Census of India 1971

# INTERCENSAL GROWTH OF POPULATION

(Analysis of Extracts from All India Census Reports)

CENSUS
CENTENARY
MONOGRAPH
No. 3




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## FOREWORD

1972 is the Centenary year of the Indian Census. It is appropriate on this occasion that one should be helped to look back over the past hundred years to get an authentic picture of the population and its growth as revealed by each of the decennial censuses in the past. India had an unbroken chain of regular decennial censuses over these hundred years, the last one having just been completed in 1971, which is indeed a proud record. The dynamics of the Indian population growth have been fascinating. Before 1931, the average annual growth rate of population found it difficult to reach even 1% in any decade. Did this mean that there was no population problem as we know of it now ? But one has to only look back at the conditions prevailing in the early decades to realise the amount of human wastage that occurred: how thousands of lives were swept away by famines; how epidemics took a frightfully heavy toll of life; how inadequate were the health facilities resulting in very high infant and maternal mortality. But fertility had always been high. There can not be a better source than the decennial Census reports themselves to give an authentic picture of the population at each census.

Demography in India is still nascent. It is only in recent years that a good number of books and articles have appeared concerning India's population. In the earlier decades the only objective, authoritative and analytical accounts of the population were contained in the comprehensive and masterly decennial Census reports. In the present monograph, Shri Natarajan has judiciously selected excerpts from the old Census reports and put them together in a cogent manner to help the reader to a source which gives a first-hand account of the socio-economic conditions that affected or shaped the "growth" of population not only in India as a whole but in different parts of the country.

The author, Shri D. Natarajan, is a doyen of the Indian Censuses. He is associated with at least four Indian censuses—perhaps five, from 1931 to 1971. He has already compiled a monograph entitled "Indian Census Through Hundred

Years" which will be published as one of the Census Centenary monographs. The present monograph is a follow up and this will be yet another addition to the Monograph series of the Indian Census Centenary.

It is hoped that this monograph, published by the Census Organization on the occasion of the Indian Census Centenary, will serve a very useful purpose in helping the reader to relevant substance from the old Census reports, most of which are out of print and the pages of the few rare copies that are available have become so brittle with age that one can hardly handle them. My appreciation and thanks to the author, Shri Natarajan, and to others in the Census Organization that have helped in the compilation of this monograph.

A. CHANDRA SEKHAR
*Registrar General and Census Commissioner, India*

NEW DELHI
*March* 29, 1972

## PREFACE

In addition to the series of monographs mentioned above, a monograph entiled 'Indian Censuses through a hundred years' has been prepared. This monograph deals with the organisational aspects of the Indian Census. The Indian Census cover the largest population—China which has a largest population has not taken a regular Census so far—and is a major administrative undertaking. The success of the Census is due to the detail and proper planning and their prompt execution.

# INTRODUCTION

This monograph contains extracts from the all India census reports from the Census of 1871/72 to 1951 relating to the Growth of population.

The population of India for each of the eleven Censuses that has taken place so far, according to the territorial units to which each related is given below :—

| | |
|---|---|
| 1871/72 | 206,152,360 |
| 1881 | 253,896,330 |
| 1891 | 284,314,671 |
| 1901 | 294,361,056 |
| 1911 | 315,156,396 |
| 1921 | 318,942,480 |
| 1931 | 352,837,778 |
| 1941 | 388,997,955 |
| 1951 | 356,879,394 |
| 1961 | 439,234,771 |
| 1971 | 547,949,809 |

The large increase in population observed in the 1881 and the 1891 Census respectively over the earlier census was due to—

(i) incompleteness of enumeration described in the 1901 census report as :

"Moreover, apart from the addition of tracts not previously counted, the first Census was necessarily in many cases tentative and incomplete, and numerous omissions occurred, especially among travellers and in out of the places even villages were sometimes lost sight of. In 1881 more elaborate precautions were taken and the omissions were fewer in number and the count was not still as through as in 1891" and

(ii) the extension of Census to territories not previously covered which included :

1881 : convict settlements in Andamans, Central India Agency, Hyderabad, Punjab States, Rajaputana, Manipur.

1891 : North Lushai, Upper Burma (excluding Shan States), Quetta, Kashmir, Sikkim.

The 1901 Census saw the extension to greater part of Baluchistan. In the later censuses also some new areas were covered which were mainly the tribal areas in the North West and North East Frontiers. But the population included were small.

After the 1941 Census, there were changes in the territories which constituted India. Between the 1931 and 1941 Censuses Burma and Aden ceased to be part of India. As a result of partition on the 15th August 1947, the former "Provinces" of North West Frontier Province, Sind, Baluchistan, parts of Bengal, Punjab and Assam along with former "Native States" of Bhahawalpur and Khairpur and States and Agencies in Baluchistan and North West Frontier Province were transferred to Pakistan.

During the decade 1951—61, the French territories of Chandernagore, Karaikal, Mahe, Pondicherry and Yanam as well as the Portugese territories of Goa, Diu and Daman merged with the Indian Union.

The report for each Census deals with the territory where the Census was taken and the territorial units mentioned are, as they were constituted at that Census.

In order to make a comparison of the growth of population during a period it is necessary to adjust the figures of all the Censuses in that period to the same territories and area.

The statement below gives the decadal percentage increase in population during the ten decades ending with the Census of 1971. The growth rate for the first seven decades are based on the population of the territories constituting India at the

1941 Census and the next three decades at the time of the 1971 Census. There may be a very slight difference in the growth rate of the first seven decades if 1971 area is adopted. But the trends of the change remain the same.

| Decade | Percentage increase in Population | |
|---|---|---|
| | Territories as existed at the time of 1941 Census | Territories as existed at the time of the 1971 Census |
| 1871/72—1880 | 1·5 | |
| 1881—1890 | 9·6 | |
| 1891—1900 | 1·4 | |
| 1901—1910 | 6·7 | |
| 1911—1920 | 0·9 | |
| 1921—1930 | 10·6 | |
| 1931—1940 | 15·0 | |
| 1941—1950 | | 13·3 |
| 1951—1960 | | 21·6 |
| 1961—1970 | | 24·7 |

There is a suspected under-enumeration of population in the Census of 1931 mainly in Gujarat due to non-co-operation movement and over enumeration in the 1941 Census in the Punjab and Bengal. The Census Commissioner for 1951 Census has estimated the inflation in 1941 Census at 20 lakhs.

It will be observed that there is a difference in the trend of growth in the first five decades and in the next five decades. In the first five decades the growth has not been uniform and has not even reached ten per cent while in the next period the growth 1921—30 was 10·6 and has uniformly increased from Census to Census. The apparent fall in 1951 could perhaps be accounted for by what has been stated above in respect of 1931 and 1941 Census. The Bengal Famine of 1943 should also have been a contributory cause.

The factors that contribute to the growth of population in a decade are the births and deaths that took place and the effects of migration of the population. The growth rate is

thus Birth rate—Death rate ± migration rate according as in-migration, is greater or less than out-migration. It has been stated in all reports that for India as a whole the net migration is negligible and has no effect on the growth rate. The growth rate will be reduced from the normal rate of growth either by a steep fall in the birth rate or considerable rise in death rate by 'abnormal' mortality. The causes of abnormal mortality are War, Famine including the diseases consequent on Famine, Epidemics such as Plague, Malaria, Influenza etc. The cause for a very small increase in four out of the first five decades are due to 'abnormal mortality' as explained in detail in the extracts from the census reports given in this monograph.

The decade 1911—1921 shows the smallest increase. The main cause was the influenza epidemic of 1918 which invaded the country in two distinct waves. According to the 1921 Census report 'all other factors in the health of the people have however been overshadowed by the influenza epidemic of 1918-19 which has dominated the population figures at the present census'.

The decade next in order is 1891—1900. The main causes were (1) the two famines in the decade the first during 1896-97 and the second during 1899-1900 and (2) the Bubonic Plague which first appeared in Bombay City in September 1896 and spread to other parts of India' where the mortality may possibly have been a million. The 1901 report says 'In a period which has witnessed the two greatest famines of the century and the appearance of a new and deadly disease, the wonder is not that the pace at which the population has grown is less than what it was during the previous ten years, when the rate of progress was more rapid than usual, but that there should have been any increment at all'.

The increment in the decade 1872—1880 was more or less the same as in the decade 1891—1900. Here also Famine was the main cause. It was prevalent in parts of Mysore (1877), parts of Madras (1876-78), parts of Bombay (1876-77) (which was also affected by cholera) and parts of North West Province (1879).

The decade 1901—1910 was better, in that it showed an increase of about 6.7 per cent though much less than the normal rate of increase. This was due to the prevalence of Plague

which made its appearance in the earlier decade. To quote from the 1911 census report 'if it be accepted that the mortality of the decade apart from plague was normal, it follows that, but for this disease, the population at the Census of 1911 would have been greater than it was by at least 6·5 millions. In other words the population would have increased by 9·3 per cent instead of by 7.1 percent'. In addition, Malaria was also prevalent in parts of the Punjab and the United Provinces which also contributed to the 'abnormal' deaths.

The decade 1881—1891 was comparatively free from the causes which lead to 'abnormal' deaths. But the growth was less than 10%. This is explained in the 1891 census report. But looking at the prevalance of marriage, it is clear that more than the existence of a few millions of widows, more or less, is required to account for the comparatively slow growth of the population under the impetus of so enormous a number of Births. The clue is to be found in the accompanying high morality. The birth-rate is very high far above that of any European country, if we exclude Russia, and reaches nearly 48 per mille on the whole country. But the death rate is equally abnormal, even if we omit the more frequent occurrence of famine and epidemic diseases in India, and may be taken to reach, on an average, 41 per mille. ..... speaking generally, it can be attributed to an excessive mortality among infants of both sexes, a large mortality among young mothers in child birth, and a general want of "staying power" after about 50 years of age. Of these factors, the first is the most prominent, as about 26% of the children born do not live to the end of the first year of life. In England the rate is not higher than 15.6.'

Famine as a killer was eliminated at the beginning of the century. 'The decade preceding the census of 1911 was free from wide spread famines such as those of the preceding ten years'. In the next decade, in 1920 "famine was declared in one district in Bombay and scarcity in another district of that province and in seven districts of the Central Provinces. Famine conditions in Hyderabad were pronounced and distress prevailed in seven districts of the Central Provinces. By the end of 1920 nearly 100,000 persons were on relief and generous remissions of revenue had to be given". "No mention

of deaths has been made. The same report says "Famine relief organisation is now so highly perfected in India that scarcity is not necessarily accompanied by high mortality".

In the decade 1941—50, "The Bengal Famine of 1943 as is well known marked a tragic reversal of this trend towards elemination of abnormal deaths."

After the influenza epidemic of the decade 1911—1921 there was no out-break of major epidemics causing un-natural deaths. The 1931 report says 'Public health has been exceptionally good during the decade : Cholera and Plague took much less than their usual toll of life and kala-azar was suppressed by the perfection of an easy cure'. Each decade saw further improvement in public health. The 1941 report describes the improvement in public health between 1920 and 1940. "Another fragment is discussed below from a brief note by the Public Health Commissioner for India which he was good enough to give me on three points put to him, namely a summing up over the last 20 years on

(a) maternal mortality

(b) infantile mortality

(c) mortality rates of the main epidemic diseases

The general effect can be summed up as a little changing but high birth rate, a falling death rate and markedly dropping infantile death rate accompany a downward trend in the death-rate from Cholera and the continued diminution of plague as a cause of mortality. All these tendencies taken to-gether point in the direction namely, a substantial growth rate in the population.

Where infantile morality is concerned the fall is significant.....when one remembers what a large proportion of

deaths actually occur in the first year of life, reduction of infantile mortality from 195 in 1920 to 160 in 1940 represents a substantial accretion to the population".

As pointed out earlier, in India the growth of population is measured by the difference between total births and deaths as migration plays an insignificant part. But birth and death statistics are so unreliable that statistics thrown by the census operations are only means to measure the growth of population. When the Government of India in 1941 wanted to postpone the census due to war conditions Mr. Yeatts the Census Commissioner remarked "The Registrar General's (U.K.) experience relates to a country with a highly developed and complete and accurate system of vital statistics. With such a system it is true that some of the importance of the regular interval disappears: the existing statistical system of the country, yielding material day by day throughout the year gives in effect a steady sequence of observations that are as good as the census from the pure population point of view."

"Consequently, far from the vital statistics system providing the steady continjing basis of the population record, in India it depends on the regular census record to provide with an anchor and test".

There is discussion in every census report on the reliability of registration data. The reliability varies from State to State. Registration was non-existent in most of the old 'Indian States' except a few major states before Independence. When 'abnormal deaths' took place due to famines or epidemics the registration system invariably failed even when the returns were better in normal times. Two important steps have now been taken by the Government to improve the situation. One is making the same authority—Registrar General—responsible for all populaton statistics including census and vital statistics. the other is making 'Vital Statistics' a concurrent subject and the passing of a Central Act for Registration of births and deaths applicable throughout the country.

The planning Commission has set up an expert committee for projection of population for planning purposes. This committee as well individual experts estimated the population for 1961 before the 1961 Census. These are given below :

| Upper limit of projections by : | (figure in millions) |
|---|---|
| 1. K. Davis | 402 |
| 2. Registrar General (1951) | 407 |
| 3. A. J. Coale and E. H. Hoover | 424 |
| 4. A. Das Gupta | 404 |
| 5. T. Chellaswami | 424 |
| 6. S. N. Agarwala | 423 |
| 7. Planning Commission Expert Committee | 431 |

The actual count at the 1961 Census was 439, thus exceeding even the highest projection (431) by the expert Committee.

According to the Expert Committee's referred to above projection, the population of the Country as on the census date (1-4-1971) was 561 millions. The census has however revealed an actual population of 547 millions.

There are discussions in some of the reports on the 'Population problem' but serious attention was paid only in the 1951 census when for three successive censuses the population had been increasing and there were evidences of further increase. There is a reference in the 1891 report to this aspect which said that 'throughout the greater portion of India, the occupied land has, probably not yet reached the limit of its productiveness.....and congestion of the population was at present found to be comparatively small extent'.

At the time of 1921 Census the question of over population and its control was raised by some Indian economists like Messrs P. K. Wattal, Mukherjee and Kale. The Census Commissioner of 1921 was of the view that this did not pose a problem then. He observed — "In various forms in which

it occurs the situation as here described, *viz*, the overtaking of the existing material resources by the expansion of population, provides the chief stimulus to progress. It forces the population to enhance the food resources by increasing the productivity of the tract and to overcome the limitations of area by improving the facilities of the communications. The enterprise involved, reacting on the mental and moral equipment of the people, widens the scope of their lives and, by raising their standards, creates a new economic stress and thus establishes a continuity of progress by a succession of reactions. In the historical life of a nation or a people the moral benefits of overpopulation in this sense are probably worth the temporary difficulties, and sacrifices which result from the inevitable delays and imperfections in the adjustment of resources to growth". In this connection among other things the Census Superintendent of Burma referred that Poland was able to increase her wheat and rye crops by 250 % during the ten years ending 1921. He was therefore of the view that the last word on production had not yet been said in Burma.

In the 1931 Census Dr. Hutton, the Census Commissioner considered that the point had not yet been reached at which the ability of the Country to feed the population was seriously taxed.

Shri Gopalaswami, Census Commissioner for 1951 Census after taking into consideration his estimated increase in population and the maximum increase in food production, came to the conclusion that it was necessary to stablise the population at 45 crores which according to him should have been reached by 1969 and so to limit the number of births that they do not materially exceed the number of deaths and thus achieve a sustaintially stationary population by 1969. The population has however already exceeded 54½ crores according to the 1971 Census. But 'Family Planning' has become an important programme with top most priority. Food production in India has also increased considerably by change in method of cultivation, application of fertilisers and improved seeds etc.

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## CENSUS OF INDIA 1871—1872

### MEMORANDUM BY THE SECRETARY OF STATE

**Increase or decrease of the population**

In connection with this branch of the subject, the very interesting question arises, whether there is reason to consider the population of India as on the increase, and, if so, at what rate. The absence of trustworthy data in most of the provinces renders it very difficult to form a confident opinion on this point, and, even in those territories for which a census has been previously taken, it must be borne in mind that a portion of the increase shown by the figures may be attributable to more perfect registration.

In Bengal, the estimates which have been formed at various times have been usually suspected to be very inaccurate, and in some cases have hardly pretended to be more than a mere guess. The one exception is the attempt made by Dr. Buchanan, between 1807 and 1814, to compute the population in the northern districts of Bengal and a portion of Behar. The mode which he adopted was to ascertain the extent of cultivation, and allowing five or six acres (according to the character of the district) to each plough, which he assumed to represent five persons of all ages, to calculate the aggregate agricultural population, whence, by consulting the most intelligent inhabitants as to the proportion which the agriculturists bore to other classes in that district, he arrived at the total number. This rough estimate was in some cases checked by ascertaining the aggregate agricultural produce, and after abatement for exports, calculating the number of mouths for which the remainder would suffice. The result of Dr. Buchanan's survey was that, in an area of 36,784 square miles, he reckoned the population to be 15,443,220 giving 420 persons to the square mile, an average which must be corrected to 412, as the country embraced in the maps accompanying his description is now found to comprise 37,425 square miles. The population of this tract by the last census was 14,926,337, or 399 to the square mile, exhibiting (so far as reliance is to be placed on the earlier figures) an average decrease in the districts to which they refer of 13 persons to the square mile during 60 years, or $\frac{1}{2000}$th per annum.

That Dr. Buchanan's mode of calculation, rough as it seems was not a bad one for the purpose appears likely from the following consideration. In the thickly populated districts of the North-West Provinces and Oude the cultivated land is about five-eights of the entire territory, and the proportion in similar parts of Bengal may be assumed to be much the same ; so that we might expect to find, in the districts surveyed by Dr. Buchanan, a population of about 5/8ths (37,425 × 240), or 14,989,600, which differs very slightly from that shown by the census, namely, 14,926,337 ; and conversely, we should find the area to be 5/8 ths $\frac{(14,926,337)}{646}$, or 37,316 square miles, which is within one third per cent of the truth.

The inference, then, may perhaps be drawn, with reference to the particular territory surveyed by Dr. Buchanan, that the area of cultivation has not materially increased since the early part of the century, or, at any rate, not to a greater extent than is counteracted by the increased facilities for exporting produce ; and that, the country being already as thickly populated as it would bear, the number of inhabitants has remained almost stationary.

In most cases the alterations which have taken place in the boundaries of the districts during this century render it impossible to compare the estimates of their population made from time to time with the results of the census. The following instance seems, however, confirmatory of what has been said above respecting the inferences to be drawn from Dr. Buchanan's figures.

In the year 1813, Mr. Butterworth Bayley, at that time the Judge and Magistrate of Burdwan, endeavoured to ascertain the population of his district. By inquiries among the Native proprietors of states and European residents, he satisfied himself that an average of 5½ persons should be allowed for each dwelling, and that the number of houses might be taken at 262,634, which gave a population of 1,444,487. The territory comprised in the district as then consituted appears from the recent census to contain 322,830 houses with a population of 1,305,316 souls, or 4½ to each house. The diminution, both in the actual numbers and in the average of residents in each house, is such as may well be ascribed to the ravages made by the epidemic fever which had pervaded Burdwan for several years, till it was checked by the dry seasons of 1873-74, coupled with the sanitary measures adopted by the Government.

In the outlying district, and those which more especially suffered from the disorders prevailing before the firm establishment of British rule, there must undoubtedly have been a large increase both of cultivation and of population, but no general estimate can be made, with any pretension to accuracy, of the addition which has taken place. The calculations given at various times for Orissa show a curious variation. At the beginning of this century, when it came under British government, the country had been well high depopulated ; and in 1822 the inhabitants were reckoned to amount to less than 1,300,000. In 1855 this estimate was more than doubled ; and in 1866 the population was thought to be at least 3,015,826. The Commissioners who inquired into the circumstances of the terrible famine in that year were of opinion that one-fourth of the people had been swept away by the calamity and their inquiries showed only 2,086,288 survivors. Yet, five years afterwards, the population was found by the census to have risen to 3,034,690.

In the North-West Provinces the Census of 1865 exhibited a falling-off in population since 1853 by somewhat less than three-fourths per cent; a result which was attributed to inaccuracy in the earlier return. The census of 1872 shows in increase on that of 1865 by about 3¾ths per cent. In some districts this may be due to the natural progress of a fairly well-to-do agricultural population; and, in writing of Moozuffernuggu the Settlement Officer expressly points out that the figures "tend at least to prove that canal irrigation does not necessarily lead to a decrease of population". In most cases,

however, the apparent increase is attributed by the officers to more accurate registration on the present occasion, especially with regard to the female population. The returns show an increase in most of the divisions, though in some parts the effect of the famine of 1868-69 is seen in the less rapid increase or even actual decrease. This is especially apparent in Jhansi, where the falling off is nearly 7 per cent.

Yet more sad is the tale revealed by the census of Ajmere and Mahirwarra. In 1865 these districts belonged to the North-West Provinces, and, according to the enumeration then made, they contained a population of 426,268, or 160 to the square mile. Having since been placed under a Commissioner directly responsible to the Government of India, their condition was tested by a separate census, taken on the 1st of May 1872, when the number of inhabitants was found to be only 316,032, or 119 to the square mile, the figures showing a decrease of more than one-fourth of the population, attributed to the famine of 1868-69 and the epidemic diseases which followed it.

In the Central Provinces the returns show an increase in the population amounting, in the six years since the last census, to 185,191, or 2 per cent. The emigration of the people from their homes to other places has in some districts led to an increase, and in others to a decrease ; in the Upper Godavery District there has been a falling-off of no less than 60 per cent ; attributed partly to the stoppage of the navigation works and partly to the emigration of the Koees into the country of the Nizam.

The returns for British Burma gave a population in 1862 of 2,020,634, and in 1872 of 2,747,148 ; in the former case the counting was not made by a systematic census, and was manifestly too low, but, allowing for the omission of perhaps 5 per cent. on that occasion, we find an increase of 625,000 persons, or 30 per cent on the numbers existing ten years ago. This shows a progressive expansion at the rate of 3 per cent per annum, an improvement doubtless due to the better administration of the country since it came under the British rule.

No good result would apparently be obtained by an attempt to compare the numbers reported for other provinces with the estimates of a more or less vague character which were made on previous occasions.

## EXTRACT FROM ALL INDIA CENSUS REPORT FOR THE 1881 CENSUS

### CHAPTER XIV

### MOVEMENT OF THE POPULATION

**General Condition**

774. The only statement with which I have not dealt in the preceding chapters is Table II, showing the movement of the population. A reference to that table (*see* page 6 of Vol. II.) shows that in a period not in any instance exceeding 14 years, and for the most part short of that and averaging nine years, a population of 206,499,611 has increased by 14,154,634 or at rate of 6·85 per cent. This rate of increase in a period of 13 years indicates an annual addition to the population of 53 per cent. or 76 per cent if the term be taken as nine years. If however, the figures for the various provinces can be relied upon, the movement of the population has not been in any way uniform. In three out of the 19 cases where the movement of the population has been traced the numbers have diminished instead of increased; and in the 16 cases where the population has increased the rate of increase varies from 1 to no less than 63 per cent. The provinces and states where the movement of the population has been traced, show the following results.

| Date of previous Census | | | | |
|---|---|---|---|---|
| 25-1-72 | Central Provinces, Feudatory States . | 62·88 | per cent in | 9 years |
| 14-11-71 | Burmah . . . . . | 36·02 | ,, | 9 ,, |
| 25-1-72 | Central Provinces, British Territory . | 20·37 | ,, | 9 ,, |
| 1867 | Berar . . . . . | 19·98 | ,, | 14 ,, |
| Jan. 1872 | Assam . . . . . | 18·34 | ,, | 9 ,, |
| 1867 | Ajmere . . . . . | 16·24 | ,, | 14 ,, |
| 18-1-1872 | North-West Provinces, Feudatory States | 16·13 | ,, | 9 ,, |
| Jan. 1872 | Bengal . . . . . | 10·89 | ,, | 9 ,, |
| 14-11-1871 | Baroda . . . . . | 9·00 | ,, | 9 ,, |
| 10-1-1868 | Punjab ; British Territory . . . | 7·05 | ,, | 13 ,, |
| 18-11-1872 | North-West Provinces, British Territory | 6·05 | ,, | 9 ,, |
| 14-11-1871 | Coorg . . . . . | 5·94 | ,, | 10 ,, |
| 1875 | Travancore . . . . . | 3·99 | ,, | 6 |

| Date of previous Census | | | | |
|---|---|---|---|---|
| 14-11-1871 | Bombay, Feudatory states . . . | 2·05 | per cent in | 9 years |
| 1-2-1869 | Oudh . . . . . | 1·48 | ,, | 12 ,, |
| 14-11-1871 | Bombay, British Territory . . . | 1·03 | ,, | 9 ,, |

So far the movement of the population has been on the side of increase. In the following three cases, however, the movement has been the other way :

| | | | | |
|---|---|---|---|---|
| 15-11-1871 | Mysore a decrease of . . . . | 17·19 | per cent in | 10 years. |
| 15-11-1871 | Madras . . . . . | 1·35 | ,, | 10 ,, |
| 1875 | Cochin . . . . . | 0·14 | ,, | 6 ,, |

775. The annual increase has averaged for each province following :

| | |
|---|---|
| Central Provinces, Feudatory States . | 6·99 per cent. |
| Burmah . . . . . | 4·00 ,, |
| Central Provinces, British Territory . | 2·26 ,, |
| Assam . . . . . | 2·04 ,, |
| North-West Provinces, Feudatory States | 1·79 ,, |
| Berar . . . . . | 1·43 ,, |
| Bengal . . . . . | 1·21 ,, |
| Ajmere . . . . . | 1·16 ,, |
| Baroda . . . . . | 1·00 ,, |
| North-West Provinces, British Territory | ·67 ,, |
| Travancore . . . . . | ·66 ,, |
| Coorg . . . . . | ·59 ,, |
| Punjab, British Territory . . . | ·54 ,, |
| Bombay, Feudatory States . . . | ·23 ,, |
| Oudh . . . . . | ·12 ,, |
| Bombay, British Territory . . . | ·11 ,, |

Subjoined I give the annual decrease in the three cases already quoted :

| | |
|---|---|
| Mysore . . . . . | 1·72 per cent. |
| Madras . . . . . | ·13 ,, |
| Cochin . . . . . | ·02 ,, |

776. Thus we have the apparent extraordinary contrast of the Feudatory States of the Central Provinces increasing at the rate of 7 per cent. per annum, while in Mysore there has been a decrease of 1·72 per cent per annum. This is the more remarkable as the population of the British territories of the Central Provinces according to the Census returns, has during the same interval of time increased only in 2·26 per cent per annum. This contrast however, is only apparent, existing in the figures and not in the facts. The defective nature of the enumeration of 1872 in the Feudatory States is

the cause of this great apparent increase of the population and the extent of the inaccuracy is illustrated by the following case, quoted from page 21 of Vol. II of the Central Provinces Report :

> "The Zemindari of Chapa returned a population of 2,615 souls in 1872, though at the settlement (*i.e.*, at a time shortly preceding the enumeration) it was believed to contain 18,666 inhabitants, and though the village of Chapa itself was known to be one of the most important and flourishing in the whole district. The Census of 1881 shows the population is 23,769."

The marked increase everywhere in the case of the Feudatory States renders it absolutely certain that the figures in 1872 were defective and that the population was not correctly enumerated. It will be found also that in other instances than the Feudatory States of the Central Provinces, the variations in the movement of the population which are so conspicuous when the annual increments are contrasted as they are in the figures above, are due less to real increase of the population than to other circumstances. In some cases undoubtedly the increase is real; for instance in Burmah, where there has been a large addition to the population produced by immigration to that province. So possibly in Assam, where the numbers of the people are continually being added to by emigration there from the neighbouring countries. But in the Central Provinces British Territory, there can be no doubt that there was a similar understatement of the population in 1872, though not so great as was apparent in the Feudatory States, under the same administration.

777. The same may be said of the great apparent increase in the population of the Feudatory States of the North-West Provinces; and in the British Territory, North-West Provinces, there was grave under statement of the population in 1872. Mr. White in his remarks on this subject at page 21, *et. seq.*, goes very thoroughly into this question, and gives very good reason for the conclusion at which he arrives, that the population of the North-West Provinces has not increased and may have decreased. Amongst other proofs of the defective nature of the previous enumeration in the North-West Provinces to which he refers, is the very marked difference in the movement of the two sexes. The male population has increased 647,864 on 16,414,037 and the female population 1,239,317 on 15,659,227 ; that is, the population has increased 3·95 per cent, while the female population has increased 8·99 per cent.

778. This proof of defect in preceding enumerations is almost universal, and is not confined to the North-West Provinces. In the accompanying abstract the increases and decreases in the various provinces are given on the population as returned by the Census of 1881 compared with the population as shown in the last preceding enumeration. These figures are shown in the form of percentages for both sexes and for the two sexes separately. In the first three columns the actual increment or decrement, during the time that has elapsed between the two enumerations, is given ; but as the enumerations in different provinces have occurred at varying dates, and the time intervening is not identical in every case, the three last columns have been added, which show the actual annual per centage of increase or decrease for the entire population, and for either sex in every province.

## ABSTRACT XC

*Percentage of Increase or Decrease of the Population on a comparison of the present and the preceding Census in each Province*

| Provinces | Total increase per cent. | | | Annual Increase Per cent | | |
|---|---|---|---|---|---|---|
| | Both Sexes | Males | Females | Both Sexes | Males | Females |
| Central Provinces, Feudatory States | 62·88 | 51·79 | 64·00 | 6·99 | 6·87 | 7·11 |
| Burmah. | 36·02 | 38·72 | 23·09 | 4·00 | 4·30 | 2·57 |
| Central Provinces, British Territory | 20·37 | 19·82 | 20·49 | 2·26 | 2·14 | 2·39 |
| Berar | 19·98 | 19·82 | 20·15 | 1·43 | 1·42 | 1·44 |
| Assam | 18·34 | 17·70 | 19·01 | 2·04 | 1·97 | 2·11 |
| Ajmere | 16·24 | 17·23 | 15·11 | 1·16 | 1·23 | 1·08 |
| North-West Provinces, Feudatory States | 16·13 | 13·77 | 18·79 | 1·79 | 1·53 | 2·09 |
| Bengal | 10·89 | 10·48 | 11·30 | 1·21 | 1·16 | 1·26 |
| Baroda | 9·00 | 7·48 | 10·07 | 1·00 | ·83 | 1·19 |
| Punjab, British Territory | 7·05 | 6·42 | 7·79 | ·54 | ·39 | ·60 |
| North-West Provinces, British Territory | 6·05 | 3·95 | 8·99 | ·67 | ·44 | 1·00 |
| Coorg | 5·94 | 6·34 | 5·42 | ·59 | 3·6 | ·54 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Travancore | 3·99 | 4·22 | 3·78 | ·66 | ·70 | ·63 |
| Bombay, Feudatory States | 2·05 | ·53 | 3·72 | ·23 | ·06 | ·41 |
| Oudh | 1·48 | ·49 | 2·55 | ·12 | ·04 | ·21 |
| | | Decrease | | | Decrease | |
| Bombay, British Territory | 1·03 | ·29 | 2·49 | ·11 | ·03 | ·18 |
| | | | Decrease per cent | | | |
| Mysore | 17·19 | 17·74 | 16·63 | 1·72 | 1·77 | 1·66 |
| | Decrease | Decrease | Increase | Decrease | Decrease | Increase |
| Madras | 1·35 | 2·85 | 0·16 | ·13 | ·28 | ·01 |
| Cochin | Decrease 0·14 | ·18 | 0·09 | ·02 | 03 | ·001 |

779. In 15 out of the 19 cases shown, there has been a perceptible difference in the increase of females as compared with the increase of males and the only cases where the increase in the number of the males has been greater than that amongst the females are :—

| | | | |
|---|---|---|---|
| Burmah | 430 | against | 257 |
| Ajmere | 123 | ,, | 108 |
| Coorg | 63 | ,, | 54 |
| Travancore | 70 | ,, | 63 |

Both in Burmah and in Coorg the course of immigration will probably account for the difference thus perceptible. In Burmah, 1,612,824 out of, 1,991,005, males were home-born, but of the females (1,745,766) 1,582,204 were home-born. If we deduct in the male the excess of male immigrants as compared with female immigrants from the increase in the male population of Burmah, we find the actual addition to the male population will be 23·75 instead of being 38·70 in the period of nine years that intervened between the last and the present Census. This is almost identical with the percentage figure (23·09) denoting the increase of females in Burmah during that time. In Coorg there are 53,235 males out of 100.439 who were home-born. Of the females (77,863) 50,202 were home-born. If we deduct the excess of male immigrants, 19,543, Coorg instead of showing an increase of its male population, will show a decrease of 14·35 per cent.

In Ajmere the females in 1872 were evidently understated. In Travancore there may have been understatement, but not to the same extent.

780. The prolonged acturial inquiry that has been made into the age figures has led Mr. Hardy to conclude that the normal rate of increase may be taken for :

| | |
|---|---|
| Bengal as | 8 per cent per annum |
| Madras as | 8 per cent per annum |
| Bombay as | 8 per cent per annum |
| Punjab as | 6 per cent per annum |
| North-West Provinces as | 32 per cent per annum |

781. If this is correct, and it is more likely to be accurate than the rates given by a mere comparison of figures, some of which are undoubtedly erroneous it would seem, judging by the Census figures of the two periods, that Bengal in the preceding Census has shortcounted its population by 2,169,565; that the North-West Provinces had similarly undercounted its people by close on a million; that Madras, on the other hand, if its figures were correct in 1871, should have had, in 1881, 34,207,719 instead of 31,170,631; and Bombay 17,390,010 instead of 16,454,414. Similarly, if the Madras rate of increase is applicable to the Mysore State, which adjoins the Madras district on three sides, the population of the latter country should have been 5,474,678 instead of 4,186,188. If the calculation is accurate, the differences observable in

these last three cases would show the number which the population had lost either by extra deaths or by a disease prevailing beyond the ordinary limits, and represent a loss in Madras of 3,037,088, in Bombay of 935,596 and in Mysore of 1,288,490.

The calculation in Abstract XCI, for Madras, Bombay, and Mysore give the figures for the population in each case at each succeeding year, allowing for the additions occurring annually in the three populations. They are made on Mr. Hardy's rates of increases.

ABSTRACT XCI

| | Mysore | Madras | Bombay |
|---|---|---|---|
| | Increasing annually at 8 per Mille between 1871 and 1881 | Increasing annually at 8 per Mille between 1871 and 1881 | Increasing annually at 8 per Mille between 1871 and 1881 |
| Population at preceding Census . . . | 5,055,412 | 31,597,872 | 16,285,636 |
| 1st year succeeding . . . | 5,055,854 | 31,850,654 | 16,315,916 |
| 2 ,, | 5,136,620 | 32,095,457 | 16,446,444 |
| 3 ,, | 5,177,712 | 32,351,950 | 16,578,014 |
| 4 ,, | 5,219,134 | 32,610,762 | 16,710,638 |
| 5 ,, | 5,260,851 | 32,871,648 | 16,844,322 |
| 6 ,, | 5,302,938 | 33,134,621 | 16,777,276 |
| 7 ,, | 5,345,352 | 33,399,697 | 17,115,074 |
| 8 ,, | 5,388,124 | 33,666,895 | 17,251,994 |
| 9 ,, | 5,431,229 | 33,936,229 | 17,390,010 |
| 10 ,, | 5,474,678 | 34,207,719 | — |

782. There can be little doubt that the great decrease in the Mysore population a decrease not only upon the estimated figures, but on the actual figures as recorded at the two enumeration can be largely, traced to the effects of the famine of 1877-78.

783. Unfortunately, the local knowledge which would have illustred the Census figures in connexion with this subject is wanting, as no Censu report for the Mysore State has yet been published. The districts in Mysore which suffered most in the calamity of 1877 are described to me by Major Cunningham, who is employed in the Mysore administration and who has been good enough to give me a brief note on the subject on Tumkur Kolar Hassan, Chitaldroog and Bangalore. In these districts the famineis said to have been most severe.

In Mysore and Kadur it was more moderate, and in the remaining district of Shimoga slight. Major Cunningham writes : "It must be remembered the whole province was acutely affected by famine in the districts of Shimoga, Kadur, Mysore and Hassan there are tracts of what is locally called Malwadi Country covered more or less with forest, well watered and done to the western Ghats, these being under the immediate influence of the south-western monsoon. In these tracts the crops did not fail, or only partially failed ; prices rose enormously and the well-to-do cultivator profited by the hardness of the times. But still the influx of starving and diseased paupers, the high price of necessaries and the general unhealthiness of the time told greatly upon the population especially the poor of those Malwad tracts. Further each of these districts has more or less plain country where the full effects of famine were as acutely felt as in any part of the province. It is to be expected then that the vital statistics of these districts will show the effects of famine and that those effects will be more marked according as the district has a greater proportion of plain country incorporated in it. Mr. Elliott placed the difference in order of the severity of the famine of ranking them thus :

| | |
|---|---|
| Tumkur* . . . . . | Tukmur† |
| Chitaldroog . . . . . | Chitaldroog |
| Bangalore . . . . . | Kolar |
| Kolar . . . . . | Hassan |
| Hassan . . . . . | Bangalore |
| Kadur . . . . . | Mysore |
| Mysore . . . . . | Kadur |
| Shimoga . . . . . | Shimoga |

Opposite this last I have written the districts in order of percentage of decrease in the population as shown by the Census of 1881. The order scarcely differs. Major Cunningham notes regarding the better position taken by Bangalore according to the Census of 1881 in contrast with Mr. Elliott's estimate that it is one which might be anticipated from the more favourable situation of Bangalore with its large towns, its railways and its public works, giving it as they must a quicker recuperative power than the other districts of the state possess.

