50,450	783	1.55	50,059	1,454,823	28.84
19	49,668	823	1.66	49,257	1,404,564	28.29
20	48,845	861	1.76	48,414	1,355,007	27.75
21	47,984	891	1.85	47,539	1,307,193	27.24
22	47,088	916	1.95	46,635	1,259,954	26.75
23	46,177	939	2.03	45,707	1,213,319	26.27
24	45,238	959	2.12	44,758	1,167,312	25.80
25	44,279	975	2.20	43,792	1,122,054	25.35
26	43,304	987	2.28	42,811	1,078,762	24.91
27	42,317	996	2.35	41,819	1,035,951	24.48
28	41,321	1,009	2.43	40,820	994,132	24.06
29	40,319	1,005	2.49	39,816	953,312	23.64
30	39,314	1,005	2.56	38,812	913,496	23.24
31	38,309	1,004	2.62	37,807	874,684	22.83
32	37,306	1,000	2.68	36,805	836,877	22.43
33	36,305	995	2.74	35,808	800,072	22.04
34	35,310	989	2.80	34,816	764,264	21.64
35	34,321	982	2.86	33,830	729,448	21.25
36	33,339	974	2.92	32,852	695,618	20.86
37	32,365	966	2.98	31,882	662,766	20.48
38	31,399	956	3.05	30,921	630,884	20.09
39	30,443	946	3.11	29,970	599,963	19.71
40	29,497	935	3.17	29,030	569,993	19.32
41	28,562	922	3.23	28,101	541,096	18.94
42	27,640	908	3.28	27,186	512,262	18.56
43	26,732	894	3.34	26,285	485,676	18.17
44	25,838	878	3.40	25,399	459,391	17.78
45	24,960	862	3.45	24,529	433,992	17.39
46	24,098	846	3.51	23,675	409,463	16.99
47	23,252	831	3.57	22,837	385,788	16.59
48	22,421	816	3.64	22,013	362,951	16.19
49	21,605	801	3.71	21,205	340,938	15.78
50	20,804	786	3.78	20,411	319,733	15.37
51	20,018	768	3.84	19,634	299,222	14.96
52	19,250	754	3.93	18,873	279,688	14.53
53	18,496	742	4.01	18,125	260,915	14.10
54	17,754	730	4.11	17,389	242,690	13.67
55	17,024	717	4.21	16,666	225,301	13.23
56	16,307	705	4.31	15,955	208,635	12.79
57	15,602	694	4.45	15,256	192,680	12.35
58	14,908	686	4.60	14,565	177,425	11.90
59	14,222	678	4.77	13,883	162,860	11.45
60	13,544	672	4.96	13,208	148,977	11.00
61	12,872	667	5.18	12,538	135,769	10.55
62	12,205	661	5.42	11,875	123,231	10.10
63	11,544	656	5.68	11,216	111,356	9.65
64	10,888	651	5.98	10,563	100,140	9.20
65	10,237	646	6.31	9,914	89,577	8.75
66	9,591	642	6.69	9,270	79,663	8.31
67	8,949	635	7.10	8,632	70,393	7.87
68	8,314	629	7.56	8,000	61,761	7.43
69	7,685	623	8.11	7,373	53,761	7.00
70	7,062	619	8.75	6,753	46,383	6.57
71	6,444	614	9.53	6,137	39,635	6.15
72	5,830	608	10.43	5,526	33,498	5.75
73	5,222	599	11.46	4,923	27,972	5.36
74	4,623	583	12.61	4,331	23,049	4.99
75	4,040	562	13.90	3,759	18,718	4.63
76	3,478	533	15.31	3,212	14,959	4.30
77	2,945	498	16.85	2,697	11,747	3.99
78	2,449	454	18.52	2,222	9,060	3.70
79	1,995	405	20.32	1,793	6,829	3.42
80	1,590	354	22.24	1,413	5,035	3.17
81	1,236	300	24.29	1,088	3,622	2.93
82	936	248	26.47	812	2,536	2.71
83	688	198	28.78	589	1,724	2.51
84	490	153	31.21	413	1,135	2.32
85	337	114	33.77	280	722	2.14
86	223	81	36.46	183	442	1.98
87	142	56	39.28	114	259	1.82
88	86	36	42.22	68	145	1.69
89	50	23	45.30	39	77	1.54
90	27	13	48.50	20	38	1.41
91	14	7	51.83	11	18	1.29
92	7	4	55.28	5	7	1.00
93	3	2	58.86	3	2	.86
94	1	1	62.68	1	1	.74