784. In the following statement the figures are given for these eight districts and the extent to which they have been affected by famine so far as that can be judged by a comparison of the Census of 1871 with that of 1881 will be readily perceived.

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*Mr. Elliott's order.

†Order according to census comparison.

## ABSTRACT XCII

| | Province | Number of the population | | Actual decrease | Per-centage of decrease |
|---|---|---|---|---|---|
| | | 1881 | 1871 | | |
| Famine, intense | Bangalore . . | 669,139 | 828,354 | 159,215 | 19·22 |
| | Hassan . . . | 535,806 | 668,417 | 132,611 | 19·8 |
| | Kolar . . . | 461,129 | 618,954 | 157,825 | 25·50 |
| Famine, intense | Chitaldroog . . | 376,310 | 531,360 | 155,050 | 29·18 |
| | Tumkur . . | 413,183 | 632,239 | 219,056 | 34·65 |
| | | 2,455,567 | 3,279,324 | 823,757 | 25·12 |
| | Mysore . . | 902,566 | 943,187 | 40,621 | 4·31 |
| Famine, moderate | Kadur . . . | 328,327 | 333,925 | 5,598 | 1·67 |
| | | 1,230,893 | 1,277,112 | 49,219 | 3·62 |
| Famine, slight | Shimoga . . | 499,728 | 498,976 | Increase 752 | Per centage of Increase ·15 |

785. The following figures are further proof, if proof was wanted, of the severity of the famine in the Mysore districts. They indicate the per centage of children in the first five years of life on the total population.

| | | | |
|---|---|---|---|
| Tumkur . . . . | 7·43 | Kadur . . . . | 9.68 |
| Chitaldroog . . . | 7·99 | Hassan . . . . | 9·77 |
| Bangalore . . . . | 9·40 | Shimoga . . . | 10·87 |
| Kolar . . . . | 8·41 | Mysore . . . . | 10·59 |

In the first four cases figures entirely confirm the belief as to the intensity of the famine in the four districts named.

786. The effects of the famine in Madras are noticed, at some length in the following remarks extracted from Mr. Melver's Repot of the Madras Census of 1881 ;—

"In February 1881 the total population (including that of the State of Pudukota, but excluding Bhadrachalam, and Rekapalle in the Godavari district) was 31, 134, 975.

**Actual decrease** : in November 1871 it was 31,597,872, showing a decrease in 9¼ years of 462, 897 or 1·46 per cent.

**Its significance and cause of decrease**

This fact is the most significant in this report, and is the key note of half the inferences deducible from all these returns. It is the stamp of the famine, and it marks the record on every page. The result of the Census in this respect, although abnormal in a country which is not over-populated, and which possess more than 22,000,000 acres of culturable but uncultivated land, was not unexpected. Making allowance for Census fuller and more accurate than that which proceeded it, the population is slightly above what was anticipated from the partial Census made in 1878 for the purpose of the famine report. The decrease is, beyond dispute, due to the famine 1876-1878.

**Omissions in 1871 Census**

Reference has been made to the points to be kept in view in comparing the results of the present Census with those of 1871. There is good ground to believe that the return of females throughout the Presidency, and notably in the northern districts, has been much fuller on this occasion, and that nearly half a million females were left out of the last Census. In all the three northern most districts there were more males than females returned in 1871, and in the hill tracts the former outnumbered the latter by 24 per cent. This time there are altogether more females in the three districts, and even in the hill tracts the males exceed the females by only 7 per cent. The total increase (on the same area, as in 1871) in these three districts, including the hill tracts has been nearly 14%. The present returns also suggest that in the hill tracts the men were understated in 1871. Mr. Stocks in one calculation makes the omission of females to be little more than 100,000; but as the figures for the three northern districts alone show an omission of more than this number the figures arrived at roughly are adhered to.

**Estimated decrease allowing for 1871 omission**

Assuming that 488,800 females and 359,779 males floating population were omitted from the Census of 1871, and deducting from the figures for 1881 some 35,000 inhabitants of new territory annexed to Godavari in 1874, we should have the whole falling off of the population at 1,310,000 or 1⅓ millions."

**Reasons for believing the population is ordinarily a progressive one**

Dr. Cornish, in his report printed in Appendix B to the Review of the Madras Famine 1876-1878, contends that the population of the Madras Presidency is ordinarily a progressive one. The following extract from his singularly able paper gives the grounds on which he bases this nor unreasonable proposition :—

> "It is quite clear (from the quinquennial Census) that in the space of 20 years our population grew from 23 to 31½ per cent or in the ratio of 35·8 per cent.
>
> "Now the addition of 1½ per cent annual increment for a period of 20 years would only give 30 per cent increment from 1851 to 1871;

but we see that, after allowing for uncounted population in 1851 to 1871; the actual increment in 20 years was in excess of 1½ per cent being in fact 35·8 per cent against 30 per cent.

But besides the known growth of population in the 20 years from 1851 to 1871, there is the collateral testimony afforded by the public revenue of steady increase in prosperity during the same period.

"The following abstract shows the growth of revenue :—

| | Rs. |
|---|---|
| 1856—57. . . . . | 4,88,00,934 |
| 1861—62 . . . . . | 6,13,72,399 |
| 1866—67 . . . . . | 6,52,66,085 |
| 1871—72 . . . . . | 7,12,55,819 |

"From 1856—57 to 1871—72 the land revenue of the country had increased from 375 lakhs of rupees to 443 lakhs, or in proportion of 18 per cent in 15 years. This great fact does not bear out the view entertained by the Honourable Sir, Michael Kennedy that the limits of cultivation had been reached in 1871. The abkari revenue rose in the same period from 23 lakhs to 57 lakhs; the customs revenue from 15 to 31 lakhs; salt from 54 lakhs to 130 lakhs; stamps from 7 lakhs to 39 lakhs. The remarkable thing in regard to the revenue of the country during this period was that it increased faster than population. We have already seen that the population increased 35·8 per cent in 20 years but here we have an instance of the gross revenue of the country increasing 58 per cent. in 15 years, a rate of progress hardly surpassed by any country in the world.

If this unexampled tide of prosperity reached its acme about the year 1871 and from that time population and revenue without obvious cause has ceased to grow, the fact would be unique in the history of nations. I have not by me the materials for a review of the progress of the public revenue since 1871 but the facts are at the disposal of Government in the annual reports of the Board of Revenue, and I venture to affirm that they afford no support to the theory that the Madras Presidency was stationary or retrogading in prosperity and population before the great calamity of the famine fell on the people. In addition to the public revenue, it must be noted that of recent years about 35 lakhs are raised annually for municipal and local expenditure.

**Estimated loss allowing for normal increase**

Dr. Cornish roughly estimates the normal annual rate of increase as 1·5 per cent, and, on the basis of this and the partial Census taken in 1878, takes the loss by famine to have been 3¼ millions. His figures do not profess to be more than a rough estimate. 1½ per cent would be a dangerously high figure to assume. It would, in the 20 years referred to, have given an increase of 34·69 per cent instead of 30 per cent, as stated in the above quotation. Besides the increase at each succeeding Census was no doubt in part to improving enumeration. Dr. Cornish points this out in one particular

at page 11 of his Report on the Census of 1871. Mr. Stokes, proceeding by a more exact method, also based upon the quinquennial Censuses carried out since 1851—52, finds the normal annual rate of increase at 7·95 per mille, or 0·795 per cent, *i.e.*, about half the rate assumed by Dr. Cornish. Mr. Stokes has been careful not to over estimate and it is probable that if he has erred at all it has been in the opposite direction. An examination of the age returns suggests that the rate of progress between 1856-76 was a good deal higher than 0·795 per cent. But taking Mr. Stokes' figures as correct, we find that the population of 1871, as actually censused, would have ordinarily increased in 9¼ years from 31,597,872 to 33,999,562, and instead of this figure it is returned 31,170,631, giving a loss of 2,828,931 or 8⅓ per cent, due to famine.

**Estimated loss allowing for normal increase**

To show the estimated decrease even more approximately we should allow, on the one hand, for the estimated deficiency in the return of females and of floating population in 1871, and for the population of new territory, and, on the other hand, for the estimated loss by balance of emigration and immigration. The figures as shown below, give an estimated loss in 1881 of 3,551,414 or 10·17 per cent of the population of 1881, as it would have been but for the famine :—

*Population Censused in* 1871

| | | |
|---|---|---|
| Population censused in 1871 . . . . . | 31,597,872 | |
| Add females uncounted . . . . . | 488,800 | |
| Floating population (males) uncounted . . . | 359,779 | |
| Corrected population in 1871 . . . . . | 32,446,451 | |
| Estimated increment at 0.795 per cent for 9¼ years . . | 2,466,181 | |
| Estimated population in 1881 . . . . . | | 34,912,632 |
| Population censused in 1881 . . . . . | 31,170,631 | |
| Deduct population of new territory . . . . . | 35,656 | |
| | 31,134,975 | |
| Add balance of emigration and immigration . . . | 226,243 | |
| Corrected population for 1881 . . . . . | | 31,361,218 |
| Difference . . . . . | | 3,551,414 |

This, then is probably the nearest we can get to the loss inflicted by the 1876-78 famine 3½ millions of people missing in 1881. The figures as they stand are terrible enough but when it is remembered that the loss occurs almost wholly in a portion of the Presidency in a group of districts whose

people should now have numbered 14½ millions and actually number under 12 millions the total deficit is even more significant. It means that famine, whether by deaths from sheer starvation or from starvation induced disease, by lost fertility or by enforced migration, has reduced the present population of the famine zone by nearly 18 per cent.

**Estimated population in 1876**

From the age tables it seems clear that in 1871 there was an abnormally high birth rate, and that this continued down to 1876. There is little doubt that at this period the population was increasing a good deal faster than at the normal rate. But assuming the normal rate accepting the defective return of 1871 and deducting the estimated loss by emigration the population in 1876 would have reached 32,761,093 or 1,626,118, more than it is found to be in 1881.

In 1881, therefore, there is a loss of 1.46 per cent on the actuals of 1871 of 5 per cent on the estimate of 1876, and of 10·17 per cent on what there ought to have been in 1881 even if the population had not been increasing at an abnormal rate.

**Check to progress not confined to famine zone**

In examining the age tables we find very distinctly that the scarcity affected the population, not only by a heavy mortality but by checking birth; and we find clear sigh that in 1881 the enfeebled population was recovering itself and that the birth-rate was gradually rising towards its former figure. The abnormal loss of population on what it was that it is to say, the effects of famine mortality—may be taken to have been confined to the famine districts. The loss in population, on what it ought to have been is not confined to the famines zone. Throughout the Presidency the famine told on supply and on prices. In some socalled non-famine districts the famine pressure was severe. In parts of these districts there were failure of monsoons and of crops, relief works, and famine camps; in others there was severe distress. In all there were high prices and scarcity. These conditions therefore would affect, and did affect, the population. They did not perhaps (except to a small degree) lead to an abnormal mortality in those districts they put an effective check on rapid reproduction.

It may safely be accepted that when food is scarce there are fewer births; whether this is exclusively the result of prudence, and whether that prudence is deliberate or instinctive it is not here necessary to inquire. It remains stamped on the age tables that in 1876 78 very much fewer children were begotten throughout the Presidency than in previous or subsequent years, and that this is true of the famine districts. The result is that, although the non famine districts show an increased population they do not show such an increase as, allowing for improved enumeration, they would have shown had there been no famine in 1876-78.

In the non-famine districts the population has increased by 1,288,430 or 7.19 per cent, that is to say, within 29,907, or 0.16 per cent, of what might have been expected at the normal rate of increase. In the famine districts, including Pudukota, the actual loss has been 1,751,327 on a population of

13,684,510, or nearly 13 per cent on the previous Census and the population is 2,608,437, or means 18 per cent below what it ought to have reached in 1881."

787. The following remarks by Mr. White in regard to the movement of the population in the North-Western Provinces are of interest :—

"We find that the population of Oudh at the previous Census was over-estimated relatively to that the North-Western Provinces, but to what extent we cannot ascertain. In the central tract, consisting of the Lucknow division and the two districts, Rae Bareli and Sultanpur, the decrease of nearly 8 per cent must be an indication of a real loss. It cannot be ascribed to the over estimate of the previous Census, because that is a condition which would affect the province generally; but we have here a well-defined tract showing a decrease, which another shows an increase. There must consequently have been some condition specially affecting the population of these districts. Such a condition we find from the drought of 1878 and the fever of 1879, from which this central tract suffered especially. That the population of these districts was thus especially affected we find from the smaller proportion of children living of the years of birth of 1878 and 1879. There can, therefore, be no doubt that the population of this tract actually has diminished by somewhere about 8 per cent. Owing to the effects of those two fatal years.

The terrible effect of these two years may be shown clearly by the following consideration. The rate of increase in the Fyzabad district is 3.8, that in Pratapgarh 5.5. If we assume that the central tract in question would have increased by about 4 per cent but for the mortality of 1878-79, then the male population of 1869 should have increased from 2,488,156 to 2,587,682, at the present census. The number enumerated was only 2,292,084, which is 295,598 less. Thus these fatal years would appear to have caused a loss to the population of these five districts of nearly 300,000 males.

Omitting the Benares Division the following shows the percentages of increase and decrease, calculated as usual on the male figures only for the population of the remaining districts of the North-Western Provinces, as shown by a comparison of the returns of the present and previous Census :—

| | Increase (Per cent) | | Decrease (Per cent) |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| Dehra . . . . | 22·2 | Mutra . . . . . | 14·6 |
| Lalitpur . . . . | 16·2 | Shahjahanpur . . . . | 10·1 |
| Almora . . . . | 12·7 | Pilibhit . . . . . | 9·4 |
| Jaunpur . . . . | 12·0 | Agra . . . . . | 9·1 |
| Taria . . . . | 10·4 | Etah . . . . . | 8·4 |

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Garhwal . . . . | 9·6 | Hamirpur . . . . | 5·9 |
| Saharanpur . . . | 9·4 | Aligarh . . . . . | 4·5 |
| Muzaffarnagar . . . | 9·0 | Budaon . . . . . | 3·3 |
| Etawah . . . . | 5·8 | Bijnor . . . . . | 3·1 |
| Manipur . . . . | 3·5 | Farukhabad . . . . | 1·6 |
| Allahabad . . . . | 3·5 | Banda . . . . . | 1·5 |
| Jhansi . . . . | 3·1 | Bulandshahr . . . . | 0·4 |
| Meerut . . . . | 3·7 | Jalaun . . . . . | 0·2 |
| Moradabad . . . | 2·2 | | |
| Cawnpore . . . . | 1·5 | | |
| Bareilly . . . . | 1·0 | | |
| Fatehpur . . . . | 0·6 | | |
| TOTAL . . | 5·41 | TOTAL . . . | 5·71 |

The male population of the 17 districts where the increase occurred amounted at the Census of 1872 to 6,548,032. This has increased by 354,294, or 5·4 per cent. The males of the 13 districts which have lost population numbered 5,553,026, and have diminished by 317,064, or 5·7 per cent. The gross increase in these 30 districts amounts to only 0·308 per cent on 12,101,058 males at the last Census.

The decrease has occurred in three tolerably and defined areas :—

(1) North-Western Rohilkhand and the southern tahsils of the Meerut district.

(2) The central Doab and eastern Rohilkhand.

(3) A tract from Jalaun and Banda stretching to the north-east across the Ganges to Bara Banki.

The first tract includes the whole of the Bijnor district except tahsil Nagina the adjacent tahsils of Amroha, Thakurdwara, and Moradabad in the district of Moradabad. From the Basta tahsil of the Bijnor district it crosses the Ganges and includes the Ghaziabad and Hapur tahsils of the Meerut district. The second tract includes the whole of Pilibhit district except tahsil, Puranpur, the whole of Shahjahanpur, and all Budaon except the Bisauli tahsil. It crosses the Ganges and includes all Farukhabad except Tirwa, all Etah, Agra and Muttra, and the Khurja tahsil of Bulandshar. The population of this central tract has decreased more than that of either of the others. The last tract begins from Bara Banki on the north-east, includes the five central districts of Oudh, crosses the Ganges, including the Jajmau, Ghatampur, and Bhoghnipur tahsils of Cownpore, all Fatehpur except tahsils Fatehpur and Hatgaon, all Hamirpur and Banda except tahsil Rath, Kulpahar, Banda and Badausa, the Jalaun, and Atta tahsils of Jalaun, and the Bara tahsil of Allahabad.

If these three tracts be marked out on the map each will be found to spread out in a continuous area. No single tahsil in the provinces has lost in population which is not connected with these tracts. Were this decrease due to irregularities in the former Census, the tahsils in which it occurs would be found scattered over the province without this contiguity. We find, however, that the lines of connexion are geographical, not checked by district or even provincial limits; thus any local carelessness in the previous enumeration will not suffice to explain this phenomenon. There can, I think, be no doubt that the real explanation is to be found in the drought of 1878 and the epidemic fever of 1879. All the district officers concur in attributing the diminished population of their districts to this cause.

As already pointed out, the death-rates of one district cannot safely be compared with those of another, because the accuracy of the reports has hither to depended much on the idiosyncrasies of district officers. Taking, however, a group of districts, we may compare the rates on the assumption that the rate of omission will be equal. The mean death rate given by the mortality returns for the two years 1878-79 in the 13 districts where the decrease occurs in 55.07 in the other 17 districts, in question it is only 38.9. Again, the scarcity of 1878 was caused by the failure of the rains in the preceding year. In the tract were the population has diminished, the mean rainfall of June-September was 6.9 inches; in other districts it was 9.9 inches. The latter tract has also a slight advantage in the number of male children surviving from the births of 1878, viz., 1.19 per cent on the total males.

We find then, that in order to estimate the movement of the population in these provinces, we must first set aside entirely the Benaras Division in which the previous Census was so extremely inaccurate. A comparison of the figures for the rest of the province shows that both in the North-Western Provinces and Oudh there are well defined areas of increase and decrease. The previous Census of the 12 districts of Oudh was taken on the 1st February 1869; that of the North-Western Provinces on the 18th January 1872. In the one case, therefore, an interval of 12 years and a fraction, and in the other of 9 years and fraction has elapsed between the previous and present Census. Omitting the fractions as unimportant, we have the following

statement, the mean annual rates of variation of the males in the areas of increase and decrease respectively :—

| | Male population of area increase | | | Male population in area decrease | | |
|---|---|---|---|---|---|---|
| | Previous Census | Present Census | Annual rate of Increase per cent | Previous Census | Present Census | Annual rate of Decrease per cent |
| North-West Provinces . | 6,543,032 | 6,902,326 | 0·572 | 5,553,026 | 5,235,962 | 0·655 |
| Oudh . . . | 3,334,713 | 3,559,571 | 0.545 | 2,488,156 | 2,292,084 | 0.686 |

The rate of increase and decrease has, therefore, been almost indentical in each part of the united province.

Taking now the whole of Oudh and of the North-Western Provinces without the Benaras Division, we have the following :—

| | Male population by | | |
|---|---|---|---|
| | Previous Census | Present Census | Annual rate of Increase per cent |
| North-West Provinces . . . . . | 12,101,058 | 12,138,288 | 0·034 |
| Oudh . . . . . | 5,822,869 | 5,851,655 | 0·041 |

The movement of the population in the North-Western Provinces and in Oudh, as indicated by the difference between the present and previous Census, has been almost precisely the same. The districts of Oudh so closely resemble those of the North-Western Provinces in all points material to the progress of the population that such a result as this was to be expected. The coincidence of the results in the areas of increase and decrease and in the country generally suggests that different as were the methods of the two previous Censuses in the North-Western Provinces and Oudh, their accuracy as measured by the present Census was almost the same. The rate of omissions at the previous Census of the Oudh was probably considerably greater than in the North-Western Provinces without the Benaras Division, but the omissions were compensated by the double counting of absentees already alluded to.

It is proved that there has been a decrease of the population throughout a large area of the province. But are we justified in assuming that there has been any actual increase in the province generally, or even in the portion we have called the area of increase ? In Oudh the increase in the 12 years has been five per thousand; where, at the previous Census, 1,000 persons

were counted, on the present occasion we counted 1,005. In the North-Western Provinces (without, the Benaras Division) the increase in nine years has been three in a thousand; where, at previous Census, we counted 1,000 persons, we have now counted 1,003. If, now, we consider the careful preparation for the present enumeration and the laborious checking to which the schedules were subjected, and compare this with the manner in which the operation was carried out the previous Censuses, we may, I think, fairly suspect that this very small increase of from three to five in a thousand is due to the more accurate counting. The facts of the relative proportions of the sexes at the present and previous census, and the great negligent with which the previous enumeration was effected in the Benaras Division generally, afford strong confirmation of this view. I think, therefore, the comparison tends to show that the population has not increased, and may have decreased.

Within the area of increase in Oudh and the North-Western Provinces the increment is equivalent to rate of 67 and 54 per mille respectively. The coincidence of the rates calculated on the two independent Censuses of Oudh and the North-Western Provinces raises a presumption that some increase has actually taken place, though probably less than the figures show; the annual rates of increase, 5.72 per mille for North-Western Provinces, and 5.45 per mille for Oudh, are the limits of the possible increase. This rate of increase corresponds very closely with that of the so-called stationary population of France during the four years which intervened between the Census of 1872 and 1876, *viz.*, 5.5 per mille annually. Taking therefore, the areas of increase only, we find a rate of progress the same as that of the most slowly moving population of Europe."

788. Bombay Presidency It will have been apparent from the preceding remarks that though not suffering to the same extent as Madras and Mysore for the Bombay population finds no absolute decrease in the numbers of its population—the Bombay Presidency has by no means escaped the famine which so seriously affected the more southernly portions of India in 1877-78. If the rate of increase arrived at by Mr. Hardy as the normal rate of increase annually in Bombay had been maintained continually from 1872 to 1881 I have shown in a preceding paragraph that the population in the British territory of Bombay, would have exceeded that now accounted there at the Census of 1881 by very nearly a million. Our figures, however, are not sufficiently accurate to permit of our saying that the deficiency of 935,596, the figure arrived at in a previous calculation, represents the loss of life occasioned by famine and consequent disease. There can, however, be no doubt that the effects of the famine have been felt severely in Bombay, and especially so in certain districts, to which Mr. Baines refers in his report.

789. The following extracts exhibit Mr. Baines's views on the subject.

"The famine area may be said, in a general way, to have included the whole of Kaladgi, nearly the whole of Sholapur and Ahmednagar, with the eastern districts of Poona, Dharwar, Belagum and Satara. Some portions of Khandesh and the south and east of Nasik were also affected to a less extent by scarcity amounting to famine, but

worthy of notice as throwing out of work certain classes peculiarly dependent on the season for subsistence, and whom it was undesirable to see wandering about the country in the nominal search for other than agricultural employment. Taken as a whole, the famine was felt over an area of more than 50,000 square miles, by a population of some 8,000,000, out of which it has been recorded that 34,200 miles and 5,002,000 people were severally affected. Distress began in August 1876 amongst the lower class of field labourers, and by October had spread, though to a far less extent, to the rest of the agricultural population. It appears from the official returns of relief which are, of course, the best indication of the course of famine, that after rising till January 1877 the intensity decreased during the hot season, but began to rise again from April to June when it reached its highest point. Its influence is scarcely to be traced in the vital statistics during the year 1876, but begins to appear early in the following year.

VITAL STATISTICS

| Year | Births — Ratio of Variation | | Deaths — Ratio of Variation | |
|---|---|---|---|---|
| | From 9 years average | From 7 years average | From 9 years average | From 7 years average |
| 1872 | —13·61 | —16·39 | — 9·39 | + 5·42 |
| 1873 | — 4·94 | — 7·98 | —27·18 | —15·28 |
| 1874 | + 8·26 | + 4·79 | —30·25 | —18·85 |
| 1875 | + 11·71 | + 8·13 | — 3·92 | + 7·94 |
| 1876 | + 11·91 | + 8·32 | — 7·23 | + 7·94 |
| 1877 | — 0·07 | — 3·27 | + 62·35 | + 88·91 |
| 1878 | —23·11 | —25·59 | + 36·05 | + 58·31 |
| 1879 | — 6·47 | — 9·47 | — 2·90 | + 12·98 |
| 1880 | + 16·33 | + 12·60 | —17·50 | — 4·01 |

The accompanying diagram* shows the general effect of the famine on the births and deaths of the Presidency Division. The average taken is that of seven years, excluding the two during the results were abnormal. The reason for this selection is that if the years 1877 and 1878 be included, the average becomes inapplicable to the remaining years on account of the extent of the variations in those two. This will be seen from the comparison indicated above. The diagram on page shows, that in the worst period of famine males suffered more than females, and that in the succeeding year the after effects of the scarcity of food and the insufficient nourishment maintained themselves in a large demunition of births.

**See* Page 26.

Proportional Variation per 100 from Average of 7 years excluding 1877 and 1878

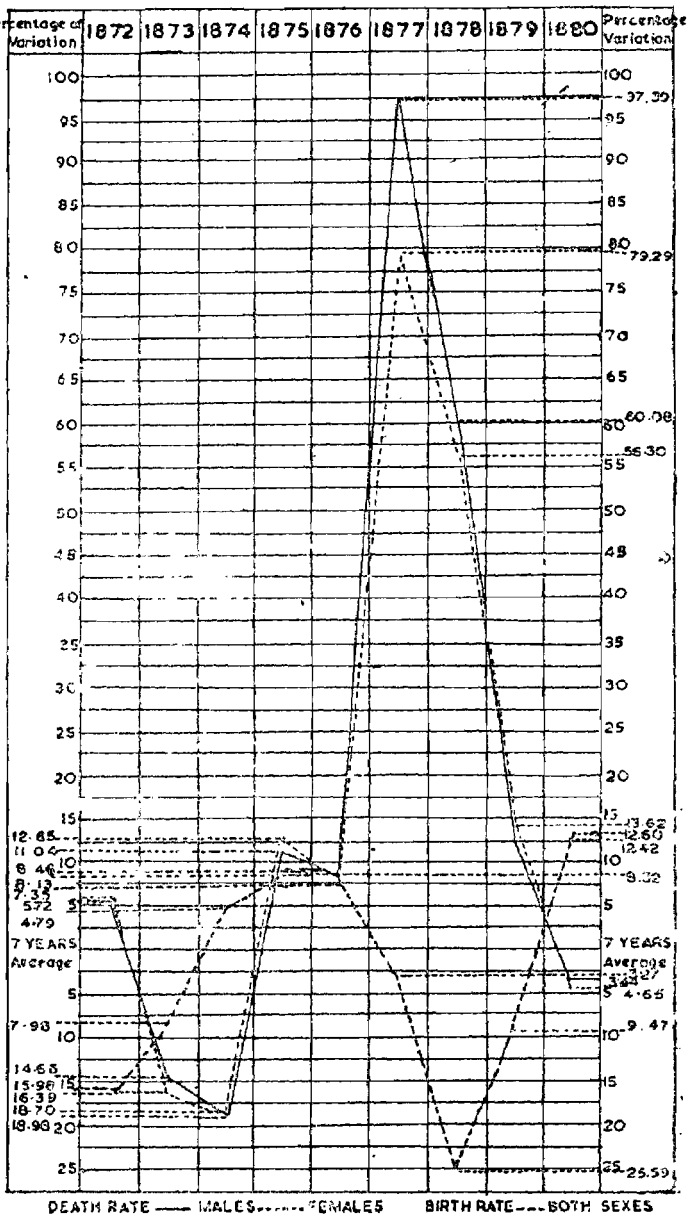
| Year | Deaths | | | | Births | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sholapur | | Kaladgi | | Dharwar | | Belgaum | | Sholapur | |
| | Males | Females | Males | Females | Males | Females | Males | Females | Males | Females |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1875 . . . . . | +15·14 | +13·08 | +0·33 | —1·85 | +20·04 | +21·32 | +23·49 | +28·64 | .. | .. |
| 1876 . . . . . | +20·59 | +25·07 | +28·85 | +24·69 | +28·54 | +21·95 | +31·33 | +28·87 | +43·72 | +40·36 |
| 1877 . . . . . | +149·16 | +117·61 | +151·01 | +355·69 | +267·84 | +192·29 | +217·76 | +168·78 | —21·07 | 21·69 |
| 1878 . . . . . | +81·16 | +74·89 | +48·50 | +49·27 | +67·28 | +67·51 | +84·71 | +86·41 | —41·12 | 42·16 |
| 1879 . . . . . | +53·45 | +57·04 | +14·06 | +22·41 | —2·47 | —3·50 | +12·27 | +11·63 | —42·43 | 42·16 |
| 1880 . . . . . | —37·08 | —27·64 | —11·39 | —14·18 | —14·02 | —18·08 | —0·32 | —2·60 | —25·84 | —37·33 |

Proportional Variation per 100 from Average of 7 years, excluding 1877 and 1878—*concld.*

| Year | Births (*Contd.*) | | | | | | Average number of deaths of females to 1,000 of males | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Kaladgi | | Dharwar | | Belgaum | | Sholapur | Kaladgi | Dharwar | Belgaum |
| | Males | Females | Males | Females | Males | Females | | | | |
| 1 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 1877 . . . . . | .. | .. | .. | .. | .. | .. | 864 | 875 | 947 | 923 |
| 1878 . . . . . | +31·4 | +33·50 | +9·13 | +6·47 | +17·58 | +18·39 | 902 | 865 | 889 | 873 |
| 1879 . . . . . | −17·71 | −18·91 | −19·11 | −20·77 | − 4·28 | −3·74 | 759 | 756 | 745 | 752 |
| 1880 . . . . . | −79·78 | −80.41 | −51·49 | −69·31 | −49.61 | −49·61 | 839 | 899 | 950 | 897 |
| 1881 . . . . . | −51.08 | −52.07 | −35.01 | −37·25 | −18.13 | −17·76 | 890 | 960 | 927 | 894 |
| 1882 . . . . . | −23·42 | −22·28 | +9·11 | +5·64 | +3·82 | +3.19 | 851 | 867 | 893 | 869 |
| Average number of females per 1,000 males enumerated | | | | | | in 1872 | 943 | 954 | 952 | 956 |
| | | | | | | in 1881 | 976 | 1,010 | 997 | 988 |

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DIAGRAM SHOWING THE ANNUAL VARIATIONS IN DEATHS AND BIRTHS RECORDED BETWEEN 1872 AND 1881



The smaller mortality amongst females than amongst males appears to be a general characteristic throughout the four districts most affected, and if the year of greatest mortality be taken, it will be seen that though the number and proportion of the deaths differ so widely in the four districts, the proportion of the females that died to males is singularly uniform, more so than in any other year of the series. The action of the famine in equalising the numbers of the two sexes, too, is seen in the comparison of the figures for the two enumerations. The range of variation is from 32 per mile in Belgaum to 56 in Kaladgi, where the relative proportions of the sexes have been most largely altered. In Sholapur, where the difference is only a little above that in Belgaum, the mortality does not seem to have been so concentrated as in the collectorates of the south, and in 1877 the ratio of female to male deaths was higher than in the other three districts, whilst the rate of increase over the average was considerable. The table affords a slight indication of the relative recuperative power of the districts, though not perhaps of much value. It appears, for instance, that the number of deaths receded below the average a year sooner in Dharwar than in the rest of the four, but that it was in Kaladgi, even making all allowance for the diminished population after the acute crisis of 1877, that the most sudden transition took place. It apparently, too, took the female population longer to recover from the disturbance than the male. With regard to the births recorded, there is little to be said in explanation of the figures given, as it is notorious that the registration of this class of domestic occurrences is more neglected than that of deaths, which are accompanied, by more important ceremonial observances. The main fact to be gleaned is that the year following the severest distress was distinguished by the abnormal falling off in the births registered, to the extent of over one quarter in the Presidency as a whole, with far greater variations in the famine area. In Kaladgi, for instance, the decrease is between 70% and 80 per cent. for the two sexes together, and in Dharwar and Belgaum it is 61 and 49 respectively. In Sholapur, however the change was not so marked as in the following year. With respect to the cause of this decrease, there are several facts to be considered. First, no doubt, a half starved population is likely to be less prolific. Then, the population itself was much reduced in number. Lastly, there is always the chance of non-registration. Even in ordinary years the accountant of the village knows more of the deaths that take place than of births, and in the time of famine after stringent rules regarding the reporting of all deaths to the Circle Relief Supervisor had been enforced by the Government, it is possible that a heavily worked village official would confine his clerical labours to the branch on which the stress laid by his superiors was more immediately before him. There are, however, general features of some value. In 1876 the returns for all the four districts show the births to have been above the average. Next year they fell below it with more or less uniformity, and the decrease is more marked in Sholapur, where the distress began earlier, than elsewhere. The year after, Kaladgi and Dharwar show a far larger decrease than either Belgaum or Sholapur. Up to the end of 1880 neither Sholapur nor Kaladgi had made rapid progress towards recovering their former rate of increase. It is worthy of notice, though the character of the registration does not admit of our appreciating the

fact very highly, that in the two worst years of famine, and in three districts out of four, the falling off in female births is greater than that of males, and in the two districts where the range of mortality was highest the same characteristic is observable in 1879 also.

STATEMENT SHOWING THE PROPORTIONAL DISTRIBUTION 1872—80

| Year | Proportional Distribution of total Number of Deaths* | | | Relative Prevalence of Epidemic | | | |
|---|---|---|---|---|---|---|---|
| | All Causes | 'Epidemic | Fever | Sholapur | Kaladgi | Dharwar | Belgaum |
| 1872 . . . . | 10·7 | 14·50 | 9·14 | 24·50 | 16·59 | 9·63 | 12·88 |
| 1873 . . . . | 8·09 | 3·50 | 8·23 | 1·47 | 1·99 | 4·56 | 1·08 |
| 1874 . . . . | 7·74 | 1·36 | 8·05 | 0·19 | 1·36 | 1·75 | 1·84 |
| 1875 . . . . | 10·68 | 17·56 | 9·79 | 22·89 | 7·64 | 9·69 | 11·78 |
| 1876 . . . . | 10·31 | 29·02 | 9·66 | 15·11 | 24·35 | 26·99 | 19·73 |
| 1877 . . . . | 18·03 | 15·01 | 15·21 | 15·67 | 37·40 | 41·11 | 32·52 |
| 1878 . . . . | 15·12 | 17·49 | 16·06 | 20·00 | 10·61 | 6·86 | 20·13 |
| 1879 . . . . | 10·79 | 1·22 | 12·87 | 0·15 | 0·04 | .. | 0·02 |
| 1880 . . . . | 9·17 | 0·35 | 10·99 | 0·02 | 0·02 | 0·01 | 0·02 |
| Total 9 years | 100·00 | 100·00 | 100·00 | 100·00 | 100·00 | 100·00 | 100·00 |

*In the whole Presidency excluding Sind.

**Epidemic**

Cholera was more prevalent than usual during the two years of abnormally high mortality. The true cause of death is very apt to be misunderstood by the agency for registration in an Indian village, so the record is anything but satisfactory. For the last nine years, for example, over 62 per cent of the deaths in the Presidency Division, have on an average been attributed to fever alone, and it is probable, I am informed, that a certain proportion of the deaths set down as caused by cholera are really cases of other diseases having some of the symptoms of that dreaded epidemic. Taking, however, the record as it stands, the year of greatest mortality is distinguished by the highest proportion of deaths from epidemics, though as regards fever, it takes the second place only. The above table gives a general idea of the distribution of the total mortality of the nine year amongst the several units of the period. In three of the four districts selected as being the most affected the proportion of deaths from both the above mentioned causes was highest in 1877, but in Sholapur the

years following seems to have been quite as bad, and with respect to epidemic a good deal worse. It is impossible from, the nomenclature and classification adopted in the village registers, to ascertain the extent of the mortality due to famine as distinguished from ordinary or epidemic disease, but it seems abundantly proved that both of the latter are many times more fatal when they attack a population weakened and dispirited by any sudden change for the worse in their ordinary diet and mode of life. Judging by the age returns, the brith statistics just quoted give a fairly approximate estimate of the decrease in the year 1877-78 and, that the greatest suffers, amongst the younger children were those of under a year of both sexes, and girls at the critical period of 13 and 14. The decrease in the number men 20 to 29 which is also marked, in the four districts is apparently to be distributed between mortality and emigration as the returns indicate that the latter movement took place to a considerable extent in certain parts of that tract.

## EXTRACT FROM ALL INDIA CENSUS REPORT FOR THE 1891 CENSUS

### CHAPTER III

### THE MOVEMENT OF THE POPULATION

**General conditions**

In this, its dynamical aspect, a population is the resultant of certain opposing forces, whose combined action tends ultimately to equilibrium. In the present stage, however, of the world's development, there is an almost rhythmic variation in the intensity of each, effecting continuous change, the bias of which is just now in favour of the positive, as distinguished from the preventive, elements. There are various ways of grouping these elements, and, on broad lines, we may adopt the two classes of the physical or domestic, and the political, or foreign. Under the former head come the natural forces of birth and death; in the latter we place war and migration. Underneath these general combinations, again, may be distinguished influences that are practically constant from those which are accidental or temporary. The reproductive instinct, for example, is constant, but its results are stimulated or repressed by artificial considerations, such as, amongst others, the prevailing views on marriage of inheritance. It may even be qualified, some hold, by a modification of type in a community which has reached a certain stage of development, in which case the restriction borders on the permanent. Death, again, is a debt due by all, though most of us are like Falstaff, loth to pay it before its time; but is liable to receive the fortuitous assistance of war, pestilence and famine. The change, too, resulting from migration may be accidental, or else part of the ordinary process of internal expansion.

The conclusions arrived at by Malthus on this important subject have been severely criticised, and often misquoted or misapprehended, but, in, the main, they have not been disproved. In certain particulars, no doubt his deductions were too sweeping, and in others, modern science, in the progress of physiological investigation and in the experience drawn from a wider field or observation, has had to introduce qualifications, derived from sources of which Malthus was ignorant. For instance, in estimating the means of subsistence, he seems to have depreciated the results of an increased and improved application of human industry to the production of food from natural sources, and to have laid too little stress on the power of dispersion in sustaining any particular population. His view, too, that the power of multiplication was only restrained by what he termed the preventive checks, appears to be controverted by what we know has happened since he wrote. For, allowing that the proportion of married women of the reproductive age is the main factor in the natural increase of the population. We find that instead of the maximum number of children that could be produced during the 20 years included, as a rule, in this

period, the average, even under highly favourable conditions, physical and moral, is about four per marriage, and only six at the maximum. We see, also, that in countries where every circumstance is in favour of multiplication, unrestricted by either postponement of marriage or abstinence from it, by war, starvation or disease, and stimulated, perhaps, by the immigration of adults of both sexes, the rate of increase is considerably below that which might, ex-hypothesis, be possible. There is every reason to suppose accordingly, that Malthus view ignores some important physiological sequence that has not even yet been ascertained. We have, however, the suggestion, to call it by the least assumptive title, of Mr. Herbert Spencer, that pressure of population consequent on excessive fecundity, tends to provide, in some degree, its own corrective. For this pressure implies an increased demand upon the intellectual and nervous qualities of life to meet it, and the stock of nutriment being the same, these latter can only be satisfied at the expense of the reproductive faculties. The more the former are brought into play, the less there is left for the sustenance of the others. Life may be, and probably is, lengthened, but the community is neither so numerous nor so physically well equipped as the well fed savage. If this doctrine be correct, and it has much to recommend it, one of its consequences may fitly be mentioned here. It is, that according to the theory, every community has to pass through a stage of what we may call probation. Between races and even the larger political entities, such as nations, a higher type of civilisation in the one and of character in the other, is pretty sure to prevail, and this is apparently what Bacon implied in the latter portion of the phrase quoted at the head of this chapter, and what one of our greatest modern statist, Dr. Farr, meant when he said that the "character of every race of men, "allowing for accidents of position and time, is the real limit to its numbers in the "world". But in the case of smaller aggregates than the above, where, that is, competition lies within narrowed limits and is actuated by more individualised impulse, intelligence and what are called the social virtues, must be, for a time, and considerable one, at a discount. For, by the hypothesis, they result in diminished fecundity, so that, until they have permeated widely, through the community, the class which exercises them must inevitably fade into numerical insignificance relatively to the reckless prolificity of those who have nothing to lose by the indulgence of their strongest instinct. This is an aspect of the population question which it has luckily not been necessary to take into consideration hitherto in connection with India, but the peculiar social organisation of the great mass of the people of that country renders it impossible, for enlightenment to progress at any thing like the rate of its numerical growth. The period of probation, therefore, during which these multitudes will have to be passing through the discipline of hardship before they are mentally adapted to their new circumstances, must be a peculiarly long and trying one. Luckily it seems, to be still far off, and the approach to it is by steps almost imperceptible. For before pressure of the character above described can be felt by a community it is necessary that dispersion should have reached its limit. By dispersion is not here meant solely the migrations of a single community, but the corresponding movements of all communities to tracts which allow of their providing food to supply the want of others, over and above the stock raised for their own maintenance. It is the facility of this transfer of the results of labour together with the greater

industry and intelligence brought to bear on the soil where the arable area is fully occupied, that makes it possible to say that in the present day the food supply has increased not only in line with, but even in advance of the growth of the population, and, other things being equal, this will continue to be the case, so long as there is land to be found on the globe fit for remunerative tillage.

**Conditions in India**

We can now consider the part respectively played in the movement of the population of India by the birth-rate, by famine, by epidemic disease and other causes of death, and by migration. War has happily been, for this generation, a factor in abeyance. Of the rest, the natural causes of change, that is, the birth and the normal death rates, are necessarily entitled to the first place in the list, and in connection with them, the special causes of mortality, be epidemic and famine, will have to be discussed. Migration will then be treated separately.

**Marriage customs**

Now, the number of births depends, as was remarked above, very much on the proportion of married women of the reproductive age, so we are here brought face to face with the marriage customs of the people and the tendency towards matrimony prevailing in India. In anticipation of a more detailed examination of this wide subject, which will be specially handled in a later chapter, a few general observations must suffice to explain its connection with our present topic. We should omit Burma, for the present, from the question, since the social system of that province is entirely different from that of the rest of the country. In India, as thus restricted, marriage is regulated by a few leading principles which nominally prevail amongst at least three-fourths of the population. Strict conformity with all is probably confined to a not very large minority, but such is the prevading influence of the system indigenous to the country, that a good many of its special tenets have been adopted by most of those communities that are brought into close contact with it, even though the orthodox prescriptions of their own system may be opposed to them. One of the most prominent universal duties imposed by this heterogenous public opinion is that of marriage. In the case of the Brahmanic community this is intelligible, as their current system dooms a man to a particular region of pandemonium unless he leaves a son to perform the proper obsequies for his release. The duty is also connected with the law of inheritance which is, to some extent, binding on the masses. The forest tribes conform as they become civilised and are incorporated with the rest. The Musalmans, who are, for the most part, converts from the ranks of Brahmanism, have not abandoned it, and the rest of the denominations of Indian growth equally observe the obligation. Then, again, amongst the higher and middle classes of all denominations there is the general feeling that the paternal hearth is disgraced by the presence of a girl who has arrived at womanhood unmarried. Polygamy, too, though undoubtedly rare, is allowed to all, whilst polyandry is confined to two or three comparatively small communities. It is scarcely necessary to dwell on the main fact indicated by these tendencies, that is, the enormous number of births that is likely to result from them. At the same

time, it must be pointed out that it is the universality of marriage, not the early age at which it is contracted, that is here in question. The latter has sometimes been erroneously put forward as one of the causes of an increase in the child population, whereas its chief and direct effect in India seems to be only to shorten the mean lifetime of a generation, and not to increase the number of births per marriage, possibly owing to the physiological cause mentioned above, the nature of which has not yet been ascertained. Furthermore, the relative age at marriage is largely a matter of local custom, as well as of social position, and in certain tracts the upper classes marry, as a rule, at a higher age than the lowest in others. It should also be borne in mind in regard to this part of the subject, that the term marriage includes both the formal betrothal, which is the principal ceremony, and the subsequent handing over the bride in manum viri, the interval between the two being, as above mentioned, dependent on the local custom or the rank of the contracting parties, as the case may be. Amongst the Hill tribes and many of the labouring classes, the ceremonies are not distinguished, as girls are not married in either sense till they are grown up. In its ceremonial aspect, the betrothal is the binding and more important part of marriage, but from our present standpoint it is superfluous to pay attention to more than the later stage of this social arrangement. Thus we find that 94 per cent of the unmarried females are below 15 years of age, and that though the proportion of women between 15 and 40 years of age is but a trifle in excess of the corresponding ratio in European countries in India, no less than 84 per cent of them are married, whereas in Europe, if we omit Hungary, where the ratio rises to more than 63, the average is not above 40. The period in question, too, contain in India about 70 per cent of the total married female population, but in Europe, excluding Hungary, as before, the average is only just above one half. This fact takes us a step further in the analysis of the return, for if we sub-divide the period into two, it seems that of women in India between 15 and 25 years old 87 per cent are married; but in Europe the highest proportion, to the west of the Leith is in France, where it is only 22. In the remaining period, from 25 to 40, the ratio of wives in India falls to 81 per cent; whereas in the West, it advances to about 70. The divergence is here due to the Indian custom as to widow-marriage. The orthodox Brahmanic view, whether it be well founded or not we need not inquire, absolutely prohibits the marriage of females whose husbands are dead, so that a girl betrothed in infancy, whose affianced happens to die before the latter part of the ceremony has taken place, is as much a widow as she who enters that condition at the decline of life. This rule is only strictly observed amongst the comparatively small communities of the upper classes, and throughout the masses there is great variety of practice. The lower and lower middle classes are, on the whole, influenced chiefly by local opinion on the matter, and where adult marriage is the rule, there is generally found no objection to the "maimed rites" and less expensive procedure involved in bringing home a housewife at second-hand. On the other hand, the general tendency of social aspirants to adopt the customs of those immediately above them, is extended to the case of the widow of course, and when a man of this class has, as the French say, "arrived", he makes the fact apparent by secluding his womenkind and abjuring widow-marriage. The above remarks apply to the Brahmanic community only, or, at most, to the fringe of Hill tribes that border on the

plains. The Musalmans have no prejudice in the matter, tests the first matrimonial venture of the prophet himself, but even amongst them the pervading atmosphere of Brahmanism has had a certain effect. On the whole the proportion of women who are returned as widows is 17·6 per cent of the total of the sex, or about 3.5 to every widower. In Europe, the average ratio is about one half the above, and there are only about 106 widows to 100 men in the same condition. To some extent, therefore, we may take into consideration this rejection of second marriages amongst females as a check on the number of children that might be brought into the world under the operation of the great stimulus given by the religious sense of the majority to the indulgence of the strongest animal instinct of humanity. But, looking at the prevalence of marriage, it is clear that more than the existence of a few millions of widows, 'more or less, is required to account for the comparatively slow growth of the population under the impetus of so enormous number of births. The clue is to be found in the accompanying high mortality. The birth rate is indeed very far above that of any European country, if we except Russia, and reaches nearly 48 per mille on the whole country. But the death rate is equally abnormal, even if we omit the more frequent occurrence of famine and epidemic disease in India, and may be taken to reach, on an average, 41 per mille. This matter will be discussed in its due sequence, but, speaking generally, it can be attributed to an excessive mortality amongst infants of both sexes, a large mortality amongst young mothers in childbirth, and a general want of "staying power" after about 50 years of age. Of these factors, the first is the most prominent as about 26 per cent of the children born do not live to the end of the first year of their life. In England the rate is not higher than 15.6. The operation of the second cause is more difficult to determine, as the retrun is complicated by the admitted repugnance in some parts of the country and among certain classes to communicating any information about the married or nublic women of their household. As to the last, the returns as they stand uncorrected indicated more than five per cent deficiency of persons of 40 years old and upwards, as compared with the age-tables of Europe. The general divergence of the constitution and age distribution of the two communities can be appreciated to some extent from the average duration of life, which is little more than 24 years in India, against nearly 44 in England. These figures are given merely for the purpose of comparison. They do not show the actual mean age of the population, as it stood at the census, but the higher estimate obtained by considering the community as stationary. The former averages would, necessarily, in the case of increasing populations be some years lower. Still, the fact is made prominent by them that in India the generations must succeed each other with much greater rapidity than they do in the West.

**Birth and death registration**

In estimating the growth of the population of India by what we have termed the natural increase, that is by the excess of births over deaths, we are without the aid of complete registers of these occurrences. Registration has been in force for a considerable time and a good deal of attention has been paid to it, but the circumstances of the country are against it. In municipalities, especially where town-duties are levied on imports, the deaths are registered with approximate accuracy, as the corpse has to be carried out to the

cemetery or burning-place past one of the toll-bars. Births, however, even here escape registration to a very considerable extent. In the rural tracts, where the country is open, the villages close together, and their staff of officials fairly complete, the results are, on the whole, very good; the births, indeed, are probably as correctly entered as in the towns. But in the hill tracts, where locomotion is difficult and the villages far a part, even if stationary, and the people not only illiterate, but suspicious of everyone who is not equally so, the returns are too often altogether neglected, or kept by the headman by means of knots in a piece of string hung up to a beam in his roof till the next visit of the accountant or other officer, who writes up the register from dictation. In many parts of Bengal, too, the absence of a village staff placed registration for a long time in the hands of the lower grades of the rural police, so that the return was trustworthy in towns only. Then again, there are tracts where registration is not even attempted, owing partly to the density of the forest and the sparsity of the inhabitants, or again, to the nature of the tenure, which varies greatly in its degree of independence of State control. The large area under the feudatory chiefs is excluded from the returns. In a few cases, such as Mysore and Baroda there is a system of registration, but in most of the larger States information of this sort is not available. Finally, we come to the personal grounds of objection to the system. The householder of rank dislikes inquiries of any sort as to his family affairs. The rest do not fall in with the official idea of its utility, even if they understand the question. The death of an adult male member of a family is an event known to the whole village, and is registered accordingly, so is the birth or the death of a son. But mothers, wives, and daughters pass away without leaving a ripple on the surface of village life, and it is with respect to them that registration is most deficient. It is plain, however, from the returns, that the greater accuracy is annually being obtained, and is one or two provinces, as was remarked above, the results for the 10 years that elapsed between the two enumerations so nearly coincided with those of the census that both operations may be congratulated on their successful issue. Elsewhere, the latter is the only means of, as it were, taking stock of the population. Even in England, where registration of domestic occurrences has reached so high a degree of accuracy, the last census showed that the results, apart from migration, were not quite what were expected. There in another point in connection with these returns for India that requires notice. The increasing accuracy of the registration, especially where the latter has been hitherto backward, is likely, if not duly discounted in the returns, to lead to the assumption that changes are taking place in the birth and death rates which, in fact, are not taking place. This is the more noticeable when the population on which the rates are calculated is maintained, as it often is, at the figure of the last census throughout the decade, so that even though the registration may have been uniform in its degree of accuracy during the whole interval, there is a sudden descent in the rates when the increase of perhaps 10 or more per cent in the population, shown by the census, is brought into the returns. With all their deficiencies in respect to the absolute figures, these returns afford most useful data in comparing one year with another; for the error to be found in them is in all probability constant and uniform throughout the whole series. It is in this capacity that they have been used in preparing the corrections to be applied to the age-returns, which, as will be shown in a later chapter, enable us to dispense, to some extent, with the actual numbers.

**Epidemic disease**

Having thus disposed of the main normal factors in the natural increase of the population, it is necessary to refer to those which we may call incidental, the first of which is the check on the increase produced by the prevalence, in annually varying proportionate strength, of certain epidemic diseases. It is not easy to treat this subject otherwise than very generally, for the diagnosis of the village accountant or the local constable is very liable to error, and except in the hospitals and dispensaries, the classification of the causes of death leaves much to be desired. Small-pox and cholera, however, if, indeed we may call them epidemics in India where they are always present, are probably more correctly registered that most of other fatal maladies. The symptoms are too well-known, and the disease, too, in both cases, is under the special control of a certain female divinity, who is to, be propitiated only through the mediation of the classes descended from the pre-Aryan population. The rest of the ills to which Indian flesh is heir to, excepting accidents and snake-bite, mostly come on to the returns under the generic title of fever. Taking the return for what it is worth, we have had, during the past 10 years, a population under observation averaging about 197½ millions, with a mean annual number of deaths amounting to 5,140,000, which seems to indicate an omission of at least one in three. Of those registered, the 10 years' average includes about 309,000 deaths from cholera, yearly, with the maximum of 475,600; 126,750, from small-pox, the highest number being 333,380, and 3,397,300 from fever, with the corresponding limit of 4,110,000. Of the remainder, a number just short of a thousand is unclassed; and accidents and what are grouped under the head of bowel complaints, account for the rest. Thus, to fever are attributed 66 per cent of the deatns, to cholera, 6; to small-pox, 2; to bowels complaints, 5; and 21 to injuries and unclassified causes. The latter include roughly speaking, 60,000 accidents, of which a considerable proportion are due to drowning, and 20,000 deaths from snake-bite.

**Cholera and small-pox**

Cholera and small-pox are the two main causes of abnormal mortality in India, apart from famine and certain special outbreaks of fever, which will be noticed below. Not a year passes without cholera in some part or another of the country, and there seems to be no sign of its becoming rarer or less fatal. Whatever may be its origin, its dissemination is no doubt largely due to the immense congregations of pilgrims at certain seasons of the year, especially about the hottest time, to bathe and drink at one of the many sacred rivers or pools of the country, just about the month when the water is at its lowest. In spite of all the sanitary precautions adopted, the outbreak is still a matter of chance, and once it happens there is no limit to its local extension. As to small-pox, though it cannot be said to have been stopped by the greater prevalence of vaccination nowadays, it is said to be of a milder type in some parts of the country where it was formerly frequent and severe. The returns of blindness seem to indicate this to a slight extent.

**Fevers**

Fever, as has just been remarked, includes a variety of diseases, amongst others influenza, in the form in which it was prevalent during the past three years. There are, however, certain classes of fever that seem confined to special localities, which they ravage for a few years, and often disappear as unexpectedly as they broke out. For instance, in the Brahmaputra valley of Assam, the "black sickness" (kala azar), that broke out some years since, has been peculiarly destructive to life along the southern bank, and has also crept across to a few tracts on the northern. For some time it baffled medical research, but its nature was thoroughly investigated in 1890 by a competent expert, who found the disease to be largely due to the insanitary habits of the villagers. The name he proposed for it was parasitic anaemia, or anchylostomiasis. Whatever it may be, its results are painfully apparent in the two districts where it has been rife for the longest period, and the provincial Superintendent of the Census attributes to it a loss of over 100,000 people during the decade. Another instance of epidemic fever is that popularly known as the Bardwan outbreak, from the name of the district where it was specially prevalent some years ago. The tract, however, has obtained this bad eminence unjustly for it seems that the disease originated further in the delta, about Midnapur, where it is attributed to the water-logging consequent on the choking of the natural drainage channels of this part of Bengal, by reason of the gradual changes in the course of the main estuaries. This process has been in operation, too, high up the delta, even to the border of the submontane tract, and affects the returns of four large districts. It is not only in the lower part of the Gangetic basin that water-logging has occurred. In the south-east of the Punjab the natural drainage has been obstructed to some extent, and portions of the Karnal and Delhi districts have passed out of popular favour, apparently for good sanitary reasons. Remedies have been tried, and others are about to be applied to the condition of the tract by Government. The case of the southern portion of the Ganges Doab was mentioned in the last chapter. Here, however, there does not seem to have been so much an increase of mortality as the abandonment of the soil because it deteriorated for agricultural purposes. Along the borders of the Tarai, or Sub-Himalayan forest and grazing tract in Rohilkhand on the other hand, fever has increased in prevalence during the last decade or so. Though it is not said to be of so special a type as that of Bardwan or Assam. On this point the Report of the Provincial Census Superintendent, which has not yet been submitted, will no doubt contain full comment. In other parts of the country there have been outbreaks of fever due to some local cause, such as that in Amritsar in the Panjab, where the city population fell off by 11 per cent., whilst the rural tracts surrounding it continued to increase. In other cities, too, the malady we now call influenza grew to the intensity of an epidemic, and carried off numbers of the inhabitants in a few weeks. These examples, though not covering the whole field, suffice to show that in India the abnormal influences affecting the death rate are by no means as rare as the equable climate and the healthy outdoor life of the population at large would lead one to suppose they would be.

**Famine**

The next of the influences that we have to consider is that of famine with which we have in India always to reckon. Most fortunately, the 10

years under review have been almost free from this calamity, and the one or two cases of serious failure of crops that did occur were purely local and restricted to very narrow limits, both territorially and with respect to the population affected. In fact, the only occurrence of this description worth mentioning is the scarcity that prevailed in the northern portion of the east coast of Madras in 1889 and even here the direct effects were comparatively small. The season following the census, however, was unluckily marked by distress in the southeast Deccan as well as in Rajputana and by scarcity of a milder type in Bihar but this is a period falling beyond the limits of the present subject. It is otherwise with the great famine of 1876-78 in the Deccan and South India, which has impressed itself rudely on the census returns. Here, as in the case of Orissa in 1886, and Rajputana, two years later, and again, of the North-West Provinces, in 1861, the effects will be marked out in the age-tables until the generation that suffered them has passed out of life. But for the present, we have only to consider famine as one of the checks on the growth of the population, not in its detailed action on the latter. That check is exercised in a two fold manner, directly and indirectly. It not only increase the number of deaths, but it tends to diminish that of births otherwise than by merely destroying possible parents as was the case in Thebes of old.

TABLE A

| | | Males | | Females | |
|---|---|---|---|---|---|
| | | Famine | Normal | Famine | Normal |
| MADRAS | Total increase | 20·56 | 11·20 | 19·58 | 12·10 |
| | Increase of children under 5 | 72·83 | 19·69 | 71·82 | 19·14 |
| BOMBAY | Total increase | 20·03 | 10·05 | 19·11 | 10·63 |
| | Increase of children under 5 | 66·34 | 15·87 | 66·60 | 16·97 |

As regards the first, the number of people who die from actual want of food is probably small compared to the deaths which result from the greater hold which disease those who are enfeebled by diminution of their usual supply of nutriment. At times of scarcity, the mortality from ordinary causes such as bowel complaint intermittent fever, rises considerably above the normal rate, since many would in ordinary times offer a successful resistance. The second of the checks just mentioned was very prominent in the age returns at the Census of 1881 in Deccan and Southern India, and reappears at the age of 10 to 14 in those territories. From these data it is clear that famine is most felt in the first four or five years of life. It then seems to pass lightly over the adults, and to fix on the ages where the distress is acute, for the evidence on this point is not conclusive, as it is on the other. Now, as the reproductive ages are the least affected, one would expect to find the process of replenishing the gaps in the depleted population in full operation within a year of the return of normal prosperity. But even where the famine was followed by a bumper harvest this did not happen, and the cause of the check in reproduction was undoubtedly physical weakness, resulting from

the long spell of insufficient nourishment endured by the masses. It took from three to four years, according to the returns, to restore the vitality of the worst tracts, but the marginal table shows that since then a considerable amount of lee-way has been made up. In regard to this table it should be borne in mind that the famine was far more severe and of longer duration in Madras than in Bombay. There is also an indication that the resistance offered to distress is greater on the part of females than of males. On the whole we have only to read of the terrible mortality that accompanied the historic famines of 100 or 150 years ago to appreciate the advance that has been made within the present generation in administrative experience of how to deal with these calamities, so that their effects may be mitigated, though to prevent them is impracticable. By the aid of line of railway and telegraph, the tract threatened with scarcity is brought into speedy communication with those in which the harvest has been abundant, so that from the latter food pours in as long as the prices at the market of the former keep the transport remunerative. The case of the classes thrown out of work by a failure of the crops, who have neither grain of their own nor cash in hand to buy what is physically within their reach, has been duly considered, and so far as a crisis of this sort is concered, the problem of State aid for the unemployed has been solved. An estimate based on local inquiry, collated with the census returns of caste and occupation is prescribed for each district, showing the approximate numbers of the community that are most prone to suffer, classified according to the order in which they are respectively likely to be thrown upon State support. Estimate and plans of undertakings of public utility involving the employment of the requisite amount of unskilled labour are kept in readiness by the public works Branch of the Local Government, and by each of the latter a code of rules regarding famine administration has been framed, which includes minutiae of sanitary arragments, daily tasks, the laying out of camps of work and refuge, with other measures of relief that the experience of the last 30 years had proved to be the most efficient in the circumstances of the tract and population to which they are to be made applicable. The loss of life which is inevitable in time of famine is thus likely to be reduced to a minimum.

**Probable diminution of normal mortality**

The present system of administration is conducive also to the preservation of life in less abnormal circumstances. The spread of vaccination though uneven, is doing much to mitigate the ravages of small-pox, cholera, which it seems impossible to prevent altogether, is localised by segregation, or by the strong measure of prohibiting religious gatherings, whenever they are likely to lead to an outbreak of this scourage, and in all such cases the sanitary arrangements of the locality are placed under the control of special Superintendents. As for normal disease, every year sees in increases in the number of dispensaries, which are, in fact, small hospitals under trained men, scattered about the rural tracts, whilst in larger towns the lower grade of medical practitioner, turned out by the universities, is growing in popular favour against the rivalry about the herbalist and exorciser. There seems, again, no immediate prospects of any turned rural amelioration of the views of the populace respecting marriage, which will remain, therefore, to be one of the chief duties of man, whilst the extension of trained historic aid of late years will in time probably do something to counteract the result

immature mothers and their progeny of the ruthless empiricism of the barber's wife who at present is the chief officiator in this capacity. But can there be any to the result towards which all these provisions tend ?

In countries where there are no large tracts of unoccupied arable land, the rate increase of the population is, other things being equal, inversely as its numerical of every census shows that in compliance with the tendency noted in earlier in this chapter, as a country fills up, the annual rate of increase diminishes. The conditions on which that rate can be maintained at a uniform level are either the increase of return from the cultivated land, to which the limit is soon reached, or dispersion of one of the two kinds already specified. The community must be taken itself to occupations other than food-producing, and indent for their nutriment on other parts of the world, where the products of their industry are in higher demand than food; or the dispersion must be over fresh land in their own country.

Whilst and where this last is to be got, pressure of population amounts to no more than local congestion, for so long as there is room, actually potentially productive, relief is only a matter of time, more or less according to the character of the people concerned, their adaptability to change, and nature of the tract within their reach.

**Quality of agriculture.**

Now, in India, there are several tracts where the agricultural skill and experience of the people have been said by experts to get the maximum yield out of the soil. In others, the harvest does not respond so thoroughly to the care bestowed on it owing to the scanty or uncertain rainfall, but the aid of irrigation can be called in to preserve the crops. In most parts of the country there is a great waste of the material available for fertilisation. Cattle are very numerous, but they are turned out to stray over waste land, or where they can pick up a little grazing more or less scanty, so that their droppings are either wasted or collected only for fuel, and their bones are being exported for use in Europe in increasing quantities. In some parts of the country sheep and goats are systematically hired out to be penned at night on the field, but this practice can affect but an insignificant portion of the dry-cropped area. As to rotation, experts have a good deal to say against the somewhat primitive cycle received by the Indian husbandman from his forefathers, and it may, perhaps, be possible to increase or sustain the productiveness of the soil by a change in system, but this, like so many other suggestions in the same direction is at present a matter of conjecture. The variety of character amongst the cultivating classes, too, is a factor in the situation, as well as that of the soil. The chance, under the present conditions, of many more tracts in India rivalling the fertility of Oudh and the great deltas is about equal to that of the scratcher of the hillside in the forests, or the many-acred driver of the Maratha plough, settling down into a market gardener. So far as lies within our present purview, neither one nor the other is probable or impossible.

**Prospects of dispersion**

It appears from what has been sketched above, that throughout the greater portion of India the occupied land has, probably, not yet reached the limit of its productiveness, and in the preceding chapter it was shown that congestion of the population was at present found to comparatively a small extent. We have to consider now the question of dispersion, whether vertically, by change of occupation or produce, or laterally, by change of locality, as to the former, circumstances seem to point to a long continuance of the present position of India as a self-sustaining country. With its existing population it manages to set aside very considerable areas for the production of raw material other than food, and throughout the decade under review, the outturn of this class of produce seems to have increased rather than to have been restricted by the growth of the population. From one quarter, cotton and wheat, from another, indigo, jute and tea; rice from third, and oil seeds and opium impartially, pour into the seaports, in close response, apparently, to the opportunities offered in foreign markets. The easier task for the cultivator would doubtless be to confine his efforts to the growth of foodgrain or pulse, so his free adoption of the alternative roves that he appreciates its superior advantages. As for manufacturing industry, its progress, though rapid of late, has not been diverse enough, either in kind or locality, to make much impression on the country at large. It has certainly hitherto won only a comparatively small portion of the community away from the agriculture to which the later is traditionally devoted. For one thing, India is at present at a disadvantage in comparison with many of its compeers as regards a sufficient native supply of good coal and iron. Its labour is plentiful enough; whether it is cheap or not depends on its quality relatively to that of the more highly paid wage receiving class elsewhere. Some branches of industry, it is true, have taken root to an exent that seems to open out the way for the transfer of capital to India from countries where, for various reasons not yet prevalent in the East, profits are, to put it mildly, uncertain. Amongst these are, of course, cotton and jute works, to which may now be added paper-making and articles of leather. The wider extension of any of these operates towards the dispersion of the population fro mthe land, and so far tends to lighten the burden as it becomes heavier in the course of years.

Finally, there is the question of lateral extension to measure the possibilities in this direction it is necessary to ascertain the area of arable land still available for cultivation, and this, as was shown in a previous chapter, we are unable to do, with even approximate accuracy, for the country at large. It will be more convenient, therefore, to touch briefly upon the point in connection with the provinces for which the best information is available. For our present purpose, the returns of birth place, which form part of the general series, will enable us to appreciate to some extent the tendency towards migration within India. This tendency, it is clear from the tables, is at present remarkably weak; and that this should be the case is no more than s to be expected from a community so devotedly agricultural, a class nvariably opposed.

**Migration**

*Migrare vetusto De nemore, et proavis habitatas linquere silvas.* In India, too, there is the additional attractive power of the village organisation and the prevalent connubial system. With regard to expansion within the limits of the land appertaining to the village itself there is no difficulty, but cultivators from outside are, as a rule, only admitted with considerable reluctance, and in many parts of India would not obtain land at all. Then, too, where the available waste land lies in a compact tract within an easy distance of the ancestral village, the population is able to advance on it, as it were in line, and is this in a position to form fresh communities on exactly the old model, and to keep in touch also with the home and tradition of their forefathers. The objection to agricultural migration begins where the tract to be occupied is separated from the native land of the emigrants by a population differing from the latter in race or language, and except in a few special cases, attempts at migration of this sort, to any great extent, have not yet been successful. In Assam, a good many of the immigrant labourers on tea plantations have settled down on plots of land near the scene of their work, made over to them for home cultivation.

In the west of the province, too, there is a flourishing colony of the same class, under missionary supervision. An attempt to relieve parts of Bihar by means of State grants of land in Burma has been made within the last few years, and though it is too soon as yet to judge of the results, the progress made on a small-scale seems encouraging. The difference in race and language, however, will probably be found as obstacle to any rate extension of the movement. Temporary displacement of the population, however, both agricultural and other, is by no means rare, and is increasing in both number and variety. The movement is not yet extending to any significant degree to Foreign countries. For instance, during the last 10 years, the number of emigrants registered was only 130,483, the greater portion of whom were bound for the West Indies and Guiana. But Burma and Ceylon from Madras, and from Bengal to the tea gardens of Assam, the annual movement is considerable. The docks and mills of Bombay and Calcutta, too, and the wheat harvests of various parts of northern and central India, and the plantations of Coorg, attract a considerable number of extra hands the proceeds of the labour serving to sustain the whole family during the period when the cultivation of their plot of land at home does not entail their presence.

**Interchange of wives between contiguous villages**

Now, the important feature in the above is the fact that no less than 9,661 persons out of every 10,000 were born in or touching the district or State where they were enumerated, and that by far the larger proportion of these were natives of the place in which the census found them. Then, again, the movement from the contiguous territory is not migration, in the ordinary sense. Instead of being the transfer of families, it is mainly the interchange of children in marriage, a practice which obtains to a greater or less extent according to the predominance of the influence of Brahmanic prescription, with its strict observance of endogamy, as it is usually termed, within the caste or tribe and the accompanying prohibition of marriage within certain degrees of relation-ship, of which some are, according to western notions, rather

remote. In order to make this clear, two columns have been added to the statement, giving the ratio of females to males, first, amongst the district-born, andagain, in the case of those who come from other parts of the country but, touching the unit of tabulation. There are, of course, other factors that enter into the proportion, such as the complexity of territory with other districts or States, which is the case in Bombay and Baroda. But, on the whole, the marriage system is at the bottom of the divergence. Thus, in Bengal, where it will be noticed that the difference in this respect between the two groups is small, it appears from the more detailed tables of the Province that the ratio is but 687 females to 1,000 males in the eastern division, though there, too, the females are on the whole, in excess. But here the bulk of the people are Musalman, on whom the strict marriage law of the Brahman is not binding, and we find in all the rest of the province a proportion varying from 812 in the north, where women are altogether in defect as compared with men to 1,934 in Orissa, the population of which is wholly Brahmanic in belief. It is the same, though to a smaller degree, in Bihar, where society and the village are organised very much as in the neighbouring territory to the west. In this last, the proportion of females from across the district border is remarkably high, and for this the small size of the unit may be to some extent accountable. Not to dwell too long on this point, it will be seen that in Burma, where the Buddhist form of faith is predominant, the ratio is low, and the same feature results in Assam and Coorg from the prevalence of male immigration to the plantations.

**Summary of conditions**

Summing up what has been said above as to the conditions that effect the growth of the population of India, it seems first that the number of children annually born into the country is a very high one, and that there is no prospect of its speedy or extensive decrease. Then, again, that the tendency of British administration is to prolong the normal life, and to protect it, as far as possible against the abnormal attacks to which it is there liable. As regards provision against the contigencies to which the above conditions give rise, there is, first, the prospect, of, for a time, at least, increasing the yield of food supply from the soil. Secondly, the resources for the purchase of food may be increased by the production of material in demand abroad, or in home manufacture. Thirdly, the growth of the non-agricultural industries, and, fourthly the increase of the area of land under tillage, due to either the extension of irrigation or, still more, to the slow migration of the surrounding population, as pressure increase, to land as yet untouched by the plough. Thus, in brief may be stated the population question, as it exists at present in India, and after the statistics bearing on the movement that has taken place within the last 10 years have been discussed, there may be room for a few words on the question of how far, up to the present date, has the growth of the resources of the country been commensurate with that of the people.

**General variation in population**

The second table in the general series gives the figures showing the variation in population that has taken place since 1881. It is divided into two sections first, the tracts for which returns at both the enumerations are available, and

again, the total accretion to the population in the decade, both by growth and addition. In the last category will be found Kashmer, which was not enumerated in 1881, and the Quettah settlements, as well as Upper Burma. Fort Steadman, and North Lushai land, which are new acquisitions. Internal modifications, such as transfers or exchanges, will be found noted on the fly-leaf of the table. The remarks that follow refer, of course, only to the nett variations, and exclude the increase that may be called accidental. The territory what was enumerated in 1881 returns an increase during the decade of 27,821,420, a number exceeding the whole population of England, and nearly equal to that of the kingdom of Italy. The British provinces account for 19,294,509, nearly the population of Spain and Norway together, and the Feudatory States for 8,526,911, a little short of that of Scotland and Ireland. But, large as this growth seems in absolute numbers, if we take it with reference to the population to which it has been superadded, it shrinks into very moderate proportions. In British provinces it amounts to 9·70 per cent; and in the States to 15·52 or to 10·96 for the whole country. It is composed of an increase of 11·52 per cent over 94·56 per cent of the population of 1881, accompanied by a decrease amounting to 2·40 per cent over 5·44.

The annual rate of increase is thus 9·3 per mille. That this is but average is shown in the 'G' table on prepage in which, out of 28 countries, India come 20th. It is indeed an open question whether the acutal rate is not a little below this. The details of age and sex indicate a certain growth of confidence as well as of population, so that there are persons, especially amongst the forest tribes, who now appear for the first time in the return, though, no doubt, they should have been in that of 10 years back also. Then, too, the return of girls between the ages of 10 and 15, or even 20, is considerably better than it was in 1881, but it still affords evidence that reticence about this portion of the household is by no means uncommon, more particularly in the north of India. There the example of the Musalman conquerors, and the traditions of the military tribes of the Arya and some of the other settlers, are all in favour of the strict seclusion of women of the upper classes, and the middle, as is its won't, follows suit. In other parts of the country the practice is common, but as an imitation, not an indigenous growth, so that there, it seems, the objection to the census inquiry regarding the females of the family stops at a demand for inspection. This demand was specially prohibited in the rules, and the head of the family manifests, as a rule, no unwillingness to dictate to the enumerator all particulars about the secluded class, barring their names though, of course, all information thus obtained has to be taken on trust. In the north, where the custom is of immemorial standing, or is a point of racial distinction, it is too probable that an inquiry, even as to the bare numbers would meet either with no response, or a denial of the existence of such persons. On these considerations, the omissions at the Census of 1891 may be to some extent set off against those of 1881 which were repaired on this last occasion. But the genearal ratio of females to males at the two enumerations in the absence of special cause for disproportion, such as may be found, for example, in famine tracts, is a measure of some value of the confidence of the people in the intention of the State in making the inquiry. Judged by this test, the census under review brought on to the register a greater number of those left out in 1881 than it omitted of those concealed till they creep out

10 years hence. Instances of this will be seen in the returns for Rajputana, Central India, and some of the smaller groups of States, of which mention will be made below.

TABLE G

| | Country | Annual increases per cent* |
|---|---|---|
| 1. | New South Wales | 5.10 |
| 2. | Queensland | 4.3 |
| 3. | Victoria | 3.22 |
| 4. | United States | 2.48 |
| 5. | Sexony | 2.00 |
| 6. | New Zealand | 1.70 |
| 7. | Algeria | 1.56 |
| 8. | South Australia | 1.40 |
| 9. | England and Wales | 1.28 |
| 10. | Egypt | 1.25 |
| 11. | Holland | 1.18 |
| 12. | Prussia | 1.15 |
| 13. | Portugal | 1.14 |
| 14. | Hungary | 1.08 |
| 15. | Germany | 1.07 |
| 16. | Canada | 1.07 |
| 17. | Greece | 1.05 |
| 18. | Belgium | 0.99 |
| 19. | Denmark | 0.99 |
| 20. | India | 0.93 |
| 21. | Austria | 0.76 |
| 22. | Switzerland | 0.64 |
| 23. | Bavaria | 0.64 |
| 24. | Italy | 0.62 |
| 25. | Norway | 0.60 |
| 26. | Spain | 0.55 |
| 27. | Sweden | 0.50 |
| 28. | France | 0.06 |

*Between the last Census and that which preceded it.

## CHAPTER II

## MOVEMENT OF THE POPULATION

*Individual Provinces and States*

| Census of | Population | Variation per cent since previous census |
|---|---|---|
| 1872 | 206,162,360 | .. |
| 1881 | 253,896,330 | + 23.1 |
| 1891 | 287,314,671 | + 13.1 |
| 1901 | 294,361,056 | + 2.4 |

**Object of discussion**

90. In the last Chapter the results of the census have been discussed with reference to the population as it stood on the 1st March, 1901. The present chapter will be devoted to the consideration of the changes which have taken place since the time of the first general census, which was effected over the greater part of India in 1872. The variations during the periods ending in 1881 and 1891 have already been dealt with in previous Census Reports. They will, therefore, be referred to very briefly here, and the discussion will be directed mainly to an examination of those which have taken place since 1891, and of the causes which have produced them. The census returns show a steady increase of population from 206,162,360 in 1872 to 294,361,056 at the present census, but the true rate of progress has been far smaller than would appear from these figures. The earlier enumeration left out of account the population of the Andamans and the Native States of Baluchistan, Central India, Hyderabad, Kashmir, Rajputana, Sikkim, Manipur, and the Punjab, with a population at the present time, of some thirty-eight millions, and it also, of course, failed to deal with areas not then included in British Territory such as Upper Burma, British Baluchistan and certain outlying parts of Assam. Moreover, apart from the addition of tracts not previously counted, the first census was necessarily in many respects tentative and incomplete, and numerous omissions occurred, especially amongst travellers and in out-of-the way places; even whole villages were sometimes lost sight of. In 1881, more elaborate precautions were taken, and the omissions were fewer in number, but the count was still not as thorough as it was in 1891, when, except in tracts newly added and in a few of the more backward Native States, a high standard of accuracy was reached which could not easily be surpassed. It follows that while part of the apparent increase on that occasion, and still more in 1881, was due to a more exhaustive enumeration, this disturbing influence had almost disappeared at the present census. But the conditions in different parts of India are far from uniform, and before attempting

to disentangle from these artificial influences the true variations which have taken pace and to examine the causes which underlie them for the Empire as a whole, it is necessary to deal with the results in the individual provinces and states of which it is composed. When these have been considered in detail, and only then, will it be possible to arrive at correct conclusions for the whole country.

**Assam Kala-azar**

94. There are, unhappily, two marked exceptions to the example of progress set by Lakshmipur and Sibsagar and followed in a less degree by the other districts of Assam. A glance at the map will show that in the centre of the Brahmaputra valley two districts are conspicuous for a decrease in their population. Nowgong has lost 86,147 people, or nearly 25 per cent of the population recorded in 1891, while Kamrup has declined by 45,062, or 7 per cent. In both cases the chief cause of the decrease is the virulent and communicable form of malaria known from the darkening of the skin, which is one of its symptoms, as kala-azar or the black sickness. This disease, which is probably identical with the Rangpur and Burdwan fevers and the kala-dukh or kala-jwar of Purnea and the Darjeeling terai, was first observed in the Garos Hills in 1869, when the Garos were so impressed with its infectious character that they "are said to have not only abandoned their sick, but to have stupefied them with drink and then set light to the houses in which they were lying in a state of helpless intoxication". By 1883 it had spread to the Goalpura Sub-division which showed a decrease of 29,699 persons at the census of 1891. Five years later kala-azar entered Kamrup and reduced the population of the southern part of the district by nearly 12 per cent. Having spent its force there it passed on, in 1892, to Nowgong where its track is marked by deserted villages, untilled fields, a land revenue reduced by 23 per cent and a disheartened population which after 19 years of steady increase, has now receded to the figure at which it stood nearly 30 years ago. Mr. Allen thinks that the disease is dying out in Nowgong and that its advance up the Assam valley seems to have been checked by the sparsely populated hills and forests which separate Nowgong from Sibsagar. This view is in accordance with the results of modern researches which go to show that a population decimated by malaria tends to acquire some degree of immunity and that the disease can only be transmitted through certain species of mosquitoes which flourish only under special conditions of soil and humidity and can in no case travel far from their original habitat. There can be little doubt that kala-azar has done much to retard the natural development of Assam. The tale of its extraordinary fatality has travelled far and has strengthened the traditional dread with which the people of Bengal and Bihar have always regarded a country where, if a man falls ill, he is likey to die in strange surroundings without any means of getting away. The isolation of Assam has had a great deal to say to its unpopularity. Independent cultivators have been deterred from settling on the spare land which awaits the plough and immigration has been restricted to the classes who are brought in under the Labour Acts and do not move on their own initiative. If effective railway communication were opened up with the congested districts of Bihar, advantage might be taken of the movement of the population eastward which seems to have set in and settlers might be found to occupy the holding which kala-azar has left vacant.

**Decline of indigenous population**

95. Special interest attaches to those portions of the Provincial Report in which Mr. Allen discusses the decline of the indigenous population of Assam. That the Assamese are decreasing in number has long been surmised, but the extent of their losses could not be accurately stated owing to the difficulty of determining exactly what number of persons should be regarded as Assamese. Here the obvious tests of birth-place and language cannot be applied. A large proportion of the persons born in Assam are the children of coolie immigrants and many of these habitually speak the Assamese language. In order therefore to distinguish the indigenous from the foreign population, Mr. Allen has taken for the Bramhaputra Valley the statistics of 49 castes and tribes peculiar to Assam and has shown in a subsidiary table the variation in their, numbers during the last ten years. The broad facts are that in the five upper districts of the Valley the Assamese have decreased from 1,608,257 to 1,504,847 or by 6.4 per cent. In Nowgong the loss is 31 per cent, in Kamrup 9 per cent. and in Darrang 6 per cent, while Lakshmipur has shown an increase of 20 per cent and Sibsagar of 9 per cent. Some part of the increase in the latter districts is no doubt due to the immigration from the former, but most of it is the outcome of natural growth and, bearing in mind that the area of decrease is also the area which has been swept by fever and injuriously affected by the earthquake of 1897, we need feel no hesitation in accepting Mr. Allen's conclusion that "if the Assamese can increase rapidly, at the upper end of the Valley, it is only reasonable to suppose that when Kala-azar has finally disappeared, they will at any rate stop decreasing in Kamrup, Darrang and Nowgong."

**Bengal**

98. The population recorded in Bengal on the present occasion was 78,493,410; 74,744,866 in British territory and 3,748,544 in the Native State. The increase since 1891 comes to 3,819,612 or 5.1 per cent. made up of 3,397,905 or 4.7 per cent in British territory and 421,707 or 12.6 per cent in the States. Among the natural divisions of the Province, Eastern Bengal comes first with an increase of 10.4 per cent; Chota Nagpur has 7.8; West Bengal and Orissa 7; North Bengal 5.9 and Central Bengal 5.1 per cent. In North Bihar the population is virtually stationary and in South Bihar it has declined 3·6 per cent.

Before reviewing the fluctuations in the natural divisions we may glance briefly at the movement of population in the entire Province during the last twenty years. Taking 1881 as a starting point we arrive at the following results :—

| | |
|---|---|
| Census Increase 1881—1891 . . . . . | 5,136,858 |
| Census Increase 1891—1901 . . . . . | 3,819,612 |
| Difference . . . . . | 1,317,246 |

But it may be said that a substantial share of the increase in the first period is fictitious, being due merely to improved enumeration. Mr. Gait deducts half a million on this account, but would leave the second figure as it stands, holding that there is nothing to choose in point of accuracy between the last two enumerations. In the last decade he allows

for the operation of two exceptional causes. He takes plague mortality at 150,000 or more than twice the recorded number of deaths (65,884) upto the date of the census; and estimates the loss of life from the cyclone of 1897 at 50,000. This gives us the following figures :

| | |
|---|---|
| Probable true increase 1881—1891 . . . . . | 4,636,858 |
| Probable true increase 1891—1901 . . . . . | 3,819,612 |
| Difference . . . . . | 817,246 |
| Deduct for plague and cyclone . . . . . | 200,000 |
| Probable natural difference. . . . . | 617,246 |

It would be hopeless to attempt to disentangle the causes to which this difference is due. Increased immigration, enhanced mortality, reduced birth-rate, all may have had their share in the result. As to emigration Mr. Gait observes that there has been "a considerable net increase, chiefly in the direction of Assam, but it does not appear that it has been greater during the last decade than it was in the preceding ten years." But the exclusion of this factor does not help us materially to determine the relative influence exercised by the other two. The evidence of the vital statistics discounted by the uncertainty as to the degree of improvement that may have taken place in registration, to which much attention has been paid of late years in Bengal. Our figures are not accurate enough to enable us to say how much of a given result can be put down to variations of births or deaths in either direction. I think it, however, extremely probable that the reduction in the rate of increase of the population is very largely due to a decline in the birth-rate induced by the general rise in the prices of staple food grains. Mr. O'Conor's statistics of prices and wages show that the average price of common rice in Bengal has risen by 35 per cent. since the year 1890. In South Bihar common rice is dearer by 26 per cent maize by 32 per cent and wheat by 29 per cent, while during the same period the wages of agricultural labourers have fallen by 3 per cent. Conditions such as these can hardly fail to affect the reproductive energy of the large class of unskilled labourers who own no land and have not participated in the profits arising from the enhanced prices of agricultural produce. Nor are they confined to South Bihar. They extend in varying degrees to all parts of Bengal and although their influence on the birth rate may not always be traceable, we may be sure that it is there.

**Movement in relation to density**

99. Subsidiary Table III appended to Chapter II of the Provincial Report gives an interesting view of the actual and proportional variation of population in relation to density in different parts of Bengal. For the province as a whole the absolute and proportional increase of population is greatest in tracts where the density is below 300 persons to the square mile. These show an increase of 1,003,219 persons or 8.6 per square mile

Next in order come tracts with a density of from 500 to 600 which have increased by 440,263, but in these the relative increase is only 4.6 per cent, while the areas with a density of from 900 to 1,000 have gained nearly 7 per cent. On analysing the figures by natural divisions it appears that the sparsely peopled territory owes its growth to the filling up of spare land in Chota Nagpur and the Sub-Himalayan tracts and the reclamation of the Barind in Northern Bengal. "If Chota Nagpur and North Bengal be left out of account, the greatest absolute addition to the population during the last decade has occurred in *Thanas* with a density of 500 to 600 persons per square miles. In East Bengal the greatest absolute increment has taken place in *Thanas* with 800 to 900 persons per square mile and the greatest proportional growth in those with from 400 to 500, and then in those with from 900 to 1,000." On the whole it seems to be clear that the pressure of population on the land in Bengal has not generally reached the point at which immigration begins to be checked and the struggle for existence re-acts on and diminishes the reproductive instinct. The densely peopled tracts of Bihar may perhaps form an exception. Here we have extensive emigration combined, in South Bihar, with a decline, both absolute and relative, in the population of the most crowded tracts. In North Bihar the statistics are more ambiguous and there is a substantial increase in the *Thanas* with a population of from 800 to 1,000. But in both divisions the conditions were abnormal, especially at the close of the decade, and it is doubtful whether any probable inference can be drawn from the results of the census.

**Movement by natural divisions East Bengal**

100. The causes of the growth of population in Eastern Bengal are not far to seek. The rainfall is copious and regular; the soil is naturally fertile and is renewed year after year by the action of the great rivers which overflow their banks at regular intervals and cover the country with a rich deposit of silt. The climate is on the whole a healthy one. The people are sturdy and prolific specimens of the Mongolo-Dravidian type; they have profited enormously by the rise in general prices and the introduction of jute; their standard of living is high and prosperity has engendered in them a spirit of independence which finds its expression in various forms of violent crime. Throughout the division the proportion of increase is remarkably uniform. In Hill Tippera it is raised by immigration to 26 per cent; while in Chittagong it has been reduced to 4.8 by the cyclone of 1897 and the outbreak of cholera which followed in its track. No signs of pressure on the means of subsistence can be discerned, and it is shown in the table already quoted that the population has grown most rapidly in the areas which are most densely peopled.

**Chota Nagpur**

101. The Chota Nagpur plateau and more especially in the districts of Ranchi and the Santhal Parganas emigration was very active during the decade and the census shows a net increase of only 7.8 per cent. The collieries and tea gardens attract the labouring classes in increasing numbers. The Native States in the south and west of the division shown an increase of 13 to 14 per cent, which is probably due in some measure to improved enumeration.

**West Bengal**

102. In Western Bengal the increase is 7 per cent, varying from 13 per cent of natural growth in Birbhum, which is recovering from a cycle of malaria to 1·4 in Hooghly, where fever is rife and the population would have been stationary but for the influence of the mills and factories of Serampur. Howrah owes its increase of 11·3 to the influx of mill-hands, who form something like 17 per cent of the population, while the growth of the western portion of Burdwan, where one-third of the inhabitants are foreigners, is due to the attraction of the coal mines.

**Central Bengal**

103. Central Bengal gains 5 per cent on the whole. Mills and reclamation of Sundarban jungle add nearly 10 per cent to the 24-paraganas; rivers blocked by silt and lines of stangnant swamps explain the decline of 4 per cent in Jessore and the small increase of 1·4 per cent in Nadia. The addition of 24·2 per cent to the population of Calcutta has been dealt within the last chapter.

**North Bengal**

104. Northern Bengal has an increase of nearly 6 per cent It is largest in Jalpaiguri (15·6) where ordinary cultivation has expanded and the tea garden of the *Thanas* in the Duars attract a foreign-born population of from 28 to 55 per cent. The increase of 11·5 per cent in Darjeeling is due to the influx of cultivators from Nepal, while Bogra owes a similar increment to the industrious Santals, who are reclaiming the laterite ridges of the once fertile Barind from the jungle which had been allowed to over run it.

**North and South Bihar**

105. There remain two divisions in which population has remained stationary or has actually declined. In North Bihar, where one person per thousand has been added to the population during the decade, famine prevailed in five out of six districts during 1896-97. Yet no correspondence can be traced between the prevalence of famine and the fluctuations of population. "The stress of famine", says Mr. Gait, was greatest in Darbhanga, but this district shows the larger gain of population (3·9 per cent) Purnea escaped the famine altogether, but it has sustained a loss of 3·5 per cent or exactly the same as Champaran, where the decline is greatest in the very tract that suffered least from famine. Saran, which has a decrease of 2·2 per cent was far less severely affected than Muzaffarpur, which has gained 1·5 per cent and its loss of population is amply accounted for by the plague epidemic which was more virulent there than in any other district except Patna; the Gopalganj sub-division where the famine was worst has added slightly to its population of 1891. In Muzaffarpur and Darbhanga, the great rice-growing tracts under the Nepal Frontier, which suffered most in the famine year, show the greatest growth of population. The decadent tracts in Muzaffarpur and Bhagalpur either escaped the famine altogether, or suffered from it only in a minor degree. The true causes

of the decay in parts of North Bihar must, therefore, be sought elsewhere. Champaran and Purnea are well-known to be unhealthy and have suffered since 1891, not only from malarial affections, but also from severe epidemic of cholera. The outbreak of this disease in Purnea in 1900 was of unparalleled severity and no fewer than 46,240 deaths were laid to its account in the annual returns of mortality. The part of Bhagalpur that has lost population borders on Purnea and shares the unhealthiness of which that district is the victim. In Saran, as already noted, plague fully accounts for the decrease which is greatest where that disease was most fatal."

"South Bihar includes all the plague districts except Saran, and its decrease of 3·6 per cent. is mainly attributable to the direct and indirect losses caused by the epidemic, *viz.*, a very heavy mortality, the flight of a great part of the immigrant population and, in some parts, the failure of the census staff to effect an exhaustive enumeration. Except in the west of Shahabad, the areas of greatest decadence exactly coincide with the areas that have suffered most from plauge, and tracts that have been free from the disease have, as a rule added to their population. Prior to the census the epidemic had been most, virulent and most widespread in Patna, where the population has declined by 8·3 per cent as compared with 1891. The loss is greatest in the thickly populated urban and semi-urban country on the bank of the Ganges where the mortality due to plague was greatest. The southern part of the district which suffered least from plague has almost held its ground."

106. *Berar.* After fifty years of almost unbroken prosperity Berar was visited during the ten years preceding the last census by two famines, which followed each other in close succession and reduced the population by 143,475 persons or 4·9 per cent. In 1867 when the first Census was taken the people numbered 2,227,654; by 1881 they had increased to 2,672,673 and by 1891 to 2,897,491. In 1901 the population had fallen to 2,754,016.

**The famine of 1896-97**

Everywhere , except in the hilly tract of the Satpura Range known as the Melghat Taluk, the famine of 1896-97 was due rather to an inordinate rise of prices than to actual scarcity of food. It was felt most severely by the large class of field labourers for whom there was no work and for the half starved immigrants who flocked in from the Central Provinces and helped to swell the death roll. Although the death rate of Berar rose in those year from 37·6 to 52·6 per thousand, there were few deaths from starvation among the natives of the Province, except in the Melghat. Here the failure of crops was complete; there were no stores of grain to fall back upon; the jungle tribes—Bills, Konkus and Gonds—were too shy too inert, and too unused to regular labour to come on to the relief works, and a considerable number of them admittedly died of want. The famine of 1899-1900 was a calamity of a more formidable type, brought about by the great atmospheric movements which determine the variations of the monsoons. Not only did both the autumn and spring crops fail completely there was also a dearth of fodder; the stores of grain which are still habitually maintained had been exhausted in 1897 and not replenished in the following year, and to complete the disaster, the sources

of water supply dried up and a large number of cattle perished from thirst. The death rate rose from 40 to nearly 83 per thousand; the birth rate fell from 50 to 31. The number of deaths returned was, 236,022, being nearly 126,000 in excess of the decennial average, and nearly four times as many as occurred in 1898. Some of these people no doubt were immigrants from the neighbouring parts of Hyderabad, but no estimate of their number can be made, and it is impossible to doubt that there was considerable mortality among the inhabitants of the Province. The daily average number of persons relieved was 265,744 or 9·2 per cent of the population, while in July 1900 the figure rose to 601,424 or nearly 21 per cent.

**Comparison of census figures with vital statistics.**

107. In respect of the accuracy of its vital statistics Berar ranks higher than almost any other Province in India and a comparison of the census figures with the returns of births and deaths fully bears out this reputation. The recorded excess of deaths over births during the ten years 1891-1900 comes to 150,803 persons, while the census shows a loss of 143,475. And a calculation made by Mr. Chinoy, in paragraph 80 of his report, from the vital statistics combined with the birth place returns, brings out a total population of 2,750,542 persons or only 2,474 less than that ascertained in the census. Another form of calculation, set out in subsidiary table VI compares the population actually found in the census with that which would have been in existence if the rate of increase which prevailed from 1881 to 1891 had gone on for the next ten years. On this hypothesis, which takes for granted the continuance of unbroken agricultural prosperity, "we find that Berar has, during the decade, suffered a loss of 387,224 persons for 12·3 per cent. But the vital statistics and the nature of the seasons during the decade show that in only five years, *i.e.*, from 1891 to 1893 and 1898 and 1899 the population was progressive, as there was a large excess of briths and deaths in each of those years, while in the remaining five years deaths outnumbered births excessively. Taking the normal annual rate of increase in Berar for the five years in which the population was progressive and adding the net gain of 14,215 by migration, the population of Berar in 1901 should have been 3,031,120 or 277,104 more than it was actually found. This difference amounts to 10 per cent, and is probably the nearest we can get to the loss inflicted by the two famines and unhealthy years."

**Bombay**

110. During the last decade there has been a considerable growth of industrial activity. The number of cotton mills has risen from 87 to 138 and the number of employees from 18,000 to 810,000. There has also been a considerable extension of the system of railways. But these conditions have only a small influence compared with the state of agriculture and the public health. For some years after 1891 the seasons were normal and, with the exception of occasional visitations of cholera, there was no unusual mortality; but than followed "a succession of famines, bad seasons and plague epidemics unrivalled in the recent history of any other part of India."

**Conditions affecting movement between 1891 and 1901**

Plague first appeared in Bombay City in September 1896, and gradually spread all over the Province especially in the Deccan and the South Maratha country, and in Thana, Cutch and the larger towns in Sind—Karachi, Hyderabad, and Sukkur. The total registered mortality from plague upto the 1st March 1901, the date of the census, was nearly a third of a million. The Superintendent has not given his opinion as to the extent to which these figures indicate the actual mortality, but it is well-known that in the case if all serious out-breaks of epidemic disease the machinery for reporting vital occurrences becomes disorganised. The plague Commissioners were of opinion that the true death rate from plague was greater by at least 35 per cent than that actually reported, and in Bengal it has been estimated that the deaths from the disease were more than twice as numerous as those shown in the returns; it would thus probably be safe to say that in Bombay the plague was responsible for a reduction in the population of from half to two thirds of a million persons.

At the time when the census was taken plague was raging in the Bombay City and in the Belgaum and Thana districts; in the plague districts of Bengal it was found that the consequent alarm and confusion affected the accuracy of the enumeration, but in Bombay Mr. Enthoven thinks that the plague was a help rather than an obstacle, as the days of scare were over and the people were accustomed to constant censuses for plague purposes. However that may be,it is probable that the Bhils and other wild tribes, who rubbed off much of their shyness on the famine relief works, were more completely accounted for on the present occasion than at any previous enumeration.

The famine of 1896-97 fell most heavily on the Deccan districts and Bijapur In the rest of the Presidency the scarcity did not amount to famine, and relief works were not necessary, but there was widespread suffering from the high prices which prevailed. During the next two years the crops seem to have been fair, except in the Deccan, but then came the famine of 1899-1900. This calamity, following as it did on a succession of lean years, caused even greater distress in the Deccan than its predecessor of 1896-97, but the brunt of it fell on the well cultivated and usually fertile plains of Gujarat, the garden of Western India", which until then had been regarded as outside the famine zone.* Sind, owing to its dependence upon irrigation, again escaped, and so did the Konkan and South Maratha country. The area affected on this occasion was nearly twice as great as in the famine of 1876-78 and the maximum daily average number of persons relieved was three times as great. When the census was taken over 100,000 persons were still in the relief camps.

Excluding Aden the number of immigrants of all kinds has fallen from 988,980 in 1891 to 804,014 at the present census, and that of emigrants to other parts of India from 706,542 to 626,799.

*That is to say at the present day. The terrible famine which devasted Gujarat in 1630 was probably one of the most severe of these scourges than ever visited India.

The result of the adverse conditions of the decade is that the census of 1901 shows a decrease of a million and a half, or 5 per cent, as compared with that taken ten years previously; the population of British territory has fallen to 18,550,561, a drop of 2 per cent, while that of the Native States is now only 6,908,648, or 14 per cent less than in 1891. The returns of the Sanitary Department show an excess of births over deaths to the extent of 645,000 in the first six years of the decade, and of 47,000 in the years 1898 and 1899. while in the two famine years, 1897 and 1900, there was an excess of deaths amounting to 120,000 in the former, and 813,000 in the latter year*

## CENTRAL PROVINCES

### Decrease in the past decade

122. The events of the ten years preceding the last census have signally falsified the optimistic views of the first Famine Commission. A succession of bad seasons culminated in the first great famine of 1896-97, which was followed, after a single year's respite, by the widespread calamity of 1899-1900. Epidemics of cholera prevailed in seven years out of the period and malaria fever was on several occasions unusually frequent and severe. These disasters, coming upon a weakened and impoverished people, reduced their number to 11,873,029 persons, a decline of 1,071,776 or 8·3 per cent.

### Its probable causes

(*i*) *Emigration:* 123. We have no means of determining with any approach to precision to what extent this loss of population is due; (1) to emigration exceeding immigration, (2) to a reduced birth rate, (3) to an enhanced death rate. All these causes have no doubt contributed in varying degrees to the result, but it is impossible to separate them with certainty and to state definitely what effect each has produced. Let us first consider emigration and immigration. The returns of birth-place show that 482,228 persons born in the Central Provinces were enumerated in other parts of India, and conversely, that 460,694 persons born elsewhere were enumerated in the Central Provinces. The former figure represents an increese of 1,665 and the latter a decrease of 71,672 on the correspondng statistics of 1891. But neither the one nor the other is a true measure of the real movement of the period. Each merely shows the net result of migration and reduction by death on the total number of emigrants and immigrants respectively. The number of people that actually migrated can only be estimated approximately. The method I adopt for this purpose has the sanction of the high authority of Mr. Neel Humphreys and has been used by my friend Dr. Longstaff in estimating the movement of population with in the United Kingdom. On the system it is assumed that the average number of

*In the Memorandum on the Material Condition of the people of Bombay Presidency 1892-1901, it is said that plague and famine by increased mortality and reduced birth rate caused a loss of two and a half millions in British territory and of two millions in the Bombay State.

Central Provinces people in other parts of India during the decade was the arithmetical mean between the number at its beginning and end, thus :—

$$\frac{482,228+480,565}{2} = 481,396.$$

A death rate of 40 per 1,000, which is a fair ratio to take, would in ten years carry off two-fifths of the average population

$$\frac{481,396 \times 2}{2} = 192,558.$$

Adding to this the census increase of 1,663 we get 194,221, as the probable number of emigrants during the ten years. By the same process, only deducting the census decrease in immigrants of 71,672, the immigrant population is calculated at 126,940. The difference of 67,281 represents the extent to which the balance of emigration and immigration has contributed to the decline of population in the Central Provinces. So far as emigration is concerned, the figure assumed above does not differ very materially from Mr. Russuell's estimate of between one and a half and two-lakhs. But he omits to take immigration into account and assumes that the whole number of emigrants can be deducted from the deleine in population brought out by the census. This of course is not the case, I think it possible, however, that the number of emigrants to Assam may have been understated owing to many of the tea coolies recruited in the Central Provinces, being collected at Purulia and returned as natives of Bengal. People of the coolie class do not distinguish very clearly between Chota Nagpur and the Central Provinces and are apt to speak of both indifferently as 'Nagpur'. On the whole then the net loss to the Province by migrantion during the ten years may be estimated at 70,000.

124. The general conclusion is that emigration accounts for only an in significant proportion of the census decrease of population. This is in the main what the circumstances lead us to expect. That there should have been a large increase in the number of persons who were conveyed to Assam under the Labour Act is natural enough; a famine is the recruiter's opportunity, and assisted emigration is a most effective form of relief. It takes the ruined cultivator or landless labourer to a new country where his labour is wanted, and in a large number of cases he and his family settle down and prosper in Assam. But while assisted emigration increased, ordinary or spontaneous emigration to neighbouring provinces declined, doubtless for the sufficient reason that people had nothing to gain by wandering into adjacent tracts where the famine was as severe as in the Central Provinces, and the relief arrangements, at any rate in the second famine, less complete and liberal.

*(ii) Reduced birth rate* 125. For the first four years of the decade the birth rate was not very markedly below the average rate (40.8) of the decennial period 1881—91. In 1895 it dropped suddenly from 39 per thousand to 33 ; in the next year there was a fall to 32 and in 1897 it fell to 27. In 1898 the rate rose to 30 and in

1899 it reached the very high figure of 47 per thousand, declining again to 32 in the following year. It is not contended that these statistics are absoultely accurate. still less that they can be made the basis of any precise calculation. Their fluctuations, however, show a close correspondence with the comparative severity of distress in different districts and we may credit them with a fair degree of relative accuracy. In 1895, for example, the drop in tne birth-rate was peculiarly conspicuous in the districts of Saugor, Damoh and Jubbulpore regarding which the Famine Commission of 1898 observed that the whole machinery of famine relief ought to have been brought into play at the beginning of 1896. At this critical time, indeed, the birth rate appears to have given a clearer note of warning than the death-rate. The former declined in Saugor by 50 per cent. in Damoh by 39 per cent, and in Jubbulpore by 31 per cent; while the rise in the death-rate was only 18 per cent in Saugor, 11 per cent in Damoh and 8 per cent in Jubbulpore. The point seems to deserve some attention. The relation between the rise and fall of prices and the fluctuations of the birth-rate is known to be very regular and intimate and there are physiological reasons for believing that the reproductive functions are the first to be affected by any marked reduction or deterioration of diet. It follows that in a country where scarcity and famine recur at uncertain intervals special attention should be paid to the registration of birtns and their variations should be recognised as giving a trustworthy indication of any continued decline in the material condition of the people. They are of course nine or ten months in arrear of the causes which give rise to them, but where these causes themselves have been overlooked or misinterpreted the fall in the birth-rate tells a decisive tale. Our sources of information as to the prosperity of the masses are not so infallible that we can afford to neglect even a tardy warning.

(*iii*) *Enhanced death-rate* 126. Turning now to the death-rate we find that in six years out of ten it was substantially in excess of the averaged ratio (32.4) for the period 1881-1891, that in 1896 it rose to 49 per thousand and in 1897 to 69, the rate for 1900, the year of the second famine, being 56.7. For the first famine the returns of deaths are probably a good deal below the mark. In many districts the reporting officers, mostly illiterate village watchmen of the lowest castes, were greatly overworked, rural society was disorganized by famine and cholera, and large numbers of people especially members of the wilder tribes, had left their homes and wandered away into the jungles in search of food. Accurate registration is difficult enough to attain in ordinary years; when panic has set in on a large scale it becomes impossible. In 1900 the elaborate organiza tion of famine kitchens kept natives of the Province in their villages, special work of a congenial nature was provided for the jungle tribes, and aimless roaming about the country seems to have been reduced to a minimum. It may therefore be assumed that the mortality statistics in 1900 are approximately correct. For the purpose of estimating the deaths directly and indirectly traceable to the second famine, the Famine Commission of 1901 take the decennial average or recorded deaths at 351,548 and deduct this from 539,234, the number of deaths registered in 1900. They thus arrive at 187,686 as the excess mortality of that year in British Districts. If we follow their method and deduct the same decennial average from the number of deaths registered in 1896 and 1897 we get 424,195 as the excess mortality of the first famine, and

611,881 as the excess mortality of both famines in British Districts alone. Adding 123,680 for Native States the abnormal mortality of the Province may be stated in round numbers at 735,000.

It does not follow, however, that the whole of this mortality can be set off against the census decrease of population. On the one hand it includes the numerous deaths which occurred among the poverty-stricken wanderers from the adjacent Native States, who suffered acutely both from privation and disease. On the other hand the actual loss must have exceeded the diminution shown by the Census, which compares the population of 1901 with the population of 1891, and takes no account of the natural increase which occurred during the first four years of the decade when the birth-rate was only slightly below its normal standard. If during this period the population had increased at the rate of 6 per thousand, or 2 per thousand less than the mean rate of increase of the preceding ten years, the number of people actually living at the end of 1894 would have been 13,258,287, and the decrease of population within the decade would have amounted to 1,385,258 or half as much again as the diminution disclosed by the census.

**Deaths from starvation rare**

127. It need hardly be explained that the phrase famine mortality does not imply death by starvation. A certain number of such deaths must of course occur in every great famine especially in one which, as was the case in 1896-97, finds the administration comparatively unprepared for the emergency which has to be met. But in practice it is found impossible to distinguish between deaths caused by actual want of food and deaths due to disease accelerated by insufficient or unsuitable food. No record therefore, is available of deaths from starvation properly so called. Nor is it possible, with any approach to accuracy, to distribute the recorded mortality among the various forms of disease. As the Famine Commission of 1901 point out, "the data rest upon the erratic diagnosis of the village watchman, who is in the habit of attributing to fever all deaths as to the cause of which he is in doubt." All that can be said is that scanty and unwholesome food and a short and polluted water supply more than trebled the mortality from cholera and bowel complaints, and that in the autumn months of both famine periods virulent epidemics of malaria effected all classes of the people.

**High infant mortality**

The weakest of course suffered most acutely and both famines were marked by very high infant mortality and a disproportionate increase of deaths among people of advanced age. The following statistics of deaths by certain age periods in the two famines illustrate these remarks:—

DEATHS

| | Under 5 years | 5—15 | 15—40 | 50—70 | 60 and above |
|---|---|---|---|---|---|
| 1896 and 1897 . . . | 350,013 | 130,999 | 274,227 | 215,930 | 147,145 |
| 1899 and 1900 . . . | 355,696 | 79,968 | 153,522 | 117,208 | 99,770 |
| Difference per cent. in latter period . . | +1·6 | —38·9 | —44·0 | —45·7 | 32·2 |

The figures bear striking testimony to the great advance in the organization of relief and the higher degree of success in saving life which distinguish the famine of 1890-1900 from that of 1896-97. In the second famine indeed the infant mortality was conspicuously high, but if allowance is made for defective reporting in the first famine there is little to choose between the two. It must further be remembered that in 1899 the birth-rate rose by nearly 60 per cent, and that half of the births took place in the last six months of the year, so that when famine conditions set in an abnormally large number of children were exposed to exceptional risks. The precise causes of the enormous mortality that occurred seem to be rather obscure. It is not alleged that the parents were specially reduced. Gratuitious relief was liberally given to nursing mothers and to women advanced in pregnancy, but most of them preferred to follow their husbands to the relief works and "it was a common sight to see a healthy strong woman, with a miserable pining infant wasted to a skelton, unable apparently to nourish it." One is tempted to conjecture that some congenital influence must have been at work. It is conceivable that the outburst of fecundity which follows upon a period of scracity may contain within itself the elements of imperfect vitality and that a crop which has sprung up so quickly may be foredoomed to perish prematurely. However this may be, the figures for all the later age period bring out a remarkable contrast between the first famine and the second. Putting aside the financial aspects of the problem, and the rather over-rated danger of demoralizing the people by indiscreet liberality, there can be no question that in 1899-1900 the administration of the Central Provinces was signally successful in keeping alive the large section of the population whose only want was a sufficiency of ordinary food. Children at the breast alone could not be saved ; their needs were, and always will be, of too special and delicate a character to be met by the rough machinery of famine relief.

**Madras**

*Conditions affecting movement between* 1891 *and* 1901

132. Since 1891 the conditions in Madras have not been favourable to a rapid increase of the population. According to Mr. Francis, "Plague checked trade and enterprise, and there were three scarcities—in 1891-1892, in 1897, and in 1900. The first of these was most severely felt in the Deccan districts especially in the Cumbum and Markapur taluks of Kurnool, and in the adjoining western taluks of Nellore. The Second affected the Deccan Division again, and the Ganjam, Vizagapatam and Godavari districts of the East Coast Division. The third was again worst in the Deccan (especially in Cuddapah) and the western part of Nellore, and also attacked the west of Kistna adjoining. What the precise effect of each of these visitations was it is not easy to say. The Sanitary Commissioner concluded from the vital statistic that though no actual deaths from starvation, were reported during the scarcity of 1897, the total diminution of population due to the famine conditions which then prevailed, such as a reduced birth-rate, increased susceptibility to ordinary decrease among ill-norished persons, and so on, was over 20,000 persons. Most of this loss was estimated to have occurred in the Deccan districts." It may be added that the above famines were less severe in Madras than in many other parts of India. The worst was that of 1896-97, but thanks to

the prompt measures of relief undertaken by the Madras Government and in the case of the East Coast districts, to the fact that the previous four years had been years of plenty, the sufferings of the people were far less than they would otherwise have been.

The volume of emigration has grown remarkably since 1891, especially to Ceylon and Burma. In Ceylon there are now at least 403,000 natives of Madras compared with 235,000 and in Burma 189,810 compared with 129,345; in the Straits Settlements the present number is 51,800 against 48,064 in 1891. There is also an adverse balance of migration in the case of movements between Madras and other parts of India, excluding Burma, aggregating 214,000, as against some 138,000 in 1891.* So far as the information available goes, it may be concluded that the net loss on account of migration has risen from 550,000 in 1891 to 858,000. There are moreover many emigrants from Madras in Natal, Mauritius, and other colonies, but exact figures are not forthcoming.

On the other hand the productiveness of the land has been increased during the decade by the Rushikulya and Periyar irrigation schemes in Ganjam and Madura respectively, and by greater attention to irrigation from tanks and wells. Communications have been greatly improved, and there are now more than 3,000 miles of railway compared with about 2,000 in 1891. There has also been a considerable development of industrial enterprise, especially in respect of cotton mills which in 1901 employed an average of 16,000 persons daily compared with 6,000 in 1891. At the same time a rate of progress equal to that which obtained during the ten years preceding the census of 1891 was clearly not to be expected in the decade under review, and the fact that the population has increased by as much as 7.8 per cent, affords unmistakable evidence of the general well-being of the people and of their growing capacity to resist the evil effects of crop failure.

## UNITED PROVINCES

141. Since 1891 the Provinces have suffered from a succession of calamities. In the earlier part of the decade the rainfall was excessive and badly distributed, and not only caused serious damage, in many parts, to the crops, but also led to a severe outbreak of malarial fever, which in 1894, raised the death-rate to an exceptional height and sapped the vitality of the people to such an extent that the birth-rate in 1895 was unusually low. Then followed several years of deficient rainfall. In 1895 the monsoon ceased early in September and in the ensuing cold weather there was scarcely any rain. The autumn harvest was in consequence 20 per cent below the average and that of the following spring yielded barely three-fifths of the normal outturn. The eastern

*It is not stated in the local report that the census of 1881 was generally less accurate than the one taken ten years later, but this was the case in other provinces and it may be assumed to have been so in Madras also. In the case of the Ganjam district it was admitted that the population had been "much under stated in 1881", and it is probable that in other districts also the standard of accuracy was less high than that attained, with the aid of growing experience, at the census of 1891.

It is impossible to ascertain the exact figure now.

districts and those in the Central India plateau, or British Bundelkhand, where the loss of successive spring harvests had weakened the staying powers of the people, suffered most, and in the latter tract famine supervened. The monsoon of 1896 was even more unsatisfactory than that of 1895. Up to the third week in August the general prospects were fairly good, but the monsoon gradually became weaker, and September and October were practically rainless. The rains of the ensuing cold weather, moreover, were not sufficient to replenish the moisture in the soil. The autumn and spring harvests were thus both very short and the two combined are estimated to have yielded barely half the normal outturn. This led to severe distress in almost all districts, while in many there was actual famine. The suffering was greatest in the Central India plateau and the Central Plain, in the south-west of the Western Plain, and in Jaunpur and Mirzapor. In February 1897 no less than 1¼ million persons were attending the relief works. The number fell in March but rose again in April, and then rapidly declined until July, when the advent of the next monsoon rendered further relief operations unnecessary. The efforts made to alleviate the distress were successful in preventing serious loss of life, and the death-rate of 1897, though high, was lower than in 1894, when there was no famine and the unhealthiness of the season was alone to blame.* The reported birth-rate in 1897 was the lowest of any year in the decade, but in 1898 it was normal, while in 1899 it was the highest on record (48¾ per 1,000).

142. With the exception of the Bundelkhand districts, it does not appear that the famine has had any general effect on the growth of the population and the explanation of the diminished rate of increase must be sought in other directions. The previous decade was one of recuperation after heavy famine losses while the present one commenced with a normal population; the unhealthiness of its earlier years caused a high death-rate and reduced the reproductive power of the people ; and, lastly, high prices and the attractions of remunerative employment elsewhere led to extensive emigration, especially to Bengal, Assam and Burma. These tracts contained 200,000 more natives of the United Provinces at the time of the present census than they had done ten years earlier. The number of emigrants to Bombay has declined, but this is probably due to a higher rate of mortality in the industrial centres of that Presidency rather than to a diminished amount of emigration. There was an exodus of nearly 150,000 persons to the West Indies, Fiji, and Natal during the decade, while the return flow from these places amounted to less than a third of the above figure. There was also a considerable movemens from the Sub-Himalayan districts across the Nepal frontier, especially during the famine of 1896-97, but of its volume no precise information is available.

| Year | Number of | | Excess of emigrants |
|---|---|---|---|
| | Immigrants | Emigrants | |
| 1891 . . . . . | 799,137 | 1,370,144 | 571,007 |
| 1901 . . . . . | 680,691 | 1,510,295 | 829,604 |

NOTE.—The number of emigrants here shown refers only to those found in other parts of India.

*The reported death-rate in 1897, morever, was as high in several districts where the distress was slight as it was in those where famine conditions prevailed.

On the other hand, there were various circumstances which tended to mitigate the misfortunes due to adverse climatic conditions. The main system of canals had been completed prior to 1891, but numerous minor channels and drainage cuts were made during the decade and the area irrigated in 1896-97 was far greater than it had ever been before. The length of railways in the Provinces rose from 2,699 miles in 1891 to 3,569 in 1901 and the high prices of 1899 and 1900 benefited the cultivators in the tracts that escaped crop failure, who were able in those years to export 1½ million tons of grain to other parts of India. There was also a great development of various industrial undertakings, chiefly at Cawnpore and Agra, and nearly 30,000 hands were employed in cotton, woollen and jute mills, leather factories, brass and iron works, and the like, compared with barely half that number at the commencement of the decade.

**Central India**

The loss of population is greatest in the Western States *i.e.*, in the elevated tract lying along the Arravalli, Satpura and Vindhya ranges. In several years the rainfall was deficient and the crops were poor. This tract did not suffer from scarcity in 1897, but in 1899, an almost complete failure of the monsoon, following close on a deficient rainfall in the previous year, brought on a very severe famine, which was accompanied, as usual, by cholera and bowel complaints and a sort of paralysis attributed to the eating of a kind of wild pulse. The mortality was very high, and resulted at the present census in a decrease of more than two-fifths in the population of the Malwa Agency, and of nearly the same proportion in that of Bhopal. In the Indore Agency nearly a third, and in Bhopawar a sixth, of the population of 1891 has disappeared. These figures, appalling as they are, have their counterpart in the adjoining States of Rajputana. The least unsatisfactory figures in this tract are those for the Indore Residency, where the decrement is only 5 per cent, an amount sufficiently large in itself, but small in comparison with the enormous losses in the neighbouring States. During the famine there was a great deal of emigration to the Central Provinces and Indore, from Bhopal and other States, but by the time of the census the great majority of the survivors from amongst these refugees had returned to their homes, and, in the case of the Central Provinces, the number of persons who owned Central India as their birth place, was considerably less than in 1891. It seems clear, therefore, that the decrease recorded in the population of these States is due in the main to the heavy mortality of the famine year. The States of Bundelkhand and Baghelkhand escaped the famine of 1899-1900 but were hit very hard by that of 1896-97. They had, moreover, suffered from excessive rainfall, which saturated the heavy black-cotton soil, in the earlier years of the decade. The public health was bad in several years, especially in 1897. The result of these adverse conditions is a decline of 10.2 per cent in Bundelkhand and of 13.0 per cent in Baghelkhand.

**Hyderabad**

Since 1891 the State has suffered from a succession of bad seasons and in only two years was the rainfall favourable to the crops. The western districts, which adjoin the Bombay Deccan, shared in the famine of 1896-97, the distress being greatest in the south-western tract which had suffered most severely in 1876-78. The evil effects of this famine were, however, slight compared

with those of its successor of 1899-1900, which was most severely felt in the north-western districts, Aurangabad, Birh, Parbhani and Naldrug or Oosmanabad. Plague appeared in 1897 in the tract adjoining Bombay and, by the time of the census, 7,811 deaths from the disease had been reported, of which considerably more than a third occurred in the district of Oosmanabad. The immigrants from outside fell from 383,713 in 1891 to 325,197 at the present census and the emigrants from 387,983 to 317,790. Migration, therefore had only a minor share in producing the decrease disclosed by the present census, which is attributable mainly to a succession of bad seasons and especially to the famine of 1899-1900.

**Kashmir**

152. The period since 1891 has on the whole been prosperous. The greater part of Jammu suffered from famine in 1899-1900; Kashmir proper escaped but prices have risen, owing to improved communications and better facilities for trade. The people have profited greatly by the extension of settlement operations, amongst the beneficial results of which may be mentioned a greater fixity of tenure, the substitution of cash for revenue in kind, the abolition of middlemen and of various vexatious imposts, the regulation of the system of forced labour and the remission of outstanding arrears of revenue. There have been two severe epidemics of cholera, but otherwise the public health has been fairly good. Steady progress in vaccination has cheked one of the chief causes of mortality and the Srinagar water-works and improved city sanitation have mitigated the ravages of cholera. The number of emigrants from Kashmir to the Punjab has fallen from 111,775 in 1881 to 87,545 in 1891 and 83,240 at the present census. The Census Superintendent attributes this to the improvements which have been made of late years in the administration of the State. The immigrants of all kinds number 85,597 compared with 69,257 in 1891; they come chiefly from the districts of Punjab frontier Sailkot, Guardaspur, Gujarat and Hazara. Amongst both emigrants and immigrantes females are slightly more numerous than males. The causes of the varying rate of progress disclosed by different parts of the State have not been very clearly stated in the local report. The general increase is assigned in the main to the advantages which the cultivators have derived from the settlement operations but in one of the Jammu districts, Bhimbar, the portion which has been settled has lower population and the net increase in the district at large comes from two tahsils which have not yet been brought under settlement. It is understood that the latter escaped the famine while those which had been settled did not. There seem to have been some alterations of boundaries since 1891.

**Mysore**

154. Since 1891 the agricultural conditions have on the whole been good The crops failed to some extent in the Maidan, or eastern portion of the State, in 1891-92 and again in 1896-97, but the distress was local and did not amount to famine. The public health was fairly satisfactory until plague appeared in August 1898 and did great mischief. The total registered mortality from this cause upto the time of the census exceeded 35,000, of which more than half occurred in the cities of Mysore and Bangalore, including the Civil and Military Stations. The epidemic had also serious indirect consequences

in the dislocation of trade and the return to their old homes of many settler from other tracts. On the other hand, the rapid development of the Kolar Gold mines and the consequent general expansion of trade and industrial activity, including the construction of the Cauvery Power Works where electricity is generated for working the machinery in the Gold Fields a hundred miles away, coupled with the extension of the State system of railways and irrigation works, have not only provided the labouring classes within the State with remunerative employment and greatly augmented in the general prosperity of the people, but have also stimulated immigration in a remarkable degree. As stated above, the plague which was raging when the census was taken must have driven away many of the temporary settlers, but in spite of this the number of immigrant has risen from 195,798 at the previous to 306,263 at the present census. The number of emigrants has fallen from 143,533 to 131,682. The net gain from these movements of the people accounts for about a sixth of the total growth of the population.

**Rajputana**

157. Since 1891 the country has suffered from a succession of seasons of deficient or ill-distributed rainfall. In the first year of the decade severe scarcity was felt in Marwar, Bikaner and Jaisalmer, the three States lying west of the Aravalli range, in the region of sandy desert and scanty rainfall which forms the "North-West Dry Area", described in the last chapter. In 1895 the same tract obtained barely two-thirds of its ordinary rainfall and relief operations were started in Jaisalmer. The next season was also unfavourable and famine conditions spread into Bikaner; Marwar was affected by scarcity and there was also some distress east of the Aravallis, in Dholpur and Bharatpur, which lie in the "Indo-Gangetic Plain, West". The rainfall was again deficient in 1898, while in 1899 the monsoon practically ceased towards the end of July, and the abnormal heat withered the grass and standing crops, dried up many of the irrigation tanks and wells, and brought on a famine more severe even than that of 1868-69. Everything that the Supreme Government could do to cope with the calamity was done. Loans were made to the various durbars on favourable terms; a Famine Commissioner was appointed, and Engineers and Staff Corps officers were deputed to assist in supervising the administration of relief. The durbars were, however, unprepared, and valuable time was lost in making the necessary arrangement and collecting the required establishments. The distress continued to grow until June 1900 when 5 per cent of the population was in receipt of relief.* During the next three months, however, heavy rainfall and the number on the relief works rapidly dwindled away. Fever epidemics broke out in 1892, 1899 and 1900, the most virulent of all being that which followed the heavy rainfall of August and September 1900, which was aided in its ravages by the impaired vitality of the people. Vital statistics scarcely exist in Rajputana but the general consensus of opinion is that the mortality from fever from August 1900 to February 1901, exceeded that caused by want of food in the period during which famine conditions prevailed. However, that may be it is probable that the population at the beginning of 1899 was at least as great as in the 1891, and that the whole of the decrease which has taken place

*For a severe famine the proportion of persons receiving relief was very small In some parts of British territory, in the course of the same famine, over 20 per cent of the population were at one time in receipt of State aid.

is attributable to famine and disease during the two years immediately preceding the present census. It has been said that much of the loss is due to emigration, and it is well-known that during the famine the relief works in the adjoining British territory were crowded with half-starved wanderers from Rajputana. In the Rajputana Famine Report the number of famine emigrants is placed at nearly three-quarters of a million. The traditional customs of the inhabitants of the vast desert tracts forming the western States is to emigrate with their flocks and herds on the first sign of scarcity, before the grass withers and the scanty sources of water supply dry up, the famine refugees must either have died or returned home before that day so that at the same time the number of persons born in Rajputana who were found in other parts of India on the night of the census was almost the same as it was ten years earlier, and it would seem, therefore, that the emigration of natives of the Rajputana States cannot be held responsible for any appreciable part of the falling off. The number of immigrants from outside, however, has decreased during the decade by about 173,000 and this may possibly be due mainly to the return to their old homes of persons born elsewhere. But even so, the losses owing to famine and its sequelea, must exceed two millions or, say, 17½ per cent.

## GENERAL SUMMARY

### Elimination of variations due to census of new areas

159. The movement of the population in each of the provinces and states which make up this great Empire having now been briefly reviewed, an attempt will be made to focus the main results and to present them from a wider and more general aspect. The proportionate growth of the population disclosed by the returns for successive enumerations is shown in Subsidiary Table No. I. The gross increase of the population during the decade preceding the census of 1901 was 2·4 per cent compared with 13·1 and 23·1 per cent in the periods 1881-91 and 1872-81 respectively, but, as already explained, the real progress is obscured by the gradual extension of the area included within the scope of the census operations. Of the increase of nearly 48 millions recorded in 1881, no less than 33 millions was derived from the counting of new areas,* and of the increases of 34 millions and 7 millions registered in 1891 and 1901, 5½ millions and 2½ millions respectively were obtained in the same way. The exclusion of these fictitious gains reduced the rate of increase in the three periods 1872—1881, 1881—1891, and 1891—1901 to 6·8, 10·9 and 1·5 per cent respectively.

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*The new areas are as follows :

In 1881—

Convict Settlement in Andamans, Central India Agency, Hyderabad, Punjab State, Rajputana, Manipur.

In 1891—

North Lushai, Upper Burma (excluding Shah States), Quetta, Kashmir, Sikkim.

In 1901—

Native Tribes in Andaman, Manipur (Schedules destroyed in 1891, part of Lushia Hills, Shah State, part of Upper Burma, Malakand, Dir, Swat, Chitral, Kurram and Shirani Country in North Western Frontier Province, Baluchistan and Baluchistan Agency.

**Elimination of variations on account of better enumerations.**

160. It is less easy to estimate the effect of the gradual improvement which has taken place in the accuracy of each fresh enumeration. There can be no doubt whatever that serious omissions occurred in 1872**, and in the report on the results of the present census in Bengal, where some striking instances of the incompleteness of that pioneer count are quoted, the conclusion is arrived at that, of the increase of 11¼ per cent recorded in 1881, half, at the very least, was due to this cause. In the United Provinces, which endured the horrors of famine in 1877-78, the Census Superintendent of 1881 was of opinion that the gain of 5·3 per cent then disclosed was wholly fictitious, being due solely to faulty enumeration in 1872. It is not likely that the census of that year in these two provinces which, with their states, contained between them more than half the total population then enumerated, was below the general standard of accuracy attained elsewhere, and if this assumption be granted, the increase of population between 1872 and 1881, which has been reduced to 6·8 per cent by the exclusion of areas dealt with for the first time in 1881, almost or wholly disappears†. In any case it may fairly be concluded that the true rate of progress during this period was certainly not greater than that during the decade preceding the Census of 1901.

Between 1881 and 1891 the gain due to the greater completeness of the enumeration was much smaller, but it was nevertheless considerable. In Bengal it has been estimated, on fairly reasonable grounds, to amount to half a million, and in the United Provinces, to more than a third of a million. It must have been proportionately greater in the tracts of which the first census was taken in 1891, and it seems probable that in India as a whole the gain on this account may have been more, but was certainly not less, than 1 per cent. In 1891 the general standard of accuracy was so high that there was little room for further improvement.‡‡

**Estimated true variation in population since 1872**

161. It may therefore be concluded that the true growth of the population since 1872 has been as follows :

From 1872 to 1881—Possibily nil, and certainly not more than 1·5 per cent.

From 1881 to 1891—about 9·8 per cent.

From 1891 to 1901—about 1·5 per cent.

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**In some Provinces the first enumeration was effected in other years, *viz.*, in 1871 in Madras and Mysore, in 1875 in Cochin and Travancore, and in 1868 in the Punjab.

† The deficiency in Madras in 1871 was subsequently estimated to be about 850,000. If so, the degree of error there was less than in Bengal and the United Provinces but owing to the famine which intervened before the next enumeration, it was more difficult there than elsewhere to form an opinion as to the extent to which the Census of 1871 was defective.

‡‡ There was a considerable increase owing to better enumeration in Upper Burma and a few remote tracts, chiefly in Native States, but the total population of these areas is so small compared with that of the whole country, that the consequent gain is inappreciable and is certaintly not greater than the loss due to new omissions in places where plague was prevalent at the time when the census of 1901 was taken

**Brief analysis of variations, 1891—1901**

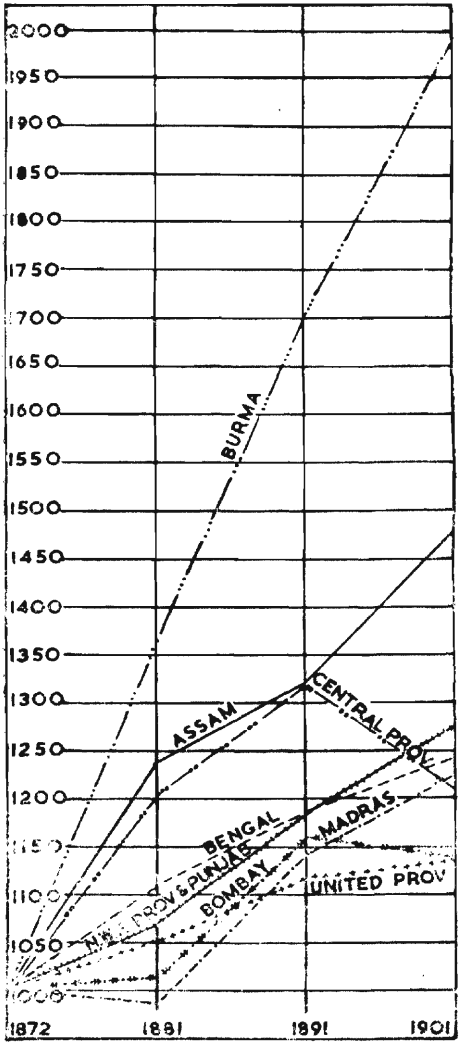
162. The net increase disclosed by successive enumerations is the resultant of very divergent figures for individual provinces and states. The changes that have taken place in the population of each political unit since 1872 have already been discussed, and the results for some of the main provinces are shown in graphic form in the accompanying diagram. In spite of the exclusion in the case of Burma, of the gain due to the enumeration of fresh areas, this province shows a far more rapid rate of progress than any other part of India, and its population has almost doubled in the short space of 29 years. Assam also is growing fast, but its true increase since 1891 is obscured by the addition of new tracts not dealt with in that year. The Central Provinces which rivalled Assam in its progress during the first two periods dealt with has experienced a severe set-back and its population is now almost the same as it was 20 years ago. Bombay also has lost ground but, thanks to the steady growth of Sind, where the physical and climatic conditions resemble those of the Punjab rather than Bombay proper the famine has produced a comparatively small decrease in the population taken as a whole. The only other remark suggested by the examination of this diagram is the general irregularity of the curves. In Burma the rate of growth is both rapid and uniform but elsewhere periods of decadence have been followed by periods of rapid growth, and these again have been marked by a slackened rate of increase in the ensuing decade. This would seem to suggest a specially rapid development during the next 10 years in Bombay proper and the Central Provinces but it is always unsafe to prophesy and is especially so at the present time when the grim shadow of the plague is still growing broader and blacker.

163. Taking the district or corresponding division of Native States as the unit, I have distinguished in subsidiary Table No. V the areas in each province or state which have added to their population from those which have lost ground during the last decade. It thus appears that the increase of 1·5 per cent in India as a whole (excluding the gain due to the enumeration of new areas) is the combination of a growth of 8·6 per cent in an area of 943,016 square miles, with a population at the present census of 193,790,645 persons and a density of 205 persons per square mile, with a decline of 10·1 per cent in an area of 606,973 square miles with a present population of 97,886,087 and a density of 161 persons to the square mile. In British territory there has been a gain of 8·2 per cent over about three-quarters of the total area and population, and a loss of 5·7 per cent in the remaining one-quarter. In the States and Agencies the area showing a gain is considerably less than that where there has been a decline ; the population of the former has risen from 25 to nearly 28 millions, or at the rate of 11·1 per cent, while that of the latter has fallen from 41 to 34 millions, a decrease of 17·3 per cent. The net result of these variations in gain of 3·9 per cent in the population of British Territory and a decline of 6·6 per cent in that of the Native States.

**Comparison of census results with those indicated by the returns of births and deaths.**

164. It is impossible in the space available to deal at any length with the returns of births and deaths collected in various parts of India. These atistics are based on information received periodically from village watch

Diagram showing the variation since 1872 per 1000 of the population in certain Provinces



men and other similar subordinates, who possess little or no education and over whom it is impossible to exercise very close supervision. In the larger provinces considerable attention has been paid, of recent years, to the improvement of the returns and, in some cases, so far as the total number of vital occurrences is concerned, the degree of error has been greatly reduced, so that even if a certain number of births and deaths are still left unreported, the consequent inaccuracy is believed to be small and fairly constant. In Subsidiary Table No. VI, a comparison will be found between the actual population of the main tracts where vital statistics are recorded, as shown by the Census of 1901, with the results obtained by adding to the corresponding population of 1891 the births reported during the decade and deducting the deaths. The figures are in some cases obscured by migration, especially in Assam and the United Provinces, but elsewhere the estimated population indicated by the vital statistics corresponded to a remarkable degree with that ascertained at the census. It appears, therefore, that these returns now afford a fairly correct indication, not only of the variations that take place from time to time in the public health, but also of the actual growth or decadence of the population, and reference has accordingly been made to them repeatedly, in the notes on the movement of the population of different provinces as affording a measure of the comparative healthiness or unhealthiness of different seasons and of the effects of famine on the mortality.*

In other directions very little reliance can be placed on these returns. The error in respect of age at death is just as great as it is in the case of the age return of the census. The diagnosis of diseases is also very imperfect. Cholera, dysentery and smallpox are known, but most other complaints are indiscriminately classed as fever.

**Factors on which movement depends**

165. The movement of the population depends on various factors, falling broadly into two distinct groups. On the one hand, there are the social practices of the people, amongst which may be enumerated the age at, and universality of marraige, the extent to which widowers and widows remarry, the prevalence of abortion and infanticide, and the degree of care and intelligence with which children are ushered into life, and brought up, especially during the critical first few months after birth. On the other, there are the physical, material or external factors which affect their longevity and fecundity, such as famine, changes in their general material condition, disease and migration. The former group of factors, which change but slowly and whose influence is fairly constant for long periods of time, will be dealt with when the age and marriage statistics are brought under examination, and the discussion in this chapter will be confined to the second group, *i.e.*, to the external factors, which are those that chiefly affect the fluctuations in the rate of growth in successive decades. It may, however, be noted in respect of the social factors that marriage is almost universal and that, al-

*It seems probable that the deaths of small children are not so fully reported as those of adults and that the standard of accuracy falls off whenever epidemic disease is specially prevalent. This certainly happens with plague and it is probably also the case with cholera. At the same time it would appear, from the general result described above, that the omissions from both sides of the account more or less balance one another.

though the prohibition of widow marriage amongst large sections of the community renders sterile a considerable number of women capable of bearing children, the birth-rate in India is far higher than in any country of Western Europe. Owing partly to a heavy mortality amongst small children, the death-rate is also high, but the resultant tendency of the social factors is to produce a fairly rapid growth of the population. The extent to which this growth is fastered or checked depends upon the external factors which will now be passed in review.*

**Migration**

166. In the case of some individual provinces and States, such as Assam, Burma and Mysore, we have seen that immigration plays an important part in determining the variation in the population, but in India, as a whole, it is an item of very small account. The total number of immigrants from foreign countries at the present census was only 642,000, or 2 per 1,000 of

| | Number of Emigrants | |
|---|---|---|
| | 1901 | 1891 |
| Ceylon . . . . . | 436,622 | 264,580 |
| Straits Settlements . . . . . | 57,150 | 53,927 |

the population, compared with 600,000 in 1891 and 409,000 in 1881. Of the corresponding emigration complete information is not available. The number of persons born in India who were numbered in Ceylon and the State. Settlements at the last two censuses of those Colonies is noted in the above table.

| | |
|---|---|
| British Guiana . . . . . | 125,875 |
| Trinidad . . . . . | 85,615 |
| Mauritius . . . . . | 265,163 |
| Natal . . . . . | 65,925 |
| Fizi . . . . . | 15,368 |
| Jamaica . . . . . | 15,278 |
| Surinam . . . . . | 18,000 |
| St. Lucia . . . . . | 1,200 |
| Martinique . . . . . | 3,764 |
| Guadeloupe . . . . . | 15,276 |
| TOTAL . . . . . | 611,464 |

*The rapid rate at which the population is capable of growing when all conditions are favourable will be seen from the results already described in the case of Lower Burma and Eastern Bengal.

We have no means of gauging the number of emigrants to Nepal, Afghanistan, Tibet and Bhutan, but in the case of Nepal, at least, the number is believed, to be considerable. Neither are the census returns available for European countries or British Colonies other than the two already mentioned. The number of natives of India residing in Europe is inconsiderable, while for the colonies, we may, in the absence of the census figures, refer to those obtained by the Protector of Emigrants. According to the returns published by him there were no less than 611,464 natives of India residing in the places shown in the previous table** during the year 1900*. There was also, upto the 31st March 1901, a total immigration of 34,147 natives of India recruited for work in Uganda, of whom 9,864 had again returned to India on the termination of their agreements and 710 had died. There were in addition 2,430 free emigrants regarding whose subsequent movements details are not available. It may be assumed that about 26,000 natves of India were actually in Uganda at the time of the census. It was estimated in 1898 that there were at that time, 5,000 natives of India in the Transval, and a year later the number in Cape Colony, Basutoland and South Rhodesia was reported to be 3,913; there are believed to be about 10,000 in Zanzibar and the census of 1891 showed about 15,000 in Australia and New Zealand for all these places combined we may place the total at 35,000. If we assume that Nepal contains the same number of emigrants from India as are received from that State by the British districts which adjoin it, or about 158,000, and, making a rough guess, take 50,000, as the number who are resident in Afghanistan, Bhutan and other countries, for which no definite information is forthcoming, the aggregate number of emigrants amounts to 1,374,000, or more by 732,000 than the number of emigrants counted in India on the 1st March 1901. The adverse balance, though considerable by itself, forms a very small fraction of the total population and migration may, therefore, be neglected when dealing with the movement of the population in India as a whole.

**Adverse conditions of decade**

(*i*) *Famine*

167. We nave seen that the main influence causing fluctuations in the rate of growth of a community at different periods is its material condition and in a country like India, where two-thirds of the people are dependent on agriculture, this varies with the state of the harvests. When the crops are good the people are prosperous, but when they fail the pinch of scarcity is at once felt. It has been repeatedly shown, in discussing the movement of population in the 4 different provinces and states, how intimately the variations which have been reveal at succeeding enumerations are connected with the occurrence of famine. When there has been a famine in the period between two censuses, the population is stationary or decadent, but when there has been no famine, it is progressive. The rate of growth is greatest

*The statistics of emigration to the colonies show that in all 198,585, persons left India during the decade of whom 120,550 were natives of the United Provinces, 30,775 of the Punjab, 28,314 of Madras, and 11,357 of Bengal, the balance being made up of smaller contributions by the other provinces and various native states. (Financial and Commercial Statistics of British India, Ninth issue page 436.) Having regard to the number of natives of India actually resided in the Colonies it seems doubtful if the returns of emigration are complete. About one-quarter of the emigrants eventually return home, bringing with them savings which in the decade preceding the present census, were estimated at 70 lakhs of rupees.

**See on page 69.

during a period of good crops following close on the heels of a famine. The reason for this is partly that a calamity of the short causes a high mortality, chiefly amongst the very old and the very young and other persons already of a feeble constitution, so that when it is over, the population contains an unusually high proportion of healthy persons at the reproductive ages, and partly because, by reducing the number of dependents to be supported, its ultimate effect is to improve the resources of the poorer classes and so encourage them to have larger families.* Thus Orissa, which lost a quarter of its population in the famine of 1865-67, gained nearly 18 per cent in the period between the censuses of 1872 and 1881. Madras having suffered severely in the famine of 1876-78, added 15.1 per cent to its population between 1881 and 1891, and Bombay which shared in the same calamity had an almost identical increment.

169. In India, as a whole, the decade ending in 1891 was remarkably free from serious crop failure, while the preceding period witnessed several widespread famine. It is thus easy to see why the population was very nearly stationary between 1872 and 1881 and grew rapidly in the next ten years. But it was not likely that such rapid progress would be maintained. Even with a continuance of good seasons a period of rapid increase would naturally be succeeded by one of slower growth owing to the diminished number of persons at the pre-productive ages about 15 years after a famine and the exceptionally large number of young children. Moreover good seasons and bad of in cycles and a succession of fat years is invariably followed by a series of lean ones. This sequence of events was noticed by Mr. Baines who, in dealing with the results of the census of 1891, wrote:—

> "The rate of increase thus unveiled is not likely to be maintained, and after so many years of average seasons, previous experience in India warrants the expectation of check to the growth of population such as that which occurred between 1861 and 1871 and 1871 and 1881. The measures to prevent the loss of life that have been briefly touched upon [ Chapter III will, no doubt, mitigate the severity with which this check is applied, so far as its direct action is in question, but, nevertheless, it will not be surprising to those who have gratuitously the statistics, if there be in 1911, if not 10 years sooner, a considerable readjustment of the age distribution at the beginning an end of the tables."

The anticipated has happened and the period from 1891 to 1901 was even more disastrous to the cultivators than that from 1872 to 1881. The adverse conditions of the decade have been repeatedly mentioned in the notes on movement in individual provinces and states, but it will be convenient to give a brief summary of their leading features in India as a whole. In 1891-92 there was scarcity over a considerable area in Madras and Bombay, and in parts of Bihar. In 1895 a weak monsoon led to extensive crop-failure in the southern districts of the United Provinces, and a sudden cessation of the

*It has more than once been pointed out by Settlement Officers that the size of the family varies with the material condition of the people; that a landless labourer's family is on the average smaller than that of a small cultivator, and the family of the latter than that of one with a large holding, vide Muzaffarpur Settlement Report, page 364, and Report on Material Condition of small agriculturists and Labourers in the Gaya District, pages 17 and 23.

A rapid rise in the birth-rate after any unusual, catastrophe is a well-known phenomenon. M. Bertillon says; "La natalito' s8abaisse, a la suite de la nuptialite, orsque La pupulation subit queleque desastre (guerre, disette, chomage, etc.) La periode de crise, une fois passee, la natalite devient plus forte qu'elle n'etait avant la crise, comme si la population eprouvait le besoin de reparer le temps perdu." (Cours Elementaire de Statistique Administrative, page 477.)

rains of 1896 resulted in famine in the United Provinces, the Central Provinces, and Berar, and parts of Madras, Bombay, Bengal, and Punjab, Upper Burma, Rajputana, Central India and Hyderabad. Altogether an area of about 300,000 square miles with a population of nearly 70 millions was affected and, on the average, two million persons were relieved daily during the twelve months from October 1896 to September 1897; the number rose to more than 4 millions at the time of greatest distress. The loss of food crops was placed at 18 or 19 million tons. The Commission appointed to review the system on which relief was administered in this famine and to gather up its lessons came to the conclusion that "while the areas over which intense or severe distress prevailed were greater than in any previous famine, the degree of success attained in the relief of distress and the saving of human life was, if not complete, far greater than any that has yet been recorded in famines that are at all comparable with it."[1]

In 1899 the monsoon again failed, and the results were even more disastrous, for though the population affected was slightly less than in 1896-97, famine conditions prevailed over an area half as great again and with less easy means of communication, the drought was much more severe, the people had not yet recovered from the previous visitation, the mortality amongst cattle from want of fodder and water was very heavier, and the tracts which suffered most lay for the greater part in Native States, where the relief organization was necessarily less perfect than in British territory. In the height of this famine there were for weeks together over six million persons in receipt of relief, and the value of the agricultural production of the year was estimated by the Viceroy to have been 60 millions sterling below the average; there was also a loss of some millions of cattle.

170. It is impossible to say with any pretence to accuracy what was the actual mortality caused by these calamities. The Commission of 1901 thought that about a million deaths were attributable to the famine of 1899-1900 in British territory, and it would probably be safe to assume that another three millions must have occurred in the Native States, which contained more than three-fifths of the population afflicted and where the relief operations were generally far less successful. No estimate has been made of the excess mortality in 1896-97 but it cannot have been much less than a million. The total mortality due to the two famine mays therefore, be taken roughly at five millions. The diminished vitality of the people resulted also in heavy fall in the birth-rate, but this was to some extent counterbalanced by an unusually high rate of reproduction when the people had recovered their normal condition.

(ii) *Plague*

171. Excluding a small tract in the Himalayas where it has long been endemic, bubonic plague made its first appearance in India in modern times in Bombay City in September 1896 and after spreading over the Western Presidency, notwithstanding the measures taken to prevent its dissemination, gradually extended its revages to other parts of India. By the date of the census the recorded mortality was nearly half a million, to which Bombay contributed seven-tenths and Bengal two-thirds of the remainder; Mysore with 35,731 reported deaths had suffered heavily in proportion to its poulation and so too had Baroda and Hyderabad. The extent to which the actual number of deaths exceeded that reported is uncertain, but it is known that the

difference was very considerable and it may be assumed that the true mortality from plague was not less than three-quarters of a million and may possibly have been a millon.

**Their effect smaller than might have been expected**

172. In a period which has witnessed the two greatest famines of the century and the appearance of a new and deadly disease, the wonder is, not that the pace at which the population has grown is less than it was during the previous ten years, when the rate of progress was more rapid than usual, but that there should have been any increment at all. In ancient times the occurrence of a severe famine was marked by the disappearance of a third or a fourth of the population of the area afflicted, and the fact that in British India the famines of 1896-97 and 1899-1900 should have resulted in an excess mortality in those years of only 15 and 30 per mille respectively is a remarkable proof of the efficiency of the relief operations.*

**Conditions making for progress**

*(i) Railways*

173. In other respects the past decade has been one of great progress. The railways open in 1890-91 had an aggregate length of 17,000 miles, which in 1900-01 had grown to 25,000, an increase of more than 50 per cent. The advantages of these improved communications and of the facilities which they afford to trade and migration are most marked in times of scarcity. It has been proved by recent experience that, even in years of severe famine, India has ample supplies of food, in areas beyond the afflicted zone, to support the whole population, and the extension of railway communication has now made it possible to carry it to the tracts where the crops have failed. During the twelve months ending 30th September 1900 food grains and pulses to the extent of nearly 72 million maunds were imported by the affected provinces (other than the Punjab), which in ordinary years export about 7 million maunds, and prices never rose to the extreme height common in former periods of scarcity. But for the railways it would have been impossible to effect these vast movements of grain, which, be it observed, were brought about entirely by the ordinary business agency of the country without any special assistance from Government.**

*(ii) Irrigation*

174. Great strides have been made of late years in the development of the State system of canals for irrigation purposes, and in 1901, 43,000 miles of canals were in operation, compared with only 9,000 ten years previously. The total irrigated area in British India now averages 30 millon acres, of which about one-half is watered by irrigation works owned or controlled by the State. The great benefit conferred by these works was clearly shown in

*In a few of the smaller and more backward Native States the famine of 1899-1900 caused a terrible loss of population but, as a general rule, even in Native States, the administration of relief was far more efficient and effectual than it had ever been before. A brief account of some of the famines which occurred before the advent of the British and of their disastrous consequences will be found in Chapter III of Mr. C. W. McMiun's little book on "Famine Truths, Half Truths, Untruths."

**The importance of good communication as a means of mitigating the suffering caused by famine is well illustrated by the history of the Orissa Famine of 1865-66 when ships laden with grain were prevented by the winds of the south-west monsoon from leaving the port of Calcutta, and it was impossible to supply food to the starving people until hundreds of thousands had died.

the famine years, especially in the Punjab, where the crops raised from the irrigated fields of the Chenab Colony were of the greatest use in meeting the demand for food in other parts of that Province.*

*(iii) Development of coal mines, etc*

175. The persons mainly affected by famine are the landless labourers; the actual cultivators usually have sufficient food stocks or savings to enable them to tide over bad times, but the labouring classes live from hand to mouth and, on the advent of famine, are deprived at once of the means of employment on which they chiefly depend. Not only is there less field work to be done, but what little there is, is done by the land occupants themselves. The most effective remedy, therefore, lies in the opening out of other means of livelihood, and great strides have been made in this direction during the past ten years. The expansion of the railway system above described has caused an increase in the number of natives employed in connection with it from 248 to 357 thousand. The coal mines of Bengal have shown a remarkable development, and in 1901 the out-put of coal was 5½ million tons, or more than three times the quantity won in 1891; the production in other parts of India, which now exceeds a million tons, has nearly doubled during the same period. The average number of labourers employed daily in the coal mines has risen from 35,000 to 95,000. The quantity of petroleum extracted (almost wholly in Burma) exceeded 50 million gallons in 1901 compared with barely one-eighth of that quantity ten years previously. The value of gold taken from the Mysore Mines has risen from one to three crores of rupees. The production of manganese ore in Madras, of tin in Burma, and of mica in Bengal and Madras has also increased considerably.

*(iv) Growth of factories and mills*

176. The development of the coal mines has provided the country with an abundant supply of cheap fuel and has greatly encouraged all kinds of industrial activity. The jute mills of Bengal number 34 against 25 in 1891 and the number of their employees has grown from 61 to 110 thousand; there are also 168 jute presses employing 21,000 persons compared with 33 employing 8,000 persons in 1891. The number of cotton mills in Bombay has risen from 89 to 138 and that of the labourers engaged in them from 78 to 107 thousand. The jute industry is still a monopoly of Bengal, but rivals to the cotton mills of Bombay are springing into existence in many places. In respect of other industries the development, though less marked, has been very considerable, and cotton ginning and pressing mills, iron and brass foundries, paper mills, oil mills, potteries, sugar factories and tanneries are rapidly growing in numbers and importance in different parts of the country. During the decennium the foreign trade of India by sea has risen in value from 1,956 to 2,547 millions of rupees the coasting trade from 778 to 948 millions, and the foreign trade by land from 83 to 136 millions. Joint stock companies have risen in number from 950 to 1,366, and their paid up capital, has increased from 266 to 330 millions of rupees. Every thing seems to the fact that India has entered upon an era of great industrial development

*An account of the advantages derived from irrigation in the famine of 1896-97 and of the progress made in developing of the State system of irrigation during the previous 20 years will be found in the "Narrative of the Famine in India" by Mr. T. W. Holderness, paragraphs 103 to 111.

and if so, not only may a marked improvement in the material condition of the poorer classes be looked for, but the danger of loss of life, in the event of crop failure, will in future be very greatly diminished. The demand for labour in Calcutta and other great industrial centres already far exceeds the supply and one of the problems of the immediate future is the devising of means whereby the employers may be brought into touch with the classes who would benefit most by taking to the new means of livelihood created by British capital.

(v) *Cultivation of special products*

177. The cultivation of coffee and indigo has received a check and that area under these crops is less than it was ten years ago. The area under tea on the other hand, has risen from 345 to 525 thousand acres and the number of tea-garden coolies has risen in still greater proportion, the total number employed in 1900 was 719,000. In Bengal the profitable jute plant is replacing other less remunerative crops and the area devoted to its cultivation in 1900 was reported to be 2¾ million acres, or more by 50 per cent. than it was ten years previously. The crop statistics of Bengal, especially those of earlier years, are very unreliable, but it is a matter of general observation that the cultivation of jute is spreading in all directions.

(vi) *Probable improvement in public health.*

178. It is impossible in the present state of the vital statistics, which have only recently attained a fair degree of accuracy, to draw from them any conclusions as to variations in the death-rate, and whatever opinion may be formed on this subject must be based solely on a prior grounds. In all the larger towns the water-supply and sanitary arrangements have been greatly improved. Much has been done in the smaller towns also, and even in the villages. Great care is taken to guard against epidemic disease at the fairs and festivals where the people assemble in large numbers, and in most cases they can now reach them by rail and thus ecsape the horrors which attended the old journey by road, while they no longer disseminate disease in the villages along their line of march. When cholera breaks out, efforts are made to eradicate it by the disinfection of wells and other sources of water-supply. The protection of the people from smallpox by means of vaccination is making steady progress. Where the public health is found to be suffering from obstructed drainage, efforts are made to remove the defect, and numerous artificial drainage channels have been cut during the last few years, chiefly in Upper India. Lastly the number of dispensaries established by Government and local bodies is rapidly increasing and medical aid is thus being brought nearer to the people. It would seem that these and other measures cannot fail to have a marked effect, and that, apart from plague and the obscure fever epidemics, such as the "Burdwan fever" or the "Kala-azar" of Assam which break out from time to time, the general health of the people must be steadily improvinng..

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*Although not specially liable to epidemic disease, the whole of the sub-Himalayan region from the Punjab to Assam is, and has long been, very unhealthy and the population generally decadent in spite of the existence of large areas of waste land fit for cultivation. Climate is still a more important factor than density in determining the growth or decay of the population.

**The Outlook for the future**

179. With all these causes making for progress, the present outlook is a hopeful one, and unless famine should again supervene, there is every prospect of a steady growth of prosperity which is likely to bear fruit in an accelerated rate of increase of the population during the next few years.

It may be said that India has already more inhabitants than it can support, but this is not really the case. It will be seen from subsidiary table III of the last chapter, in which the unit is the district or state, that a fifth of the total population of the country is congregated on less than a twentieth of the area, where there are more than 600 persons to the square mile, a quarter more on a twelfth of the area, carrying from 400 to 600 per square mile, and nearly a fifth on an eighth of the area with a density between 200 and 400. Taking these figures together we find that nearly two-thirds of the total population of India occupy only a quarter of the whole area, while the remaining one-third is scattered over three-quarters of the area, which is still very sparsely inhabited and nowhere contains as many as 200 persons to the square mile.

There are no doubt certain localities, chiefly in parts of Bihar and in the east of the United Provinces, where the pressure on the soil is already felt, but it is believed that with more scientific farming the present produce of the soil might be greatly increased, in which case not only would the dearth of land now felt disappear, but room would be made for an even greater population. There are, moreover, many tracts where, even under present conditions, there is ample room for expansion. There seems to be no reason why Burma as a whole should not support a population at least half as dense as that of Bengal, with its extensive areas of hill and ravine in the Chota Nagpur plateau and elsewhere, in which case its inhabitants would number nearly 60 millions in the place of the 10½ millions it now contains. The waste lands of Assam are crying aloud for colonists and even in densely populated Bengal there are extensive areas still awaiting reclamation.* Lastly, many tracts which are now barren and inhospitable and support only a scanty population can be made productive by means of an artificial supply of water. Parts of South Bihar that were very sparsely inhabited only twenty-five years ago now carry a fairly dense population, owing to the construction, by the people themselves, of reservoirs and water channels which have enabled them to substitute rice for scantier and more precarious crops. We have already seen how the sandy desert between the Sutlej and the Chenab has been transformed in a few short years into valuable corn fields. But what has yet been done is perhaps only a small instalment of that which the future has in store. There is enough water in the rivers of India, now running useless to the sea, to render fit for the plough many millions of acres at present barren and uncultivable. The great desert in the west of Rajputana has barely five inhabitants to the square mile, but there is evidence that it was well-peopled in ancient times, before the rivers that once flowed through it took another course, and it seems not impossible that some scheme of irrigation, bolder than any yet devised, may restore its lost fertility.

*Such as the Barind, the Madhupur jungle, the Sundarbans, the Western Duars, etc.

180. Overcrowding, moreover, is a purely relative term, and mere density of population means but little unless it is correlated with the degree of productiveness of the soil. There is probably no part of India where the people are more prosperous than they are in Eastern Bengal, but although more than three-quarters of the inhabitants of this tract are depended on agriculture, the density is unsually great, rising to 952 persons per square mile in the Dacca district and to 848 in Tippera; the population moreover is still growing very rapidly, the increase since 1872 in the two districts named being 45 and 51 per cent respectively.*

It has shown in the case of Bengal that, with a few exceptions for which there are special reasons, the absolute growth of the population is greater in the thickly populated tracts than it is in those which are more sparsely inhabited and it will be seen from subsidiary table No. IV at the end of this chapter that the same appears to be the case generally. The figures in this table are less conclusive than those in the Bengal Report, which are based upon the statistics for police circles, as the district has been taken as the unit, and a district covers so large an area that the mean density is often the outcome of very divergent proportions in the smaller administrative units of which it is composed. The main result, however, remains the same, and the greatest growth of the population has occurred in districts which in 1891 had already a density of 500 to 600 persons per square mile; the next greatest increment is recorded for districts with from 600 to 700; then follow in order the districts with a population in 1891 of less than 100, 200 to 300, 300 to 400, 400 to 500, and 700 and over, while at the bottom of the list are those with a population of 100 to 200**. The advantage held by tracts with a comparatively dense population would be even more marked if we excluded Burma, the circumstances of which are exceptional, and the Punjab, where the growth of the Chenab colony has disturbed the figures. Elsewhere the more thinly inhabited tracts show a net decrease since 1891. It must, however, be remembered that these are the areas that suffered most from the famines and at the next census a relatively rapid rate of growth may be looked for in the areas in this category.

The population of India has been kept down in the past by war, famine and pestilence. The fear of war has been removed by the establishment of the *Pax Britanica*. Famine also is no longer the terrible scourge that it was in days gone by, and reasons have been given for hoping that its visitations will have a constantly diminishing effect. It is only in the case of pestilence that the prospect is gloomy. Plague is still spreading over the land and is taking a yearly increasing toll. How long it will continue to gain ground, or when it will disappear, it is impossible to predict, but this much seems certain that it will be a factor to be taken serious count of when the time comes for reviewing the results of the next census.

*It is curious to notice that Dr. Voleeker, in his book on the improvement of Indian Agriculture, mentions Dacca as a place where native agricultural methods are indifferent and susceptible of improvement, while he instances Gujarat as a tract where existing methods cannot well be ameliorated. Both Dacca and Gujarat have in alluvial soil, but while the former supports with ease nearly a thousand persons to the square mile, Gujarat with barely quarter of that number is impoverished.

**This result differs from that arrived at in 1891 but on that occasion the true rates of increase were obscured by the gains derived from the greater accuracy of the enumeration. These were largest in the more sparsely inhabited tracts where the deficiencies in the Census of 1881 were most marked.

## CENSUS OF INDIA 1911

### CHAPTER II

### MOVEMENT OF POPULATION

**Introductory remarks**

85. In the last chapter the distribution of the population as it stood on the 10th March 1911 has been examined and endevour made to explain its varying density in different parts of the country and the manner in which it is apportioned between towns and villages. In the present chapter the statistics will be regarded in their dynamical aspect; the results of the recent census will be compared with those of previous enumerations and the causes of the variations which are thus disclosed will be investigated. The raw material for this discussion will be found in Imperial Table II. In the Subsidiary Tables at the end of this Chapter it is worked up in various ways in order to bring out more clearly the most important features of the changes which have taken place.

As stated in the Introduction, the first general census was taken in the year 1872 and the second in 1881; and since then enumerations have been effected every ten years. The variations disclosed at the successive enumerations upto 1901 have been fully examined in the previous Census Reports. It is unnecessary to repeat at length what has already been said, and the discussion will here be directed mainly to an examination of the changes which have taken place since 1901.

| Census of | population | Variation percent 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 |

86. According to the census returns the total population of India has increased by 7.1 per cent, during the last decade and by 52.9 per cent since 1872, but the real gain since the latter date is very much less than this. Large tracts of country including the Central India and Rajputana Agencies, Hyderabad and the Punjab States, which had been omitted from the returns



8—1 R. G. India/72

or 1872, were included in those for 1881. In 1891 the greater part of Upper Burma and Kashmir and several smaller units were enumerated for the first time. In 1901 the most important additions were a portion of upper Burma and the greater part of Baluchistan. In 1911 the Agencies and Tribal Areas in the North-West Frontier Province together with a few smaller areas were included within the scope of the operations.

Apart from the additions due to the enumeration of new areas, which as can be definitely ascertained, there has been a further, but less easily recognisable, gain resulting from the relatively greater accuracy of the later enumerations. It is known that in many places the Census of 1872 was very imperfect, while even in 1881, though a very great improvement was effected, tnere were still numerous omissions. Since then a high standard of accuracy has been obtained and although improvements have still been effected at each succeeding census, they have had comparatively little effect when considered from the point of view of the total population. There is no doubt that the arrangements now made for the enumeration of travellers both by land and water are far more efficient than they were even in 1891. There has also been a great improvement since then in the accuracy of the census in backward tracts, such as tne States of the Central Provinces. This accounts in part for the extraordinarily large proportional increases in these and similar areas. Their total population, however, is so small that the gain from this cause becomes negligible when the population of India as a whole is considered. Sometimes, moreover, as in Baluchistan, greater accuracy has resulted, not in a gain, but in a loss. It is unnecessary to go more fully into this question as it was discussed in the last Census Report. The general result is exhibited in the statement given below, from which it will be seen that the real increase

| Period | Increase due to | | Real increase of popu. Millions | Total Millions | Rate per cent of real increase |
|---|---|---|---|---|---|
| | Inclusion of new areas Millions | Improvement of method Millions | | | |
| 1872—81 . . . | 33.0 | 12.0 | 3·0 | 48·0 | 1·5 |
| 1881—91 . . . | 5.7 | 3·5 | 24.3 | 33.5 | 9·6 |
| 1891—01 . . . | 2.7 | ·2 | 4.1 | 7·0 | 1·4 |
| 1901—11 . . . | 1·8 | .. | 18.7 | 20.5 | 6.4 |
| TOTAL . | 43.2 | 15.7 | 50.1 | 109.0 | 19.0 |

in the population in the last 39 years is estimated at about 50 millions, on 19 per cent. Tnis is less than half the increase which has taken place during the same period amongst the Teutonic nations of Europe, but it considerably exceeds that of the Latin Nations. In France the population has grown by less than 7 per cent since 1870, but this is because of its exceptionally low birth-rate. In India the birth rate is far higner than in any European country, and it is the heavy mortality, especially amogst infants, which checks the

NOTE.—Part of the real increase has of course occurred in the new areas shown in column 2 of the statement.

rate of increase. This subject will be dealt with more fully in a subsequent paragrah. Meanwhile it may be noted that, if the population were to continue to grow at the same rate as it has done since 1872, it would double itself in about a century and a half.

**Effect of migration on the growth of population**

87. We may first however, enumerate the various factors which determine the growth of population and pass briefly in review the conditions in respect of them which have prevailed during the decade. One of the most obvious of these factors is migration. If the number of immigrants exceeds that of the emigrants the natural growth of population will of course be artificially augmented, while the reverse is the case when emigrants are in excess. It is in the smaller units, such as districts, that the effect of migration is most marked; and we shall see further on that, even in the case of provinces, this factor is often of considerable importance. In India as a whole, however, it counts for very little. Table XI shows that the number of immigrants into India from other countries was about 627,000 in 1901 and 650,000 in 1911. It is less easy to ascertain the number of emigrants. We know from the Census returns for Great Britain and the Colonies that the total number of persons there enumerated who were born in India was about 915,000 in 1901 and 10,23,000 in 1911, but we have no information regarding the emigration to adjoining countries in Asia, including Afghanistan, Nepal, Bhutan and China. There is, however, no reason to suppose that its volume has varied much during the last ten years. In the Report for 1901 the total number of emigrants to these adjoining countries was estimated roughly at 208,000. If we assure that the number is still the same we get 581,000 as the net excess of emigration over immigration in India at the present census, as compared with 496,000 ten years ago. The adverse balance thus shows an increase of 85,000 during the decade. This is too small to be worth consideration when dealing with a variation of more than twenty millions.

The other aspects of the movements to and from India will be considered in the next Chapter.

**Other factors which determines the growth of population**

88. Apart from migration the growth of the population is determined by the relation which exists between the birth and death rates; and this again depends partly on the racial characteristics and social practices of the people and partly on external conditions, such as their material well-being and the state of the public health. It is difficult to distinguish between the influence of race and that of social customs. Some races undoubtedly have a greater fecundity and longevity than others, but it is impossible to say how far these characteristics are inherent and how far they are the outcome of their customs and environment. In India the birth-rate is every where much nigher than in Europe, but this is due largely to the universality of marriage. It is higher amongst Muhammadans and Animists than amongst Hindus, but this is because the Hindus have a much larger proportion of widows at the child bearing ages. The high birth-rate again is largely discounted by a heavy

mortality, especially amongst infants and women at child-birth. This aspect of the subject will beconsidered more fully in the chapters on age and sex. It will suffice to say here that social practices change but slowly, and that the periodic fluctuations in the rate at which the population is growing depend almost entirely on the second set of factors, namely, those affecting the material condition of the people and the state of the public health, which we shall now proceed to discuss.

**Famine**

89. In a country like India, where more than two thirds of the inhabitants are dependent on agriculture the state of the harvests is of primary importance. When the crops are good the people are prosperous, but when they fail famine supervenes. All agricultural countries are liable to the scourge and India is peculiarly so, owing partly to the variability of its rainfall and partly to the way in which the soil is parcelled out amongst petty farmers, who have no capital and no organised system of credit, and whose millions of field labourers are at once thrown out of work when the crops fail. In former times the effects of famine were far more serious than they are at the present day. There was no organised system of State relief; and in the absence of railways, even local crop failure meant starvation to many. All this has now been changed. A watchful eye is kept on the state of the crops, the course of prices and the returns of births and deaths. Programmes of relief works have been prepared and are carefully kept up to date, and all necessary arrangements have been made for commencing relief operations the moment they are needed. But even so, there are many obstacles in the way of complete success, especially in the Native States, where the preliminary organization is less complete than in British territory; and whenever a severe famine occurs its effect is immediately seen in a diminished birth-rate and a high mortality. In British territory, at least, the mortality is rarely due to actual starvation, but rather to diseases brought on by improper food and epidemics of cholera, which frequently attack the crowded relief camps. The influence of famine will be repeatedly referred to in the discussion of the growth of the population in individual Provinces and States. We shall see how the famine of 1877 reduced the population of Mysore and Madras and how those of 1897 and 1900 caused heavy losses in the Central Provinces and Berar, Rajputana, Central India and Bombay. We shall also see that the immediate effect of these visitations soon disappears. The persons who die are those at the extremes of life, the very old and the very young many of whom would in any case have died during the next few years. The number of persons in the prime of life is but little affected. Also, after a period of suspended activity, the reproductive powers of the people reassert themselves. For some years after a famine births are thus more numerous than usual and there is an abnormally low death-rate. The result is an unusually rapid growth of population. Thus in the decade 1881-91 which followed on the great south India famine of 1877, Madras had an increase of 15.7 and Mysore of 18.1 per cent and after the famines of 1897 and 1900 the Central Provinces and Berar gained 17.9 per cent, in the decade 1901-11. That the rebound was not equally great in Bombay and Rajputana is due to a continuance of adverse conditions as will be explained below.

**State of crops in decade 1901-1910**

90. The decade preceding the census of 1911 was free from widespread famines such as those of the preceding ten years. In 1907 there was a partial failure of the monsoon which was felt over a wide area, extending from Bihar to the Punjab and Bombay, and caused actual famine in the United Provinces and in a few districts elsewhere. In several other years the crops suffered locally to a varying extent from want of rain or, occasionally, from an excess of it. Prices ruled high in most years, but this, though it pressed hard on the poorer sections of the non-agricultural population was beneficial to the cultivators and did no great harm to the landless labourers, whose wages, when not paid in kind, rose in much the same proportion. There has been an extension of the area under special crops, such as jute and cotton, which are more profitable to the cultivators than foodgrains. The period was certainly not so favourable as that ending in 1891, but in India as a whole it may be regarded as one of moderate agricultural prosperity.

**The state of the public health**

91. India is peculiarly liable to fatal epidemics. From time to time cholera breaks out with great virulance and small-pox also at times causes a very heavy mortality. Until recently, however, the greatest harm has been done by epidemic fevers, such as the Burdwan fever epidemic which devasted West and Central Bengal a third of the century ago and *Kala azar* which more recently brought such havoc in the Brahmaputra valley. In the decade which has just ended epidemics of malarial fever decimated the irrigated tracts of the Eastern and Cental Punjab and the Ganges-Jammua Doab in the United Provinces, where in 1908 alone the reported mortality from "fevers" was nearly two millions. On the whole, however, the decade might perhaps have been regarded as an average one from the point of view of the public health, had it not been for the revages of plague, from which India had been practically free in recent times, until it broke out in Bombay in 1896. Spreading from that City it had already by March 1901 caused recorded mortality of about half a million. Since then it has continued its revages, especially in Bombay and Upper India. The mortality from it rose from about a quarter of a million in 1901 to 1.3 millions in 1907. It fell below a quarter of a million in each of the next two years, but in 1910 it exceeded half a million. The total number of deaths from plague during the decade was nearly 6.5 millions of which over one-third occurred in the Punjab and two-fifths in the United Provinces and Bombay taken together. The disease fortunately has failed to establish itself in Bengal, Assam and on the East Coast and in the extreme south of the peninsula. This moreover is only the recorded mortality. As is well-known, when epidemics are raging, the reporting agency breaks down and a large number of deaths escape registration. The omissions are most numerous in the Native States, where registration is usually far less accurate than in British Territory. A peculiarity of plague which has been noticed and explained elsewhere is that, in Northern India at least, it attacks women more than men, and people in the prime of life more than young and old. Consequently its after effects must shortly become apparent in a diminished birth rate in the tracts most seriously affected.

If it be accepted that the mortality of the decade apart from plague was normal, it follows that, but for this disease, the population at the census of 1911 would have been greater than it was by at least 6.5 millions. In other words the population would have increased by 9.3 instead of 7.1 per cent.

**Irrigation**

92. Great progress continues to be made with the extension of irrigation facilities. The total area actually irrigated in 1910-11 was 22.5 million acres (this was about half the area "commanded") against 18.9 million acres at the commencement of the decade. The total capital expenditure on Government irrigation works classed as productive, which in 1910-11 yielded a return of more than 8 per cent, now exceeds 42 crores of rupees as compared with 34.5 crores in 1900-01, and that on protective works has risen during the same period from 2 to 4 crores. Even more rapid progress may be expected in the near future. The great Tripal Canal Project in the Punjab, which is nearing completion at a cost of more than ten crores of rupees, is designed to irrigate two million acres in the Chej, Rechana and Bai Doabs. A still more ambitious scheme is the proposed Kistna reservoir in Madras which is expected to cost 8.5 crores, and to have a capacity double that of the enlarged Assuan dam. Various other large schemes are in contemplation, and some of them have already been sanctioned.

**Progress of trade and industry**

93. Although Indian trades and indutries are still in their infancy, as compared with those of Western countries, rapid progress has been made in recent years, and especially, so during the last decade. The estimated value of the imports of merchandise from foreign countries rose from 53 crores of rupees in 1880-81 to 81 crores in 1900-01 and to 134 crores in 1910-11. The exports of merchandise were valued at 75 crors in 1880-81, at 108 crores in 1900-01 and at 210 crores in 1910-11. During the first mentioned period of twenty years the growth in the value of imports was 52 per cent, and it was 65 per cent during the ensuing period of ten years. The corresponding increases in exports were 44 and 95 per cent respectively. Since 1900-01 the value of the imports of metals, machinery and railway materials has risen by 100 and that of cotton, including piece goods, by 50 per cent. In 1880-81 there were in the whole of India only 58 cotton mills employing 48 thousand operatives. By 1910-11 the number of mills had risen to 250 and that of their employees to 231 thousand. During the same period the number of jute mills from 21 to 58, and the number of persons employed in them from 35 to 216 thousand. The Burma Oil Industry has made great strides. There has been a remarkable expansion of railway and engineering workshops, arms and ammunition factories and the like. The most notable and promising of recent developments is the establishment of Tata's Iron and Steel Works at Sakchi which, with its imitators when they come, may be expected to make India self-supporting in the matter of rails and girders. In 1880-81 the total production of coal was barely one million tons; but in 1910-11 it exceeded 12 millions. The expansion of these and other industries is not only a benefit to the country as a whole, but is also of great use in opening out fresh avenues of employment for the sawarm of landless labourers who formerly

were dependent solely on agricultural labour for their subsistence. Another way in which the growth of the material prosperity in recent years can be gauged is by the rate at which the precious metals are being absorbed. The value of the net imports of gold and silver in 1880-81 was respectively 3.7 and 5.3 crores. In 1900-01 it was 11.19 and 12.7 crores, and in 1910—11 27.9 and 11.8 crores. The net imports of gold showed a further rise of 50 per cent in 1911—12.

**Improvement in communications by rail**

94. The improvement in railway communications since 1880 has been very great. In that year the number of miles open to traffic was less than 9,000; since then there has been an addition of roughly 8,000 miles in each successive decade; and by the end of 1910 the total mileage exceeded 32,000. The traffic has increased even more rapidly. In 1910 over 371 million passengers and 66 million tons of goods were carried, as compared with 49 and 10 millions respectively in 1881. The net earnings of the State and guaranteed railways in 1910 represented 5½ per cent on the capital outlay.

## GENERAL SUMMARY

**Summary**

130. Having passed review the changes which have occurred during the decade in the individual Provinces and States, we are now in a position to focus the main results for the Empire as a whole. We have already seen (Paragraph 86) that, after allowing for additions due to the inclusion of new areas and more accurate enumeration, the net increase of population during the ten years ending in March 1911 was 6·4 per cent as compared with 1·4, 9·6 and 1·5 per cent respectively in the three preceding intercensal periods. There are, moreover, great local, as well as periodic, variations in the rate of growth. The general average for India as a whole is the resultant of very different figures for various parts of the Empire. The changes which have taken place in the main provinces in each of the last four decades are shown in the accompanying diagram.

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2350 *REFERENCES*

3002

Assam

Bengal

2200

Bihar & Orissa

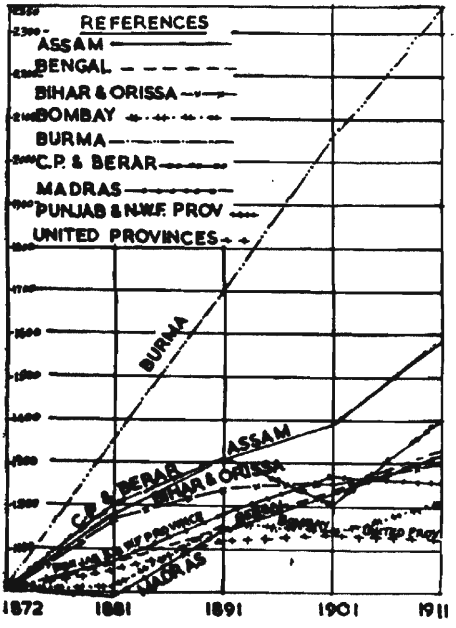
2100 Bombay

Burma

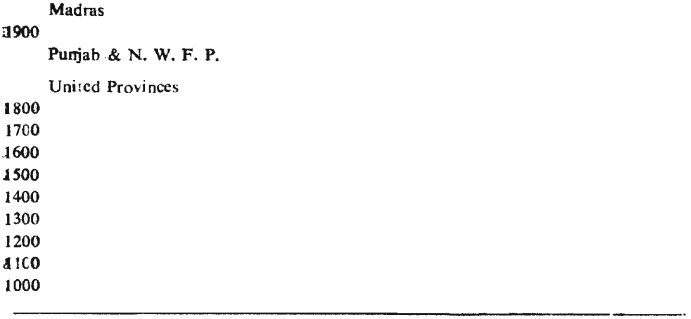
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C. P. & Berar

Diagram showing the variation since 1872 per 1,000 of the population in the main provinces




Note.—The proportions relate to British territory only and in Burma to Lower Burma only




NOTE.- The proportions relate to British territory only and in Burma to Lower Burma only.

The most noticeable feature is the continuous rapid growth in Burma. Lower Burma has grown by 135 per cent since 1872 and the whole Province including Upper Burma, which was annexed in 1886, by 37 per cent.* since 1891. In Assam including Manipur the increase since 1872 amounts to 70 and in the Central Provinces and Berar to 47 per cent. In the other main provinces the rate of growth has been much slower. In some provinces, such as Burma, Assam and Bengal there has been continuous progress but others, at some time or another, have sustained a set-back. In the largest provinces at least, the internal variations are also frequently considerable. In Bengal one district has at the present time a smaller population than it had in 1872, while four others have more than doubled their population since that date.

In British territory there has been a gain of 9·1 per cent over about nine-tenths of the area, with three-quarters of the total population, and a loss of 5·3 per cent in the remaining one-tenth of the area and one-fourth of the population. The contrast in different of the Native States is still more striking. The net increase of 10·3 per cent is the outcome of a gain of 14·3 per cent in four-fifths of the total area and poulation, completely with a loss of 6·2 per cent elsewhere. The relatively greater net increase in the Native States as compared with British territory is explained by the fact that many of tne States suffered severely from famine in the previous decade when they sustained a net loss of 5 per cent, while British territory gained 4·7 per cent. As we have already seen the recovery from famine losses is usually very rapid. Apart from this, in ordinary circumstances, a comparatively high rate of increase is to be expected in the Native States as they are, on the whole, more undeveloped than British territory, and contain a much larger proportion of cultivable waste land. It will be seen from Subsidiary Table VI that if the district be taken as the unit, the net increase in India as a whole during the last decade in the resultant of a gain of 10·3 per cent in an area of 1,517,000 square miles

*Exclusive of the specially Administered Territories which were not enumerated in 1891.

with a population of 245 millions and a present density of 162 to the square mile, and a loss of 5·5 per cent in an area of 218,000 square miles with a population of 68 millions and density of 312 to the square mile.

**Variations in relation to density**

131. In Subsidiary Table V the variations in the population which have taken place in the minor administrative units (tahsils, taluks or thanas) are co-ordinated with their density. Half the net increase in the population has occurred in tahsils which in 1901 had less than 150 inhabitants to the square mile and almost the whole of it in those with less than 450. Those with a greater density than this had a net increase of less than half a million, the gains in three of the higher density groups being largely counter-balanced by losses in the other towns. The losses in these groups were exceptional and were due entirely to the epidemics of plague and malarial fevers which raged during the decade in some of the most prosperous districts of the United Provinces. But even so it is clear that in India as a whole the rate of increase tends to vary inversely with the existing density of the population. There are of course local exceptions to this rule, *e.g.*, in Bengal, where some of the most thickly peopled districts are growing more rapidly than others with a relatively sparse population. Dacca with 952 persons to the square mile in 1901 has since added 12 per cent to its population and Tippera with 848 nearly 15 per cent.

**Comparison of Census results with vital statistics**

132. If the registration of births and deaths were accurate it would be easy at any time to ascertain the population of a given tract, except in so far as it is affected by migration, by adding to the population ascertained at the previous census the number of births since recorded and deducting from it the number of deaths. In order to elucidate this point have shown in Subsidiary Table IV the number of births and deaths recorded during the decade 1901-10, the birth and death rates per mile and the net excess of births over deaths. This excess is collated with the variations disclosed by the census of 1911 in the actual, and also in the natural population. The figures for the natural population are not in all cases quite accurate, as it has sometimes been difficult to make allowance for the areas in which vital statistics are not at present registered. In the main British provinces the vital statistics for the decade show an excess of 9·4 million births over deaths whereas the census shows that the actual increase in the population was 12·1 millions. The census figures show an excess over the vital statistics in all Provinces except the United Provinces where if the vital statistics were correct, there should have been an increase of a million in the population instead of a decrease of more than half that amount, and Bihar and Orissa, where the vital statistics indicate an increase of 1·9 millions, against an increase according to the census of 1·8 millions in the natural population. The two figures in the latter case correspond very closely. Elsewhere the nearest approximation between the two sets of statistics is in the Central Provinces and Berar, where the excess of reported births over deaths was 1·6 millions against a census increase in the natural population of 1·9 millions, and Madras, where the figures are 2·8 and 3·2 millions respectively. It is unnecessary to examine the figures.

in greater detail. Enough has been said to show that we cannot at present rely on the vital statistics for accurate inter-censal estimates of the population. At the same time, except in the case of severe epidemics when the reporting agency breaks down, the degree of error may be assumed to be fairly constant, and the periodic variations in the returns may be relied on as reflecting the real changes in the number of births and deaths.

The imperfection of the recorded vital statistics is not be wondered at when we remember the weakness of the reporting agency. In this connection Mr. Blunt writes as follows :—

"In rural circles, the reporting agency is the chaukidar, a low paid, totally illiterate person, who brings his record of births and deaths (which is written up by the patwari or other literate person in the village to the than a with him when he visits it. He is frequently away from his circle on duty, assisting the Police, mounting gaurd at camps, or giving evidence in courts ; and it is obvious that errors from omission in such cases must frequently occur. He is assited occasionally by the village headman or chief landlord, if these happen to be persons with some small amount of public spirit ; but it is clearly quite possible that births and deaths (especially deaths in the ourse of epidemics) may escape his notice altogether. His powers of judging of the causes of death are not particularly great ; and unless it is a well known and easily distinguishable disease, his diagonsis of a death is not reliable. Apart from deaths due to injury or accident, his knowledge of diseases is limited to small-pox cholera, plague and fever ; everything which is not a case of one of the first three, and a good many cases that are, go down under fever. For our present purposes, however, this is less important then the completeness of this record.

In this decade there have been reasons why his records should be less complete than usual. When plauge was ragings (especially in the early years of plague when it was for more feared than it is now), the chaukidar may well have shirked his duties to some extent. Even if he did not, with death succeeding death in rapid succession, he may very well have failed to find out on his return all the cases that had occurred during one of his frequent absences from his circle. The same, though in less degree, applies to the malaria epidemic of 1908. During famine he was wanted for various other duties and was apt to neglect his duties in respect of vital statistics ; for famine disorganizes most things; and lastly plague and malaria spared him no more than any one else, and registration was disorganised because of the illness of death of the reporting chaukidar. We might reasonably expect that though registration tends, normally, to improve with time, the calamities of the decade should have greatly retarded that improvement or even caused retrogression. Further, since plague and malaria were the chief ultimate causes which would prevent him in some way or another from properly discharging his duties, and since they caused far more loss among women than men, we might also expect that the omissions in the vital record would be rather of deaths than births, and rather of female than male deaths.

In towns matters are different, and it can be asserted with some confidence that registration there is more satisfactory. The head of the house, the policeman of the beat, the sweeper employed in the house, one or all have to report the birth or death. Moreover the agency is far better educated, in some places (Meerut for instance) the causes of death are all tested by a medical man ; and generally speaking, it is probable that little fault can be found with urban vital statistics in any respect."

The wonder is not that the returns are still incomplete but that they are as good as they are. In some provinces the number of omissions is now extremely small. In the Central Provinces and Berar, for example, the births actually reported during the decade represent 49·6 per mile of the population of 1901. The actuary who examined the age statistics did not deal with the Central Provinces and Berar but his estimates of the actual birth-rates elsewhere ranged from 41·0 in Bombay to 46·7 in Bengal.

In this connection it may be mentioned that the statistics compiled by a special staff maintained for three years in a small area in Bengal showed a total of 4,607 births and 6,910 deaths against 4,690 and 6,917 respectively returned by the ordinary reporting agency. The excess of 20 births in the ordinary returns was the net result of the inclusion of two cases of abortion, 26 of still-births, and three of double registration, and the failure to report 11 births. The excess of seven deaths was due to the erroneous inclusion of three cases of abortion, 23 of still-births and one death occuring outside the period of enquiry on the one hand, and the omission of 20 deaths on the other. The actual excess of deaths over births differed only by 13 from that returned by the ordinary reporting agency. It has to be remembered, however, that the knowledge that a separate record was being prepared must have put the ordinary reporters on their mettle and made them more careful than usual.

## CHAPTER I

## Distribution and Movement of the population.

### Movement of the population

6. According to the census returns of 1921 the population of India has increased by 1·2 per cent. during the decade. The figures of previous census with the variations per cent are given in the following table:—

| Census of | Population | Variation per cent since previous census |
|---|---|---|
| 1872 . . . . | 206,152,360 | — |
| 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 |

The average increase since the census of 1872 falls at a rate of 5·5 per cent but the real gain is considerably less than this figure owing to two factors, (a) the additions of area and poulation included at each census, and (b) the progressive increase in the accuracy of the enumeration from census to census. The effect of these factors on the past figures has been discussed in previous census reports and need not be further dealt with here. It is clear that their influence must steadily decline as organized administration extends and the system and practice of enumeration improve. So far as the present census is concerned the additional area and population included amounts to 2,675 square miles and 86,533 persons respectively, while for the present purpose it may be taken that the enumeration of 1921 was, as regards numbers, as accurate but not more accurate than that of 1911. The general result, after allowing for the factors of extension and accuracy is given in the following statement.

## STATEMENT

| Period | Increase due to inclusion of new areas (millions) | Increase due to Improvement of method (millions) | Real increase of population (millions) | Total (millions) | Rate per cent. of real increase |
|---|---|---|---|---|---|
| 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 |
| TOTAL . | 41·3 | 15·7 | 53·8 | 112·8 | 20·1 |

The real increase in the population during the last 49 years is thus estimated a about fifty-four millions or 20·1 per cent. The variations in the whole of India and the main Provinces and States are exhibited in the diagram below and the diagram on pages 95 & 96.

It will be noticed that the increase in the decade was slightly greater in the British districts (1·3) than in the States (1·0), and that in the larger provinces the variations range from an increase of 5·7 per cent in the Punjab to a decrease of 3·1 per cent. in the United Provinces. The steady rate of expansion in the provinces of Assam, the Central Provinces and Burma during the last 50 years was the subject of the following remark in the report of last census :—

> "Lower Burma has grown by 135 per cent since 1872 and the whole Province including Upper Burma which was annexed in 1886, by 37 per cent since 1891. In Assam including Manipur the increase since 1872 amounts to 70 and in the Central Provinces and Berar to 47 per cent."

Assam and Burma again show comparatively high rates of increase. Immigration is an important factor in the rise in Assam but neither of these two provinces were exposed to an invasion of the influenza equal in virulence to that which wiped off the whole of the natural increase in the Central Provinces and Berar, Bihar and Orissa and Bombay and substantially reduced the population in the United Provinces, the Rajputana and Central India Agencies and the Hyderabad State. The epidemic was severe in the North-West Frontier areas and in parts of the Kashmir State. The stimulus given to agricultural prosperity in the Punjab by the large expansion of canal irrigation has done much to neturalise the effects of the high death-rate in 1918, as is shown by the rapid recovery of the birth-rate after that year. In Bengal and Madras unhealthy conditions were more localised than in the centeral and western tracts and development of population was only partially retarded, the expansion of population in the coastal districts of South India being considerable and amounting to nearly 17 per cent in the Travancore State.

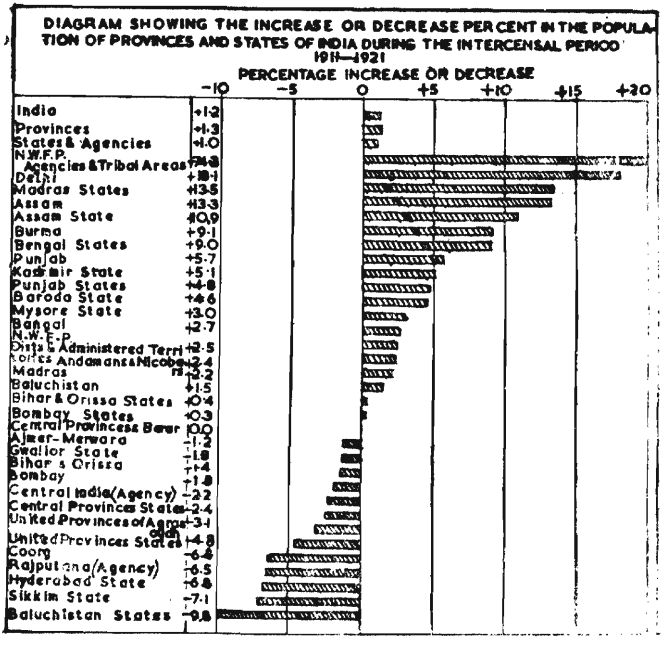

DIAGRAM SHOWING THE INCREASE OR DECREASE PER CENT IN THE POPULATION OF PROVINCES AND STATES OF INDIA DURING THE INTERCENSAL PERIOD 1911—1921
PERCENTAGE INCREASE OR DECREASE
−10
−5
0
+5
+10
+15
+20
India +1·2
Provinces +1·3
States & Agencies +1·0
N.W.F.P. +14·8
Agencies & Tribal Areas +14·8
Delhi +18·1
Madras States +13·5
Assam +13·3
Assam State +10·9
Burma +9·1
Bengal States +9·0
Punjab +5·7
Kashmir State +5·1
Punjab States +4·8
Baroda State +4·6
Mysore State +3·0
Bengal +2·7
N.W.F.P. +2·5
Dists. & Administered Terri tories Andamans & Nicobars +2·4
Madras +1·5·2
Baluchistan +1·5
Bihar & Orissa States +0·4
Bombay States +0·3
Central Provinces & Berar 0·0
Ajmer-Merwara −1·2
Gwalior State −1·8
Bihar & Orissa −1·4
Bombay −1·8
Central India (Agency) −2·2
Central Provinces States −2·4
United Provinces of Agra & Oudh −3·1
United Provinces States −4·8
Coorg −6·4
Rajputana (Agency) −6·5
Hyderabad State −6·8
Sikkim State −7·1
Baluchistan States −9·8

DIAGRAM SHOWING THE VARIATION SINCE 1872 PER 1,000 OF THE POPULATION IN THE MAIN PROVINCES

**Migration**

7. An obvious factor influencing the variation of population in any area is physical movement of people in and out of that area. So far as the whole of India is concerned, this factor is impossible to estimate exactly and in any case is not the real importance. The statistics of birth-place in Imperial Table XI give complete figures of those who were born outside and enumerated in India, but the numbers of those natives of India who, at the time of the census, were residing in Persia, Afghanistan, Nepal, China and other Asiatic countries in which no census is taken, are not known. It was shown, however, in paragraph 87 of the report of 1911 that on such figures and estimates as are available the excess of emigration over immigration in India might be placed roughly at about 581,000 persons in 1911. The number of immigrants into India from outside has decreased from 650 thousand in 1911 to 600 thousand at the present census or by about 46,000 persons. At regards emigration the excess during the decade in the number of soldiers and students who have left for foreign countries is probably more than balanced by a reduction in the emigration of labour owing the restrictions thereon while there is no reason to suppose that emigration to other Asian countries has increased. Even if the additional loss to India during the decade on the balance of emigration amounts to as much as 150,000 persons or about double the loss estimated for the previous decade the figure is of little importance compared with the gain or loss due to natural causes depending on the health and well-being of the people and shown in the birth and death-rate. Before studying these causes, it will be well to review briefly the general circumstances, of the decade which were likely to affect the growth of the population.

**The War**

8. While many of the factors and conditions set out in the next paragraph are indirectly due to the war, the war itself had little direct effect on the population of India. Such effect could operate in three ways (1) by death casualties, (2) by increasing the number of persons outside India at the census, and (3) by decreasing the birth-rate. The actual number of death casualties among the officers and ranks of Indian Army units and labour corps was 58,238. The maximum number serving out of India in combatant and labour units at any one time between 1914 and 1919 was, approximately, Indian troops 250,000, labour corps 230,000, total 480,000 ; the number about the time of census being troops 105,000 labour corps 20,800, total 125,800. A fair proportion of combatants was drawn from the fighting races of the Punjab and some statistics for that Province are given by Mr. Middleton in his report

He writes as follows :—

"It comes as a shock to the imagination to compare the mortality directly caused by the war with that due to natural causes; though was casualties were amongst the pick of the population they were numerically unsignificant when contrasted with the death-roll caused by the slightest of epidemics ; indeed it is undoubtedly true, as observed by Mr. Leigh, that the war saved more lives in the Punjab owing to the collection of men in cantonments where the ravages of influenza in 1918 were met by efficient medical precautions and remedies than it wasted on the field of battle. It is possible that the absence of so large a proportion of the able-bodied from their homes indirectly affected the population by lowering the birth-rate, but so many of these men were able to visit their homes on leave that the effect was not great enough to be

discoverable from statistics. With regard to effect upon the numbers of the population the war is an almost negligible factor in a decade which in itself will render unique in history as long as civilisation lasts."

Other provinces contributed their quota to the labour corps which were sent across the seas and local figures are affected, especially in the North-West Frontier Province, by the distribution and movements of troops; but so far as the larger totals are concerned the war is not a direct factor of any importance in the census in any province.

**Economic conditions of the decade**

9. In Considering the factors which determined the movement of the population the decade may conveniently be divided into two periods, (a) a fairly normal period from 1911 to 1917, and (b) the disastrous epidemic year 1918, accompanied by scarcity and followed by a second crop failure in 1920. As will be seen the war hardly began to affect the ordinary life of the people till about the third year after its outbreak. Agricultural conditions during the earlier period were on the whole favourable. In 1911-12 and 1912-13 there was a serious shortage of rain in parts of the Bombay Presidency resulting in scarcity conditions over certain areas of the East-Deccan, but on the whole insufficient rainfall was confined to restricted localities. The year 1913-14 was abnormally dry. The United Provinces and Central Provinces suffered from an early cessation of the monsoon rain of 1913, which caused a fall in the outturn of wheat, and there was some distress in parts of the former Province. In 1914-15 the rainfall, abundant and well distributed in the centre and north and east of the country, was unfavourable in the eastern portions of Bengal and in Madras and Burma and the rice crop was somewhat below normal. Rainfall in 1915-16 varied considerably over the country, the heavy late rain causing floods in the eastern Provinces and parts of the United Provinces and Central Provinces, but on the whole the harvest of the year was fair and the rice crop was above the normal. The monsoon of the two following years was heavy and well distributed and both wheat and rice were exceptionally good, giving a large outturn on a full acreage. Cotton and jute, the principle mercantile crops were both below the average in 1913-14 and 1915-16, but in the case of these crops the higher prices obtainable in a poor year tend to recoup the grower in value for what he loses in quantity. Meanwhile the economic conditions in India were gradually undergoing a change. The outbreak of war in 1914 caused an immediate decline in the bulk of India's oreign trade by the contraction of shipping. The influence on prices was not felt severely during the first two years of the war, fair harvests and full stocks keeping the prices of foodstuffs from any considerable movement. In 1917 however the conditions of India began to respond to the world-disturbance of the war. Men for the fighting and labour units and food, ammunitions and war material of all kinds were demanded. The strain on the railway organization dislocated the local markets and the distribution system in the country began to give trouble, while the rising prices of imported necessities such as salt, oil and cloth hit the poorer classes severely. The harvests of 1917 were good but the year was wet and unhealthy and a virulent outbreak of plague in the north and west of India caused heavy mortality. Wages had not yet begun to move with the upward movement of prices and there

was a general feeling of restlessness among the labouring classes, which rapidly increased under the influence of political propaganda. Then followed the disastrous seasons of 1918-19. The monsoon of 1918 was exceptionally feeble and gave practically no rain after the beginning of September. In the Punjab and the central and western portions of the continent the crops failed over considerable areas and scarcity, aggravated by the high level of prices, was declared in parts of the Punjab, United Provinces, Central Provinces Bombay, and Bihar and Orissa, while agricultural conditions were equally bad in parts of the Hyderabad and Mysore States. The outturn of rice fell from nearly 40,000 to 24,000 tons while the wheat harvest in the spring of 1919 was equally poor. The crop failure was as bad as, if not worse than that of 1900 and prices of foodstuffs, cloth and other necessities of life, already high, rose to highest never previously reached. Famine relief organization is now so highly perfected in India that scarcity is not necessarily accompanied by high mortality. But meanwhile the influenza epidemic, starting in the latter part of 1918, visited almost every portion of the country and wiped out in a few months practically the whole natural increase in the population for the previous seven years. Emergency measures were taken. Transport, the export of foodstuffs, and the distribution of the necessities of life were all placed under Government control, and it was only the wonderful resisting power of the people, acquired from years of steady economic improvement, that enabled the country to tide without absolute disaster over a year of unprecedented difficulty and strain. These conditions lasted through the first half of 1919 ; but an abundant though not very well distributed monsoon in that year brought some welcome relief, though prices remained high and it was necessary to stop all export of food grains and to reinforce the stocks of the country by importing wheat from Australia. The monsoon of 1920 was poor ; the autumn rains failed and the winter rains were in defect. Famine was declared in one district in Bombay and scarcity in another district of that Province and in seven districts of the Central Provinces. Famine conditions in Hyderabad were pronounced and distress prevailed in certain districts of Madras. By the end of 1920 nearly 100,000 persons were on relief and generous remissions of revenue had to be given. It was not till the end of 1920 and the beginning of 1921 that prices gradually began to come down.

**Public Heatlh**

10. Apart from the more normal causes of mortality the distinctive feature of the decade of 1901 and 1911 had been the progress through India of the plague epidemic and the mortality which it caused. The recorded number of deaths from plague during the period was about 6½ millions. In the recent decade the deaths, recorded less than half that number. There were, however, serious outbreaks of plague in Bombay, the Punjab, the United Provinces and the Central Provinces in the first two years of the decade, the mortality was again high in 1915 and higher still in 1917 and 1918, when the disease was severe in practically every part of northern and central India. Cholera is normaly most prevelant in the Eastern Provinces. It was specially virulent in Assam and in parts of Bihar and Orissa and Bengal, while in several provinces outbreaks of the disease either accompained or immediately followed the influenza eipdemic. Cholera in its most severe form has usually been associated with the deterioration in physique which accompanied famine

conditions before famine organization had been perfected. Virulent as the epidemic can still be when its hold is established it is not usually of a temporary and local nature, and the total death-rate in British India from the disease during the decade did not amount to more than 1·5 per cent. By far the largest number of deaths in India are entered under the category of 'fever', and allowing for inaccuracy of diagnosis it has usually been assumed that about two-thirds of the deaths so recorded may be ascribed to malaria. Recent investigations made in special areas, however, suggest that this proportion has been considerably over-estimated and that malaria only accounts for from one-fifth to one-fourth of the number of reported fever cases, the remainder being cases of dysentry, pneumonia, phthisis and other diseases.* Malaria is endemic in large areas of the continent, both in the forest clad country which fringes the mountain ranges and in tracts of Bengal, Assam and Burma,. Where the configuration of the country prevents the drainage of the flood-water after the monsoon. In such areas, besides raising the average level of the death-rate, it permanently lowers the vitality of the people and reacts both on the birth-rate and on their general economic condition. In parts of Western Bengal the population, has been described as sodden with malaria. Epidemic malaria was specially severe in the Punjab and United Provinces in the earlier years of the decade and again in 1917 when, owing to the specially heavy monsoon, mortality from this disease was high in almost every province. In the last few years the prevalence of an affection which is the cause of considerable mortality called *Relapsing Fever* has received considerable attention by the Health Department. This disease has been diagnosed as common in most parts of the country, specially in the northern provinces and in the Central Provinces and Berar and Bombay, but the extent of the mortality which can be ascribed to it cannot at present be estimated. Nor can figures be given of phthisis which is undoubtedly responsible for considerable mortality; especially in the towns of western India, the deaths from the disease in Ahmedabad amounting in 1918 to 5 per mille of the population.** All other factors in the health of the people have, however, been over-shadowed by the influenza epidemic of 1918 and 1919 which has dominated the population figures at the present census.

**The influenza epidemic of 1918-1919**

11. The influenza epidemic of 1918 invaded the continent of India in two distinct waves. The first infection apparently radiated from Bombay and progressed eastward from there, but its origin and foci are uncertain. It may have been introduced from shipping in Bombay during May, and there is a suggestion of some sort of mild influenza in the Bombay district, Delhi and Meerut in the spring ; but the existence of the disease in epidemic form cannot be established without doubt before June. The disease became general in India in both the military and civil population during August and infection spread rapidly from place to place by rail, road and water. The first epidemic was most prevalent in urban areas, but it was not of a specially virulent type and, probably for that reason, it is said to have affected young children and old people most severely. The mortality curve went to a peak in July and then dropped, and there is evidence of a distinct interval between the first and second waves but not of any real break of continuity, as sporadic cases were reported throughout the intervening period. It is impossible

*Fevers in the Tropics by Sir L. Rogers, 2nd Edition, p. 200.

**Tuberculosis in India *by A. Lankester*, (P. 49) Butter worth & Co. '20.

to say where the more virulent virus of the second invasion came from. There are certain facts which suggest that the disease began in the Poona district in September. It spread from province to province, lasting in a virulent form generally from eight to ten weeks, when mortality, usually due to respiratory diseases, reached its highest point. The rural areas were most severely infected, the reason probably being that while, villages have little advantage over towns in the matter of overcrowding, sanitation, ventilation the urban areas have the benefit of qualified medical aid and organised effort. Mortality was specially high among adults (20—40), particularly among adult females the disease is generally fatal to women in pregnancy. It is suggested that the high mortality among women may have been due to the fact that, in addition to the ordinary tasks of the house, on them fell the duty of nursing the others even when themselves ill. The figures show that the excess mortality between the ages 20 and 40 amounted in some cases to nearly four times the mean. It is no exaggeration to say that at the worst period whole villages were absolutely laid desolate by the disease. There was sometimes no means of disposing of the dead, crops were left unharvested and all local official action was largely paralysed, owing to the fact that the majority of the official staff were put out of action by the epidemic. To add to the distress the disease came at a period of widespread crop failure and reached its climax in November when the cold weather had set in ; and, as the price of cloth happened at the time to be at its highest, many were unable to provide themselves with the warm clothing that was essential in the case of an illness that so readily attacked the lungs. The disease lasted in most provinces well into 1919 and gave a high mortality in that year in Bengal and the United Provinces. Even after it had subsided there were in the Central Provinces, Bombay and Burma mild recrudescences later in the year, while local outbreaks continued over the country during the next two years.

The comparative severity of the epidemic in the different parts of India is shown in the map on the opposite page.* IT IS not possible to explain the peculiar variations in the local prevalence of the disease which seems to have been entirely capricious in its incidence. The cost line escaped with a low mortality while in the hilly country the disease was usually specially fatal, though this was apparently not always the case in the Punjab. The Eastern Provinces escaped lightly and Calcutta was not attacked as severely as other cities. It has been suggested that the mortality was determined by the comparative liability of the people to respiratory complications or, in other words, their susceptibility to pneumonia, and it looks as if the epidemic was more virulent in a cold dry climate than where there was comparative warmth or humidity.

There is no direct means of ascertaining the mortality from the epidemic. Influenza was unkown to the registration staff as a specific form of illness and the deaths were entered under the heads fever or respiratory disease. Various estimates have been made based on the excess mortality over some suitable mean. The average of these calculations gives a total number of deaths in the areas under registration of about 7,100,000 in 1918, as shown in the following table ; to which must be added, as the results of similar calculations, another 1½ million deaths in 1919, giving a total recorded mortality of nearly 8½ millions in the two years.

*Not reproduced here.

| Province | Estimated number of deaths | Death rate per mille of population of column 2 |
|---|---|---|
| 1 | 2 | 3 |
| Ajmer-Merwara . . . . . | 29,835 | 59·5 |
| Assam . . . . . | 111,340 | 18·6 |
| Bengal . . . . . | 386,572 | 8·5 |
| Bihar and Orissa . . . . . | 709,976 | 20·5 |
| Bombay . . . . . | 1,059,497 | 54·9 |
| Burma . . . . . | 137,491 | 13·9 |
| C. P. and Berar . . . . . | 924,949 | 66·4 |
| Coorg . . . . . | 2,014 | 11·5 |
| Delhi . . . . . | 23,612 | 56·6 |
| Madras . . . . . | 682,169 | 16·7 |
| N. W. F. Province . . . . . | 89,035 | 43·6 |
| Punjab . . . . . | 898,947 | 45·4 |
| United Provinces . . . . . | 2,034,257 | 43·4 |

Even this, however, must be a substantial under-estimate since, owing to the complete breakdown of the reporting staff, the registration of vital statistics was in many cases suspended during the progress of the epidemic in 1918 and when the time came to reconstruct the figures the number of omissions, especially in the case of women, must have formed a high proportion. In some cases the Census Superintendents give estimates of deaths considerably higher than those given in the table which are taken from the Sanitary Commissioner's report, and, as we shall see in paragraph 14 below, there is a difference of nearly 4 millions between the census figures and the deduced population, a considerable proportion of which must be due to omissions of enfluenza deaths. In any case the figure given above applies only to the areas under registration, which contain little more than three-quaters of the population of India. The epidemic was especially virulent in the Rajputana and Central India Agencies and in the States of the Punjab, Central Provinces and Bihar and Orissa, while the attack was severe in Kashmir and Mysore and acute in Hyderabad and parts of Baroda. We have no statistics for these areas, at any rate none that are trustworthy, but a rough estimate would put the direct mortality in them, from the disease in 1918 and 1919, at least in the same proportion as in British Territory. We thus arrive at a total mortality of between 12 and 13 millions for India. It is interesting to note that even this conservative estimate of a mortality,

the large part of which occurred in the space of three or four months, exceeds by nearly two millions the total estimated deaths from plague extending over 20 years (1898—1918), and is a good deal more than double the death-rate directly attributable to the famines, of the period 1897—1901. The number of deaths, however, is not, of course, the measure of the loss of life from the epidemic. The case mortality has been put roughly at about 10 per cent and on this basis the total number of persons affected by the disease was about 125 millions or two-fifths of the total population of India. The effect on the general health of the people is shown by the reaction on the birth-rate, which dropped below the death-rate in 1918 and 1919 and only gave a slight excess in India in 1920.

**Vital Statistics**

12. The cumulative effect of the various health-factors on the vitality of the population is shown in the variations of the birth and death-rates, but before making a use of the recorded vital statistics it will be well to form some estimate of the accuracy and value of the records. The registration of vital statistics is established throughout British India except in the more remote and backward tracts. The system of collection differs in detail in different Provinces. It is usually based on information of births and deaths recorded in the village (often by the headman of the village), and passed on periodically to some local authority, usually the Police, by whom registers are maintained. Extracts from these registers are sent to the local officer who is responsible for the records of public health, by whom they are compiled for the district and so eventually for the Province. The information includes particulars of the births, including still births, and death by sex and religion and the classification of the deaths under certain categories of age and of disease. The records both in the villages and in the local offices are periodically checked by touring officers of various departments. In municipal towns the registration of vital occurrences by the householder is usually compulsory by law, and the registers are maintained by the municipal authority. Owing chiefly to carelessness in administration the standard of accuracy is probably not as high in the towns as in the rural areas.

*Estimated and Reported Birth and Death Rates*

| | *Births* | | | *Deaths* | | |
|---|---|---|---|---|---|---|
| | Acland | Reported | Difference error | Acland | Reported | Difference error |
| Bengal . . . | 46·7 | 37.6 | 9·1 | 40·0 | 32·7 | 7·3 |
| Bombay . . . | 41·0 | 33.4 | 7·6 | 35·8 | 34·6 | 1·2 |
| Burma . . . | 42·9 | 33.9 | 9·0 | 32·7 | 25·2 | 7·5 |
| Madras . . . | 41·9 | 30.8 | 11·1 | 33·4 | 23·2 | 10·2 |
| Punjab . . . | 44·3 | 41.2 | 3·1 | 43·3 | 44·0 | —·7 |
| United Provinces . | 46·5 | 41.4 | 5·1 | 46·0 | 39·3 | 6·7 |

Attempts have from time to time been made to gauge the extent of errors by placing certain tracts under a special staff responsible for watching the reporting, but such attempts are themselves full of difficulties and their conclusions have not been accepted as of any final statistical value. The results of some attempts of this kind are described in Appendix II to Chapter V of the Bengal report. The percentage of omissions found varies considerably in different regions and the samples can hardly be considered altogether representative because, on the one hand, the examination of the vital statistics was usually performed by a staff engaged on fewer investigation in tracts which were specially unhealthy, and, on the other hand, the presence of the enquiring staff probably stimulated the reporting agency to greater accuracy. Statistical analysis, based on a comparison between the recorded birth and death-rates and the population and age distribution according to the census, also afford a valuable means of check. Comparing the estimated birth and death-rates given by Mr. Acland in his actuarial report on the 1911 census figures with the reported rates of the decade ending with that year, we find that the apparent omission in the reported figures vary between 7 and 8 per mille for births and are slightly less in the case of deaths. Tests made by Mr. Thompson (Bengal) on the basis : (1) of a comparison between the population returns and the population deduced from the vital statistics of the decade with allowance for migration, (2) the mean population, (3) the statistics of infant mortality in 1920, the year before the census, and (4) the results of special enquiries into the size and constitution of families, suggest the following conclusions as applicable to Bengal:—(a) about 25 per cent. of deaths that occur remain unreported, (b) the omission in the case of female deaths is ordinarily about 2 per cent more than for males, and (c) the omission in the record of births is generally between 1 and 2 per cent more than in the case of deaths. Mr. Middleton (Punjab) was able from calculations based on the comparison between the enumerated and deduced population to obtain a correction factor for the errors in birth and death registration in different districts which varied from ·5 to 16.6 per cent in the case of death rates and 9 to 29.4 per cent omitting one especially defective case) in birth registrations. In reviewing these calculations Mr. Jacob in Appendix I to the report has suggested some amendments in the working, and on even more elaborate calculations of his own has arrived at the following conclusion:—"that the vital statistics of the Punjab are likely to be about 7 or 8 per cent in error and that, provincially, errors of about 11 per cent in the birth-rate and of say 5 per cent in the death-rates may be adopted as probable. Finally it is clear that the census figures of 1911 and 1921 do not establish the accuracy of the vital statistics to a greater degree of accuracy than 7 or 8 per cent of error."

As a result of the various tests which have been made and of the general experience of those who are in the best position to estimate the value of these records the following propositions may perhaps be accepted:—

(1) In rural areas the omissions in the record of numbers vary up to about 20 per cent.

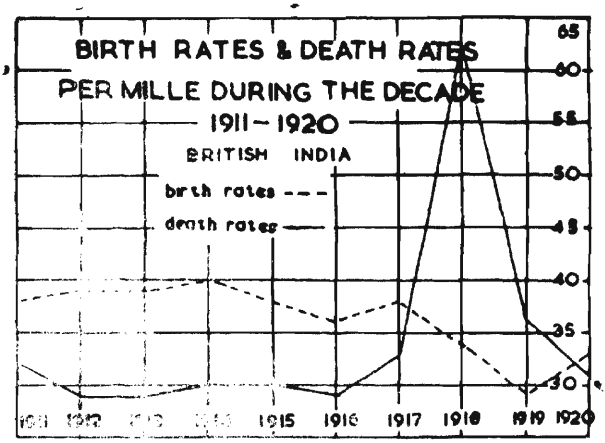
(2) The record of births is normally less accurate than that of deaths.

(3) In urban areas the standard of accuracy varies greatly according to the attention given by the local authorities. It is usually lower than

in rural areas but it has been considerably improved of recent years, *e.g.*, in Poona and Ahmednagar.

(4) The records of the causes of mortality are defective. Plague, cholera and small-pox are now often fairly correctly recorded when the epidemic is established. Other distinctions (*e.g.*, deaths from respiratory diseases), are sometimes roughly made, but the bulk of deaths, the specific cause of which is not recognized locally, are ascribed to "fever". Age categories are, outside a certain limit, a matter of guess work but the errors are probably of the same kind as those in the census Tables.

(5) Except for progressive improvement in urban areas and occasional breakdowns during epidemics the errors are more or less constant from year to year.




**The progress of population in the intercensal period**

13. In these circumstances, while the records of vital statistics are of little use as absolute figures, they are still, specially for rural areas, valuable for purposes of comparison and in estimating progress and tendencies. The fact that the omission of births is greater than the omission of deaths has to be remembered in using the records for estimating the rate of growth or decline of population. Whether we examine the figures in Tables V and VI or the curves in the diagrams which illustrate these figures the sam

feature stands out, *viz.*, the rise of the death-rate and the fall of the birth rate at the end of the decade owing to the influenza epidemic. We are at this point concerned chiefly with the numerical progress of the population and this is best illustrated by the curves in the diagram which show the combined effect of the birth and death-rates in the form of the survival rate, or the difference between them in each year.

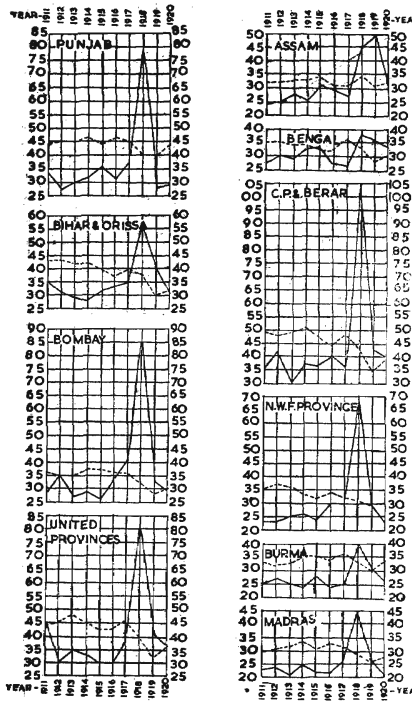
| Province | Census variation per cent 1901-1911 | Average yearly excess of births over deaths per mille 1911-1917 | Average yearly excess of deaths over births per mille 1918-1920 | Census variation per cent 1911-1921 |
|---|---|---|---|---|
| Assam | +14·9 | 5·4 | —9.4 | +13·3 |
| Bengal | +7·9 | 4·8 | —5.5 | +2·7 |
| Bihar and Orissa | +3·8 | 9·1 | —9.1 | —1·4 |
| Bombay | +6·0 | 4·7 | —10.8 | —1·8 |
| Burma | +15·5 | 8·5 | —.1 | +9·1 |
| C.P. and Berar | +16·2 | 11·8 | —23.1 | — |
| Madras | +8·3 | 8·5 | —3.1 | +2·2 |
| N.W.F. Province | +7·6 | 8·3 | —11.1 | +2·5 |
| Punjab | —1·8 | 12·5 | —5.0 | +5·7 |
| United Provinces | —1·1 | 10.6 | —17·8 | —3·1 |

The figures shown in the table given above illustrate the differences between the progress in the earlier and later years of the decade respectively. The figures given are obtained by simple arithmetical calculations on the basis of the population figures of 1911, and are an approximation only to the truth; and as the reporting of births in generally less complete than that of deaths the difference between the births and deaths, or what may be called the natural increment rates, given by the figures is lower than in actual fact. The intensity of the death-rate of 1918 as compared to the mean of the previous years is brought out in the series of curves in the diagram opposite.

The figures and curves indicate that the increase in the population shown by the 1911 census of most of the larger provinces was sustained and continued during the first seven years of the decade, so that in spite of epidemics of cholera and plague, which however did not reach the same pitch of virulence as in the previous decade, there might have been an increase of population at least equal to, if not well above, the proportion shown at the 1911 census but for the calamity of 1918, when the upward curve dropped steeply in each provice and only in a few recovered at all during the succeeding two years. Assam, Burma and the Punjab are the only three of the larger units in which a substantial increase in the actual population has occurred. Both the former are provinces which attract a considerable immigrant population from outside. The Punjab suffered less heavily from the influenza epidemic than the United Provinces and the Central Provinces, and there was an astonishing recovery in the birth-rate in the last two years of the decade. In the Central Provinces the whole of the large natural increase, which is a feature of the backward aboriginal people, was wiped out, while in the United Provinces the substantial increment in the earlier years was converted into a loss at the end of the decade.

# DIAGRAMS SHOWING THE BIRTH RATES & DEATH RATES PER MILLE OF THE POPULATION DURING THE DECADE 1911-1920

BIRTH RATES--------DEATH RATES ————



**Comparison between enumerated and deduced population**

14. Though it has been shown that the absolute figures of the recorded births and deaths far are from complete it will be of some interest to see how these records compare in each province with the figures obtained from the census. The statement below compares the results of the census with the population deduced from the statistics of births and deaths during the decade in the chief areas in which registration is in operation. These area which covered almost the whole extent of British India contain a population of 240,630,341 persons according to the census of 1911 or about three-fourth of the total population in the Indian Empire.

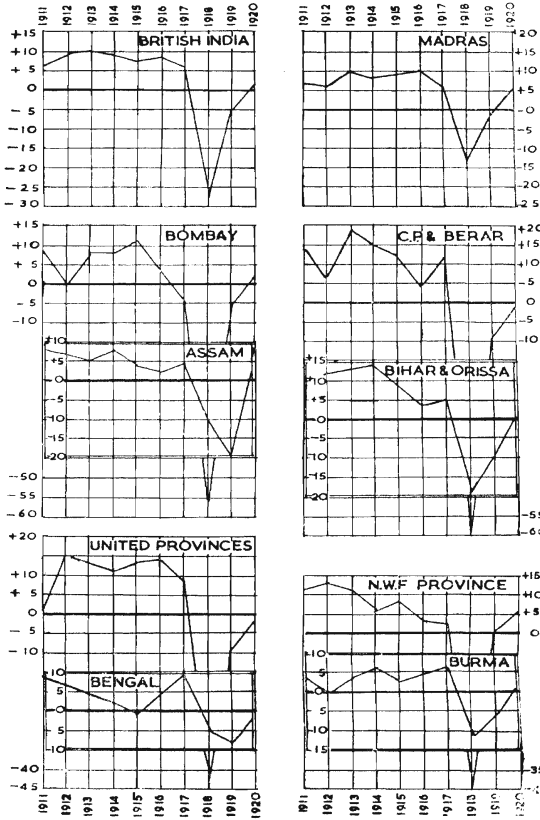
| Province (British Territory only) | Variation 1911—1920 according to vital statistics (excess of births over deaths +Deficiency—) | | | Variation 1911—1921 according to census (excess+Deficiency—) | | | Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Males | Females | Total | Males | Females | Excess or defect of column 5 over column 2 | Excess or defect of column 6 over column 3 | Excess or defect of column 7 over column 4 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Assam | +53,318 | +[illegible]000 | +51,445 | +320,930 | +454,633 | +366,297 | +760,585 | +445,733 | +314,852 |
| Bengal | +[illegible]33,533 | +300,236 | +458,354 | +1193,518 | +775,668 | +117,580 | +434,928 | +475,432 | —40,504 |
| Bihar and Orissa | +[illegible]243,533 | +[illegible]000,991 | +552,562 | —487,355 | —95,905 | —391,450 | —1730,908 | —686,896 | —1044,012 |
| Bombay | —525,316 | —[illegible]0,314 | —314,002 | —358,382 | —93,152 | —270,230 | +166,934 | +123,162 | +43,772 |
| Burma | +[illegible]33,550 | +255,280 | +314,380 | +946,415 | +492,050 | +454,365 | +365,755 | +225,770 | +139,985 |
| C. P. and Berar | +133,039 | +10,744 | +142,295 | —9,579 | +16,793 | —26,372 | —192,618 | —23,951 | —168,667 |
| Delhi | —15,333* | +10,925 | +5,958 | +74,741 | +50,980 | +23,761 | +57,858 | +40,055 | +17,803 |
| Madras | +2000,446 | +1033,934 | +916,512 | +913,235 | +487,761 | +425,574 | —1087,211 | —596,273 | —490,938 |
| N. W. F. Province | | +50,429 | +6,841 | +54,407 | +47,214 | +7,193 | +3,978 | +3,626 | +352 |
| Punjab | 1400,373** | +732,006 | +527,367 | —1108,280 | —536,563 | +571,717 | —301,093 | —245,443 | —55,65 |
| United Provinces | 907,259 | +493,618 | +463,641 | —1431,703 | —566,960 | —764,743 | —2388,962 | —1160,578 | —1228,384 |
| TOTAL | +6735,251 | +3419,903 | +3325,353 | +2924,597 | +2010,545 | +813, 962 | —3910,754 | —1399,363 | —2511,391 |

*Variation calculated on 1913-1920.

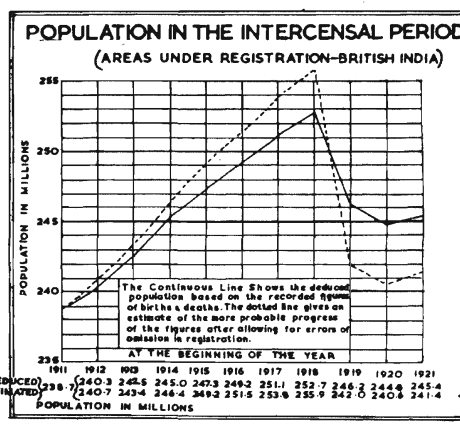
**Figures for 1911 and 1912 include Delhi.

## DIAGRAMS SHOWING IN INDIA & CERTAIN PROVINCES THE SURVIVAL RATE PER MILLE OF THE POPULATION DURING THE DECADE 1911—1920

(Difference between Birth and Death Rate: EXCESS+, DEFECT−.)



The difference in the tables of the enumerated and deduced population amounts to a defect in the former of nearly 4,000,000 of persons; the deficiency in females being almost twice as great as that in males. It is clear that were both the census and registration figures are absolutely accurate, this difference would necessarily be due to loss by migration from within to places outside India. Now the statistics of birth place enable us to calculate fairly accurately the gain or loss between British districts and the Indian States. At both the recent census and the census of 1911 the balance has been in favour of British India. The gain in 1921 was about 124,000 and in 1911 about 135,000 and the decrease of about 11,000 between these two figures is too small to be considered. The calculation is not so easy in regard to migration to countries outside India; but if the estimate of 150,000 persons lost to India in the decade by the exchange with foreign countries, made in paragraph 7, be accepted as fairly correct, the share of that amount which falls to the British India districts does not go far towards making up the difference of four millions now under consideration.



Failing loss by migration the deficiency can only be accounted for by either; (a) omissions in the census or (b) defects in the registration statistics. The degree of accuracy of the recent census has been already discussed in the Introduction. We have seen that there is no reason to suppose that the recent census was less accurate than that of 1911 in point of the actual numbers included. In any case there is nothing in the circumstances of the census of 1921 which should account for the larger loss in the female population relatively to males. The deficiency must then be due to inaccuracy in the vital statistics, and, since we can hardly suppose that the number of births has been over-stated, it must be assumed that the inaccuracy has taken the form of the omission of deaths and that the defect has been almost twice as great in the case of females as in the case of males. will be noticed that the total deficiency is a balance of the figures for the different provincial areas some of which show a gain and some a loss. In the plus and minus account of the individual provinces migration plays an important part, thus the provinces which gain by migration, *e.g.*, Assam, Bangal and Burma show excesses in the enumerated population, while those which lost by migration, eg. Bihar and Orissa, Madras and the United Provinces show defect. The account for each province so far as it can be computed will be found in the provincial reports. It must suffice here to say that there is a general consensus of opinion founded, on actual experience as well as on statistical evidence, that the registration organization completely broke down during the worst period of the influenza epidemic, when there was often neither the village staff to make the reports nor the official staff to receive them. In the reconstruction of the registers some months afterwards it is natural that a large number of deaths should be omitted, and in such circumstances deaths of females are more likely to escape recollection than deaths of males.

The continuous line shows the deduced population based on the recorded figures of births & deaths. The dotted line gives an estimate of the more probable progress of the figures after allowing for errors and omission in registration. *See* diagram on page 11.

population in millions

| | At the Beginning of the year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 |
| *Deduced* | 238.7 | 240.3 | 242.5 | 245.0 | 247.3 | 249.2 | 251.1 | 252.7 | 246.2 | 244.8 | 245.4 |
| *Estimated* | | 240.7 | 243.4 | 246.4 | 249.2 | 251.5 | 253.8 | 255.9 | 242.0 | 240.6 | 241.4 |

We may now try roughly to reconstruct the figures of the population of British India in he intercensal period. In the diagram (page 11) two curves are given, one showing the progress of the population in British ndia (regeistration areas) in each year of the decennium based on the actual records of briths and deaths. The dotted line gives an estimate of the more probable figures allowing for (a) deficiency in the registration of births in ordinary years and (b) a substantial deficiency in the registration of deaths in the year 1918. It will be noticed that, if we accept this deficiency in the number of deaths registered as explaining the difference between the deduced and enumerated populations, the estimate of the number of deaths in 1918 directly

or indirectly due to influenza given in paragraph 11 above must be even further increased, so as to account for the drop in the population shown by the fall by the dotted curve between 1917 and 1918 in the diagram. This may well be so, as the estimate of mortality based on the official records is undoubtedly a minimum.

## POPULATION AND ECONOMIC PROBLEMS

**Growth of the population.**

38. The growth of the population of India and the problems which it presents have seriously occupied the minds of socialogists and economic students of recent years. The statistics obtained at the recent census do not, perhaps, afford the best material for the study of the population problem of India, since they have been largely determined by the visitation of a disease which can scarcely be considered an item in Nature's ordinary programme for the restriction of excess population. In an agricultual country famine is merely one of the recognized extremes in the obvious relation between population and food. Epidemics such as malaria, the disease of waste places, and cholera seem to be bound up with the climatic and physical conditions of the country and are familiar in every degree of intensity. Even plague is recognized as a disease of congested areas and has a close connection with the aggregation of population. Influenza, however, seems periodically to thrust itself, An unwelcome exotic, into the picture of Indian life and represenst an unknown quantity which is euqally fatal in the jungle and in the city and has no certainty of origin, no measure of intensity and no regional limitation.

*Difference Between the Birth Rate and Death Rate estimated by the actuary for certain provinces in certain decades*

| Provinces | 1991-1991 | 1901-1911 |
|---|---|---|
| Bengal | 7.0 | 7.3 |
| Bombay | 3.9 | 5.2 |
| Burma | .. | 11.1 |
| Madras | 13.3 | 8.5 |
| Punjab | 9.8 | 5.7 |
| United Provinces | 6.5 | 0.6 |
| Combined provinces | .. | 8.2 |

My predecessor pointed out in 1911 that the rate of increase of population between 1872 and 1911 was equivalent to about 19 per cent., and that at the rate the population would double itself in about a century and a half. We have seen in para 6 above that the real increase in the last fifty years the population of India is just over 20 per cent. At this rate the doubling will take another 190 years. But calculations of this kind, though or interest, can hardly be taken seriously. Almost every one of the last five

decades has witnessed some special disaster. A severe famine in South India checked the increase in the decade 1872-1881. The decennium 1891-1901 was dominated by the great famines of the closing period. Growth in Northern and Western India was checked in the succeeding decade by plague and we have had in the past decennium an epidemic which has caused more concentrated mortality than any previous calamity. The decade 1881-1891 alone was free from any exceptional calamity and is usually considered a period of fairly normal progress. The increase in the population in that decade we 9.6 per cent for India. With this figure we may compare (1) the rate of 6·4 per cent. in the decade 1901-1911, when plague considerably reduced the population of Bombay, the United Provinces and the Punjab, (2) the steady rate of progress in Bengal amounting to nearly 8 per cent in each of the three decades from 1881 to 1911 and (3) the incremental rates for some of the large provinces for the decades 1881-1891 and 1901-1911 based on actual calculation. It is perhaps n an unreasonable estimate to place the probable natural increment in India at her present state of development and apart from exceptional calamities at between 7 and 8 per cent. in the decade.

The rate of growth for India as a whole is of course the resultant of number of very different rates in different parts of the country. In discussing the subject in the report of 1911 my predecessor pointed out that increase tends to vary inversely with the existing density of the population. The high rates of increase in the sparsely populated area of Assam, the Central India tracts and Burma contrast with the lower rates in the valleys of the Gangas and Jumna. The rate of growth of population in India is not greater than that of many countries of Europe. It is, however, the product of different conditions, the natural increment being the difference between a very high birth rate and a correspondingly high death-rate and obtained, therefore at an enormous sacrifice of life especially of infant life. The high India birth-rate is largely the result of universal early marriage and uncontrolled marital relations, the rate differing in different communities and regions owing partly to difference of martial customs and partly to variations in fertility. The Muhammadans and aboriginal tribes, who have few widows in the reproductive age-periods, have a higher birth-rate than Hindus. The birth-rate, which seems to be higher in the lower strata of society, may also vary with racial differences in fertility or, according to some modern theories with the influence of cultural and economic conditions in different stage of development. But any diminution of the birth-rate due to influences of the last kind must be very gradual in their action, and unless, as is extremely unlikely, there is some revolutionary change in the outlook of the mass of the people towards marriage, it seems impossible that there will be any general downward movement of the birth-rate in India for many years to come. On the other hand systematized attack is being made on mortality at every point both officially and privately by the improvement of sanitation, the extension of medical relief and the organized efforts towards infant and maternal welfare. Any substantial success in such measures would mean the widening of the difference between the birth-rate and the death-rate and a corresponding rise in the rate of increase of population. Carr Saunders in his interesting book on "The Population Proolem" (Clarendon Press, 1922) shows that India is one of the countries in an intermediate stage as regards the process of population growth. She has abondoned—or more or less abandoned—the old fashioned methods of limiting population to an optimum, *viz*.

periodic abstention from intercourse, abortion and infanticide and she has not yet adopted the methods of advanced countries, *viz.*, postponement of marriage and voluntary birth-control. She is at a point where her population is controlled by disease and disease only. Pell* would possibly already find in the lower birth-rates of some of the more advanced classes evidence of the sterilizing effect upon them of the increased nervous energy developed by their progressive culture and wealth.

We have already briefly reviewed the figures of density of population in India and the provinces. In writing of the relation of persons to areas Proof Bowley** remarks:—

"The density of population involves further conceptions. It is, of course a matter of simple arithmetic to divide the number of persons recorded by the number of square miles in the district which they inhabit; the difficulty is to attach meaning to the quotient. We have, in fact, two heterogeneoues totals, and the items of the one have a varying relation to the items of the other. The population total includes male and female, old and young, workers, owners and dependents. The area total includes fertile and barren acres, mountainous and plain, metalliferous and valueless, urban and rural. The relationship may be one of accidental residence or of complete dependence on the products of the land. Before we take any average we must make sure that all the members of the denominator have another common characteristics, and that these characteristics have some relationship to each-other."

Nowhere are the problems of the aggregation of population more complex than in India with its extraordinary diversity of physical and economic conditions. The discussion of the spatial density of population and its pressure on accommodation belongs to the next chapter. but we may note that tne actual physical proximity is a factor in growth which is not by any means confined to towns. If we except certain tracts in the east and south of the country, where the village is a mere administrative expression and the houses are scattered and isolated, the congestion in the areas actually inhabited is probably as great in the villages as in all but the most congested towns; and this actual physical proximity of the people in rural as well as in urban areas is an important factor in India, where so much of the mortality is due to diseases which are either infectious or epidemic and so little regard is paid so questions of sanitation. Those who have seen the villges in some of the more backward parts of the central tracts of the country bill appreciate the statement that, whether it be due to the physical conditions which limit the available residential sites or to the traditional habits of the people, at any rate, in India as in the "congested" districts of Western Ireland, the mere figures of area divided by population are not index of the real aggregation of the population in any tract. The social and economic problems of population in India have been treated in an interesting manner in a pamphlet entitled "The Population Problem in India" by Mr. P. K. Wattal. Besides bringing out, by means of statistics from the Census of 1911, the misery and scarifice of life entailed in the methods by which population is sustained and developed in India, the author examines the question as to

*"The Law of Births and Deaths" by C.E. Pell.

**The Measurement of Social Phenomena (page 40) by Prof. A. L. Bowley.

whether the productive capacity of the country can be improved so as to provide food for the increasing millions and concludes that, unless there is considerable reduction in the birth-rate, there is imminent danger of serious "over-population". Other writers on social and economic question in India such as Messrs. Mukerjee and Kale apear to hold somewhat similar views.

The conception of over-population is however itself full of complexities. It expresses an economic relation between the population of a certain area and the means of production in that area which is meaningless without a clear definition of each related element and of the area considered. Population is merely man considered in a quantitative sense, and man may include anything from a naked aboriginal to an industrial plutocrat. Again means of production may range from the gathering of edible fruits in the jungle to the digging up of nuggets out of a gold-mine, while the area populated and exploited may be a village, a district, a province or the whole country. If we try to express the idea of pressure of population more precisely we are still faced with difficulties. We may consider the relation between the number of the people of a certain defined tract at their present intellectual, moral and material standard of living, on the one hand, and the average productivity of the area according to existing methods of exploitation on the other hand, and say that if this population continues to increase numerically at its present rate it cannot maintain its material standard of living under conditions as they exist at present. In the various forms in which it occurs the situation as described, *viz.*, the overtaking of the existing material resources by the expansion of population, provides the chief stimulus to progress. It forces the population to enhance the food resources by increasing the productivity of the tract and to overcome the limitation of area by improving the facilities of communication. The enterprise involved, reacting on the mental and moral equipment of the people, widens the scope of their lives and, by raising their standards, creates a new economic stress and thus establishes a continuity of progress by a succession of reactions. In the historical life of a nation or a people the moral benefits of over-population in this sense are probably worth the temporary difficulties, and sacrifices which result from the inevitable delays and imperfections in the adjustment of resources to growth. The Census Superintendent of Burma remarks in this respect:—

"A country is obviously over-populated in a static sense when, even if all its resources were fully and most advantageously employed, it would be unable to support its population satisfactorily either with its own products or with goods obtained in exchange for its own products. The word, *satisfactorily* makes this definition somewhat vague and dependent upon a constantly changing standard of comfort and efficiency; and moreover it is always impossible to say whether a country's resources are fully and most advantageously employed. The world's average rate of wheat production is 13 bushels per acre and in England in 1921 the average was 35.3; but Professor Biffen's Yeoman wheat has yielded 96*. Are the resources of English agriculture fully employed? There is much to be said about that before calling England overpopulated in the sense now considered. That Poland has increased her wheat and rye crops by 250 per cent in the last ten years suggests that the last word on food production has probably not been said yet in Burma. Malthus, in his Essay, is commonly supposed to have had the

*See the Chapter on Soil and Crops in Creny's *Discoveries and Inventions of the Twentieth Century* (1922).

static conception of overpopulation described above; but really he understood the term in the kinetic sense and described a country as overpopulated when the rate of increase of the population exceeded the rate of increase of the supply of calories in the triple form of food, clothing and shelter. This is a very different conception indeed; a country might be overpopulated according to either of these definitions without being overpopulated according to the other. Underpopulation might be ascribed to a country by its own people, if they thought an increase of population would enable them to collect more capital or take advantage of better organization and so raise their standard of life. It might also be ascribed in the case in which an increase of population, though it might either depress the standard of living or leave it unchanged, would free the country from dread of some military or economic invasion It might also be ascribed to one country by the people of another, if the la.ter were looking for an area of less economic pressure to which they could emigrate. Moreover, as man does not live a human life on the minimum of economic support, other and wider considerations enter into the discussion."

In India where the population is predominantly agricultural the economic aspect of density resolves itself in to the question of the relation between the population and the productivity of the land. Attempts were made in the Census of 1911 to correlate the distribution and growth of the population with the cultivable and cultivated area and the out-turn of different kinds of crops. It seems clear that while the extent of the *cultivable* area is a factor in determining the distribution and expension of an agricultural population, the proportion of the cultivable area which is actually *cultivated*, on the other hand, is the esult, not the cause of the growth of the population. Correlations between the population and the area cultivated, therefore, are chiefly of interest as a means of measuring the enterprise of the people, the productivity of the soil under their efforts and their standard of living. They are not, so long as the whole cultivable area is not fully cultivated, a clue to the *pressure* of population or to its potential expansion. Except within very wide limits correlations between population and cultivable area are rendered nugatory by the vagueness of the term "cultivable area", since land at any particular time classed as unculturable is continually being opened out to cultivation by irrigation, as in the Punjab and United Provinces, or by the cutting back of forest areas, as in the central tracts of the country and elsewhere. Again the capacity of the land to support population depends, apart from its extent on its scientific treatment and economic organization. And agricultural methods, choice of crops, distribution of holdings, system of tenure are factors which have varying influence in different localities and must be studied in connection with local conditions and problems. Economic pressure may exist at any degree of density. It is responsible for a large amount of the unrest in the tribal areas of the North-West Frontier, where the crude density is a ridiculously low figure; and Dr. Mann has shown in his discussion of the conditions of typical villages in the Bombay Deccan that pressure exists in tracts where the actual density is not much above the average, that it keeps part of the population at a very low standard of living and is only partially relieved by the flow of the population into the industrial cities of the residency. Studies of this sort lie beyond the scope of a census report and it will only be possible here to notice a few typical tracts where the aggregation of population is exceptionally high and the local resources have been fairly explained.

In the Bengal Report an attempt has been made to correlate the density of the population of eleven typical districts with the crop-values based on area, outturn and price. After reducing the relative crop-values per square mile to a standard according to which the total for the Midnapur district is 500 and making allowances for other local sources of wealth, Mr. Thompson gives the results in the statement below with the following comments:—

*Relative crop-value per square mile reduced to the Midnapore standard*

| | Density of population supportable on Midnapur standard | Total relative crop-value per square mile reduced to the Midnapur standard | Density of existing population | Percentage of supportable increase at Midnapur standard |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Bankapur (Sadar Division) . . . | 476 | 450 | 361 | 33 |
| Midnapore . . . . . | 528 | 500 | 528 | 0 |
| Nadia . . . . . | 695 | 658 | 535 | 30 |
| Rajshahi . . . . . | 826 | 782 | 569 | 45 |
| Jessore . . . . . | 889 | 845 | 593 | 50 |
| Faridpur . . . . . | 1,198 | 1,134 | 949 | 26 |
| Mymensingh . . . . . | 1,143 | 1,082 | 776 | 47 |
| Dacca . . . . . | 1,351 | 1,279 | 1,145 | 18 |
| Tippera . . . . . | 1,512 | 1,431 | 1,027 | 47 |
| Noakhali (main land) . . . | 1,535 | 1,453 | 1,202 | 28 |
| Bakarganj . . . . . | 1,142 | 1,081 | 752 | 52 |

"The calculation which has given the figures in the last column involves large assumptions. It may, however, be taken to indicate that the pressure of the present population on the soil is much greater in Midnapore than in the other ten districts and that in this respect of the districts follow Midnapore approximately in the following order:—Dacca, Faridpur, Noakhal (main land), Nadia, Bankura (Sadar), Rajashahi, Tippera, Mymensingh, Jessore and Bakarganj. Since 1872, though the population has increased more quickly in Tippera and Mymensingh than in any other districts in Bengal, there is still no indication that the pressure of the population on the soil has approached its limit. Bakarganj can bear an increase of 50 per cent without allowing for further extension of cultivation into the Sundarbans. Jessore the same. Its population has gone down at each census since 1881, owing to the unhealthiness of its climate, but in the figures of the present decade there is indication of improvement. Jessore and Bakarganj are the only two districts in Bengal whose population did not increase less or decrease more in the decade 1911-21 than in the decade 1901-11. Nadia and Rajshahi have, like Jessore, been unhealthy districts for many years, and to this they owe the fact that the population has been kept down well below the limit which the soil can bear. In Midnapore, there can be little margin and Dacca and Faridpur in Eastern Bengal must shortly reach the same condition. Noakhali, which has a considerable greater margin, has its islands to fall

back. Its population has been crowded into a smaller space than before by the erosion of the sea-face, and it shows signs of relieving the pressure on the soil by taking more keenly to the cultivation of jute than formerly.

The examination of the agricultural statistics for these eleven districts has shown how varying capacity of the soil, under climatic conditions varying from place to place, enables very different densities of population to final support in different parts of the province, and how it is possible for a population over 1,000 persons to the square mile in parts of Eastern Bengal to go on increasing rapidly, while a population less than half as dense in rural district in Western Bengal remains stationary or decreases. With the progress of civilization and the improvement of communications, the standard of living adjusts itself to variations from place to place in the capacity for production, whether in agriculture or industry. The standard of living maintained in agricultural populations in Europe seems to have been adjusted to a density not more than some 250 persons to the square mile. The surplus population is drawn off into other industrial and commercial enterprises and the standard of living among agriculturists maintained and even considerably improved. In India, a stage of civilization has not yet been reached at which such enterprise draws off even a small portion of the labour not absolutely required for agricultural purposes. A stage has been reached in which the land available for cultivation is not sufficient to give full employment to a great multitude who see no occupation but agriculture to which they can turn their hands. The next stage threatens to be a long time before it is reached, and the time must necessarily be the longer on account of the fact that so large a proportion of those engaged in agriculture own substantial rights in the little plots they cultivate, and will not readily give them up when the time comes to leave agriculture for another occupation. In Europe, the maintenance of the standard of living places a limit on the increase in the numbers who continue to support themselves by agriculture, but in India, this is not the case. An explanation of the fact that Eastern Bengal districts are able to support their agricultural population at a higher standard of living than in Western Bengal, is sometimes sought in the higher proportion of aborigines whose backward civilization demands only a low standard of living. This explanation, however, does not go nearer to the root of the matter than the explanation of the low standard of living in India compared with that in Europe in the backwardness of Indian civilization. The true explanation of the possibility of a higher standard of living among cultivators in Eastern than in Western Bengal districts is to be found in such an analysis of agricultural statistics which has just been given for eleven districts."

An interesting point which the figures bring out is the fact that though there is a close correlation between density and the development of resources there is no relation between the pressure of population and the crude density. We shall see in a later chapter how the population of the Mymensingh and Dacca districts is being drawn off northwards to the waste areas in the Assam valley.

Another area of very high rural density, reaching in parts to 1,000 or even 1,200 persons to the square mile, is found in the coastal tracts of the south of India including the States of Cochin and Travancore. Here, in addition to the favourable climatic conditions, the steady substitution of

more valuable corps such as cocoanut, rubber and tea for rice has enabled a very closely aggregated population to maintain a comparatively high standard of living. The Census Superintendent of Travancore writes:—

"Not only has the population of the State been increasing by rapid strides during the last three censuses but its standard of living has also been rising.... That the material prosperity of the people is on the advance will be seen from the fact that they have been able to import rice in this decade by 29 per cent the average annual quantity imported in the previous decade, at a cost much higher than that obtaining in 1911, and that they have been able to make remarkable advances on the cultivation of the chief industrial crops of the country, namely, cocoanut, rubber, pepper and tea to the extent of 444,010, 51,469, 48, 762 and 62,659 acres, respectively. The tapioca raised in the country has been sufficient for export after meeting local requirements. The industry of fish has also considerably advanced. After supplying the increased local needs the average quantity exported has risen from 133,175 cwts. per annum in the last decade to 192,571 in the decade under review, *i.e.*, by over 44 per cent. The export of cocoanut and its products, copra and oil, has increased, by about 15 per cent. Similarly, the average annual export of pepper and tea which was 20,528 candies and 12,305,897 lbs. in the last decade has risen now to 30,083 and 18,544,659 *i.e.*, by 47 and 51 per cent. respectively. The export of rubber during the decade has been on an average 2.332,149 lbs. per year."

| District and Nautral Division | Mean density per sq. mile in 1921 (Density of rural portion only given in brackets). | |
|---|---|---|
| 1 | 2 | 3 |
| *United Provinces* | | |
| Sub-Himalaya, East | 605 | (585) |
| Gorakhpur | 721 | (690) |
| Basti | 687 | |
| Gonda | 524 | |
| Najraich | 403 | |
| Indo-Gangetic Plain (East) | 711 | (650) |
| Benares | 899 | (704) |
| Jaunpur | 745 | (711) |
| Ghazipur | 598 | |
| Ballia | 679 | |
| Azamgarh | 691 | |
| *Bihar and Orissa* | | |
| North Bihar | 642 | |
| Saran | 872 | |
| Champaran | 550 | |
| Muzaffarpur | 907 | |
| Darbhanga | 870 | |
| Bhagalpur | 481 | |
| Purnea | 405 | |

In the Ganges Valley the eastern districts of the United Provinces and the neighbouring districts of North Bihar have areas of specially high density of the districts of the Eastern Sub-Himalaya and Indo-Gangetic divisions and of the North Bihar. Mr. Edye shows by figures of cultivable and cultivated area that in all these Eastern Gangetic Districts of the United Provinces there is still room for expansion of agriculture, and he argues

from the home-loving and unenterprising character of the people that until the limit of cultivating capacity is realised the population will continue to expand. He writes:—

"In support of my argument I may mention the case of Gorakhpur, district with which I happen to have a close personal acquiantance. This district has increased in density from 707 to 723. It consists of six tahsils. The headquarters tahsil has the highest density, followed closely by Hata. The Maharajganj tahsil with much jungle and undeveloped land, has far the lowest density. The headquarters tahsil has now increased in density by six, Hata by five (two units more than any other tahsils), and Maharajganj by one. Maharajganj is reputed to be by far the most unhealthy tahsil in the district. Again, in Bundelkhand (Central India Plateau), with parts of which I am also well acquainted, there is the keenest competition for tenants on the part of landowners and it is commonly said that an extra ablebodied man means an extra nine acres of cultivation.* But the country is extremely unhealthy and the climate severe; and an unresponsive soil and a very low water-level involve a degree of exposure and exertion which the physique of the people is unable to sustain. It is of course obvious that a point must sooner or later be reached at which the means of support derivable from agriculture cannot be expanded further; and if meanwhile other means of support have not been developed, density will then be determined by agricultural conditions. The contention here advanced is that that point is not yet in sight. The above arguments are valid also for the mountainous and hilly portions of the Province (Himalaya West and East Satpuras), but their application is somewhat different. Where the country is cultivable at all, there is no evidence that the limit of agricultural development has been reached, so as to interfere with a further increase of population and density. But for large tracts of the country the limit has manifestly been reached since the beginning of historical time. The Himalayan snows could never have supported an agricultural populations; for these tracts of course density is determined by agricultural possibilities.

At that time, as we shall see later, a constant drain of labour flows out of these districts into Bengal, the remittances of the emigrants largely incresing the resources of the tract, so that, in spite of the heavy receipts in the densely populated district of Azamgarh, the district has a deficit treasury owing to the enormously heavy payments made from it to meet postal remittances from outside.

Of the districts of North Bihar, Mr. Tallents writes:—

"The density of population in this district (Saran) is 872 to the square mile the population is almost entirely agricultural and it needs no argument to show that unless some radical and hitherto undreamt of change is introduced into the system of agriculture the soil cannot bear a greater pressure of population than it is doing at present. The revisional settlement has shown that the cultivated area has increasd and that the scarcity of pasturage for the cattle has become a menace. It seems improbable that any further substantial increase will occur in the population of this district. In Champaran the case is different. The standard of cultivation is not so high as it is in Saran and in many parts cultivators are in possession of more land than they can culti-

*Along the skirts of the Vindhyas there are disused rock-hewn sugar presses in almost every village, though not a field of cane is to be seen. The people explain that there are not now enough men for the laborious cultivation involved.

vate. In the last twenty-five years there has actually been a reduction in the cultivated area. This means that there is still room for expansion and intensification of agriculture in several of the thanas. Rents are low, being on the average less than half what they are in Saran, and there is reason to suppose that immigrants will still be attracted to the district, especially to the northern and western parts of the Bettiah sub-division, where the development would be rapid but for the prevalence of malaria. In these respects Purnea resembles Champaran. Both districts run up towards the foothills of the Himalayas and parts of them are extremely malarious. Rents in Purnea are even lower than they are in Champaran and the density of population is less. There is ample room for the expansion of cultivation particularly is now that the Kosi has swung right across into Bhagalpur district and there is little doubt that the population would increase rapidly but for the scourge of malaria. On this occasion there has been a sharp decrease of population in the Kishanganj sub-division owing to the ravages of malaria and a temporary slump in the jute trade, but this has been more than made good by the increase of population in Araria, and in the areas reclaimed from the Kosi in the Sadar sub-division. In Muzaffarpur and Darbhanga there has been a heavy decrease of population in the south while in the north, where the density of population is already greater it has been more nearly stationary. The gradual northward movement of the population is still marked and is apparently continuing. The underlying reasons for this movement seem to be that the south of these districts is less healthy and that on the whole rents are lower in the north while the cultivation of rice which predominates in the north is more remunerative and capable of supporting a denser population. Here as in Saran, it is impossible to expect a considerable expansion of cultivation or of population. A tenth part only of these districts is uncultivated but cultivable and nearly half of this is devoted to mango groves which are valuable for food, timber and fuel, the remainder barely suffices for the pasturage of cattle. The density of population in Muzaffarpur is 907 persons to the square mile and in Darbhanga 870. The population is predominately agricultural and is likely to remain so, for there is no mineral wealth to attract any industry unconnected with agriculture. In these circumstances it is impossible to suppose that an increase of population is either likely or desirable."

In the Punjab the economic problem of population in each district has been exhaustively examined by Mr. Middleton in Chapter I of his Report. He finds evidences of pressure in tracts which vary considerbly in character, (e.g., Kangra, Hoshiarpur, Simla, Gurgaon, Ambala and Gujarat; but the economic situation in this part of the country is at present solved by the progressive extension of canal irrigation. The additional land brought under Government canal irrigation during this decade amounts to 2,500 square miles an increase of 22 per cent. The mean density of agricultural population is no where so high in the Punjab as in the Eastern plains of the Ganges. There has been a steady flow of colonists from congested areas to the canal tracts, amounting to about 160,000 persons in the decade, and there are still schemes in hand involving further large extensions of irrigation. In his book, "The wealth and welfare of the Punjab", Mr. Calvert is able to show that in spite of the enormous margin which still exists for the development of agricultural wealth in this mainly agricultural province, the average Punjab peasant already lives at a standard of life which is distinctly above that of a large portion of the pesantry in southern and eastern Europe.

**Standard of living**

39. The number of the population which can be supported by the resources of any tract in any country must be vitally affected by the standard of living of that population. On the other hand the increase in the demand on the luxuries (as opposed to the bare necessities) of life must, like an increase in numbers, stimulate them to develop further the resources of their environment. On the other hand the reduction of the resources of the environment by the law of diminishing returns must either put a limit to the number of the population or cause a retraction in the standard of living. The statistical measure of the standard of living of the Indian population demands enquiries of an exact and difficult nature; and though it was at one time thought such an investigation would be undertaken along with the census operations, it was eventually decided that the practical difficulties were too great. Some information, has, however been collected by certain Superintendents and in the Reports of Assam and Bombay will be found the results of enquiries into family budgets in different types of population, which are valuable additions to the contributions which are being made by the many experts students* of this very difficult and interesting study. The subject is one which is far beyond the scope of a census report, even if it were possible on the material yet available, to draw conclusions which are not dangerously uncertain and transient. In a large portion of the population the manner of living has little relation to the economic capacity or resources actual or potential of the family or individual. It is determined by tradition and limited by ignorance. It is not unusual for a family to live in comparative squalor and yet spend large sums on a marriage festival or a law-suit. A large part of the labour troubles in the country is due to the fact that the labourer will only work sufficiently to maintain himself and his family at the lowest standard, and the slackness of agriculture in many parts of the country is the result of low rents which enable the cultivator, with a minimum of effort, to produce sufficient to support his family at a standard which he is too backward and unenterprising to attempt to improve.

Still less is it true, as is no often asserted in Sanitary Reports and elsewhere, that the temporary variations in the "economic" circumstances of the people form the principal factor in determining the variations of the birth or death-rate; though where, as in cases of famine or great scarcity, the available supply of food falls below the minimum subsistence limit, the "economic"** factor becomes necessarily dominant. In India, as in every other country, the most prolific portion of the population is at the lowest stratum of life, and modern theories incline to the view that a maximum fertility is associated with a simplicity of life which includes, or at any rate appears usually to be attended by a minimum subsistence diet, and that fertility declines

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*e.g. Mr. Jack in Bengal, Dr. Mann in the Bombay, Deccan. Dr. Slator in South India, the Bombay Labour Bureau in the industrial areas of the Presidency, the Economic Societies of the United Provinces, Punjab and other Provinces.

**The word economic is used here in the sense in which it is usually applied, namely with reference to the financial and material resources of living. In its wider sense, *viz.*, as referring to all the conditions and circumstances of a "household", domestic, social, traditional and material, it is much more nearly identifical with the idea implied by the "standard of living".

as life becomes more complex, more luxurious and more individualized and the nervours train increases. This economic simplicity of living in the larger portion of the population, along with the custom of universal marriage which seem to be independent of economic considerations, and of uncontrolled marital relations has given India a high average birth-rate. Diseases due to climate and physical conditions, combined with the non-hygienic customs and traditions of the people and their complete ignorance of and indifference towards all the circumstances from the cradle to the grave which make for health and reduce the power of resistance to disease, keep up the level of the death-rate. These are the constants which regulate the standard and which can change only slowly with the progress of education and social culture and with the improvement of the environment. Of the fluctuating influences which determine the periodic divergencies from the average the most important is undoubtedly the climatic variable. It is exceedingly difficult to obtain material sufficiently accurate to admit of definite statistical correlations, *e.g.*, rainfall or prices, or outturn of crops with birth rates and death rates. Correlations between the birth-rate and prices in Bombay made by Mr. Sedgwick on the data of twenty years were inconclusive and such as I have been able to attempt have not been of any help owing to the intrusion of extraneous factors. It has recently been put forward by the Health Officer of Bengal that low prices accompany a high death-rate, and not as formerly thought a low death rate, and the reason was ascribed to the economic loss to the cultivator. As a matter of fact the economic effect of prices, as Dr. Mann has shown in his studies, differs in different classes of the agricultural community. It is well-known, however, that it is the dry years which are on the whole the healthiest, though they are not usually the years of economic prosperity, and any connection between outturn, prices and death-rates is probably due to a third common factor of this sort. On the one hand there is always in a rural agricultural population, even among those near the subsistence limit, a considerable margin of resource which enables them to resist in a remarkable way temporary economic stringency. On the other hand there appears to be an intimate connection between the quantity and distribution of the rainfall and the intensity of the infection of such diseases as malaria, relapsing fever, dysentery and so forth which are chiefly responsible for the mortality.

The annual fluctuations of the birth and death-rate are, therefore, probably much more dependent on the intensity of the onslaught of the principal diseases, due to conditions of climate and environment, than on any supposed variation in the resisting power to them of the people owing the economic circumstances. In a graph showing the death-rates of the people over a long period of years the trend of a mean line drawn through the fluctuations would give the cultural and material progress of the population and its surroundings, while the annual fluctuations from the mean would usually show the result of temporary climatic and environmental changes and only occasionally economic catastrophes. A good deal of vague thought has arisen from this confusion of the waves with the tide. The progress of this tide has probably altered but little in the last 50 years. The undoubted development of material resources has not in the ordinary rural community, been accompanied by a cultural advance such as would affect the population quantitatively. The old customs and attitudes towards vital conditions remain

unchanged and until they change in the direction either of greater economy or greater care of infant life the trend of the death-rate will not much alter except in so far as scientific efforts can improve the surrounding condition and fend off the onslaughts of the more virulent epidemic diseases. Of the relation between the standard of living of the population of Northern India and its capacity for further expansion Mr. Edye writes:—

Reasons have also been given for the belief that the limit of pressure of population on means of subsistence has not yet been reached anywhere in the province. Will the people therefore go on multiplying indefinitely, and will nature continue to interfere every few years with a calamity to check the pace? This, I think, is a reasonable expectation. A belief is generally held that a rise in the standard of living operates as a natural check on increase. This may be true of other countries, but here it is to put the cart before the horse. The Hindustani peasant has, as will be agreed by all observers, a wonderful faculty for cutting his coat according to his cloth. He will give himself all the necessaries and luxuries available to him if he can afford them; if the pressure on means of subsistence increases, he will cheerfully dispense not only with luxuries but also with what others might call necessaries. These characteristics are apparent in times of famine and they are very noticeable even in children. Where an English child needs half the contents of a toyshop to amuse him, an Indian child is content to play in the mud. If toys come his way no one could appreciate them more if he losses them again he is quite happy without them.

The population of India at the death of Akbar is roughly estimated by Mr. Moreland to have been about 100 millions, of which the share of what is now the United Provinces would not exceed 20 millions. The common people of Northern India were then undoubtedly almost naked. Blankets were unknown to them; shoes were seldom worn and little furniture was used save a few earthen vessels.* The population is now 46 millions, and the people have long been more or less substantially clothed and shoed; there are few who do not possess blankets, and brass pots are in almost universal use. The amusement which the peasantry gets out of attendance at the law courts and railway travelling—these two diversions are to the Indian what the picture place is to the English proletariat—is entirely new since Akbar's day.

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*For the above facts and the evidence on which they rest see "Moreland's India at the Death of Akbar", pages 9 to 23 and 253 to 270. Mr. Moreland estimates the population of Northern India between Multan and Monghyr at sometimes over 30 millions. His method of calculation for the tract (population=cultivated acres × labour necessary to cultivate an acre) inspires more confidence than that for Southern India for which the alleged size of armies—with a large discount for exaggeration—is the basis used. The *Seir-ul-Mutaakherin* and the words of Herodotus suggest that the alleged size of oriental armies cannot be used as evidence at all, because the unknown discount may be anything up to 95 per cent. of the known allegation. An arguable co-efficient for the Xerxes Expeditionary Force, for instance would be alleged thousands=actual hundreds.

But $\frac{\text{alleged thousands}}{2} = \frac{\text{actual hundred}}{2}$

would be equally arguable. The numbers of a massed body can only be known by counting ocular estimates even when made by educated persons are, as is well-known, of the wildest description.

In recent times the standard of living has not risen in such an obvious way, but, even during the last fifteen years there has been observable an increasing addiction to the use of small comforts and convenience, such as tea, cigarettes, matches, lanterns, buttons, pocket knives, looking glasses, glasses—even gramophones; and of countless similar trifles. It seems unquestionable that up to the present time the numbers of the people and the standard of living have been rising together. And before it is assumed that the province, or any part of it, is so congested that further increase of population is impossible, it must be remembered that the same assumption was made or implied by the traveller Fitch at the end of the sixteenth and by Sleeman at the beginning of the nineteenth century. If a stage is reached—and when all has been said it may not be far distaint for the density of some of the eastern districts is unparalleled in any rural tracts outside China—when both the population and the standard of living cannot be maintained it is quite possible that the latter and not the former will contract. But perhaps by that time industry will have become a factor for general support. At present it is negligible; such industrial concerns as exist are too concentrated—in Cawnpore and a few other towns—to affect the province as a whole for labour is immobile and shown no signs of acquiring mobility.

# CENSUS OF INDIA 1931

## CHAPTER I

## DISTRIBUTION AND MOVEMENT OF POPULATION

### Movement

5. The actual increase since 1921 is 33,895,298 that is to say 10.6 per cent on the population at the last census, and 39 per cent on the population of India fifty years ago and an increase of 12 persons per square mile in 50 years, during which time the increase in areas has been principally if not entirely, confined to comparatively thinly populated areas, and amounts to 426,055 sq. miles. These figures may be compared with an increase in England and Wales since last census of only 5.4 per cent but of 53.8 per cent in the last 50 years the last census with an increase of nearly 18 per cent in Ceylon and with an increase in Java of 20 per cent with an increase in the United States of 16 per cent, Since the last census and of as much as 26 per cent in the outer islands of the Netherlands Indies. The population of Java is of course not comparable with that of India as a whole on account of its small size and limited area, but having (with Madura) the very high density of 817 persons per square mile it is comparable with the more densely populated parts of India already mentioned. This illustrates the fact that the density in India is so variable that it is impossible to consider the question of movement of the population without going into the question of the distribution and variation of density, for density of population in India depends not on industry as in the United Kingdom, but on agriculture and is greatest of course in the most fertile areas. At this census, however, the greatest increase is in the States where generally speaking the density is lowest and therefor the increase in the population shown by the figures of this census appears at first sight indicative of pressure upon the margin of cultivation but while the greatest increase has been in Bikaner (41.9 per cent) this must be put down largely to the increase of irrigation and to the consequent immigration from outside and one of the next highest increases is that of Travancore in which the density was already among the highest in India. The increase in Hyderabad State again is partly to be attributed to an increase of efficiency in the taking of the census and cannot, therefore, be safely used as a basis of any comparison of the population as it is now and was then. Obviously the greatest increase in population is to be expected in areas such as that of Burma where the rainfall is above the mean and the density of the population below it. Where the rainfall and the density are at balance, that is, where the population is dense and the rainfall is just adequate as in the Southern Punjab, Eastern Rajputana, United Provinces, Central India generally and H.E.H. the Nizam's Dominions, irrigation has abated the liability to complete loss of crop and improved communications have made it possible to prevent heavy loss of life in times of scarcity thus enabling the population to increase on the margin of subsistence. How high a population can be supported by agriculture when conditions are favourable, is shown by Cochin with areas here and there carrying over 2,000 and in one rural unit actually 4,090 persons to the sq. mile on land producing rice and coconuts, but principally the

latter which leaves more room for the erection of buildings and brings in a higher return than rice in actual cash. In such areas *e.g.*, Cochin and Travancore the increase in the population has been higher than in the sparsely populated areas like Baluchistan or Jaisalmer State where there is no general extension of irrigation although there would appear to be more scope for an extension of cultivation. On the other hand when these thickly populated areas are examined in detail it appears that the actual rate of increase in population is greatest in the less populated and less fertile areas. Thus in Travancore there are three natural divisions the lowland—very fertile the midland—less so and the highlands, where the staple crop is tapioca and where irrigation is not practised. Now in these three natural divisions the density in 1921 was 1,403 persons to the sq. mile, 700 persons and 53 respectively, which increased during the decade to 1,743, 892 and 82 that is by 24.2, 27.4 and 54.7 per cent respectively showing a vastly higher rate of increase in the area of least density which is also the area of least fertility though not as great a numerical increase. Similarly in Bengal the greatst rate of increase has been in the Chittagong Hill Tracts and in Madras in the Nilgiris. Where, therefore, there is a population already dense, there is a clearly perceptible spread towards the less profitable land.

The increase of population has also been dependent in some cases on migration, while, on the other hand, the apparent increase may have depended on the failure to migrate. Thus the increase of 35 per cent in Ahmadnagar district, a rather barren upland in the Daccan which suffers from recurring famines, is not due so much to a series of good years or to an extension of cultivation on the subsistence margin, as to trade depression, resulting in numbers of the poulation staying at home instead of migrating to the ports of Bombay and elsewhere where in normal years they are employed during the census months of February and March. Bombay shows a corresponding decrease, probably due, in the particular case of Bombay, largely to the same cause. Other deceases there are which are not so easy to explain.

**Migration**

6. Immigration, when India is taken as a whole, influences the population very little. Table VI shows 730,562 persons as born outside India as against 603,526 in 1921, without taking count in either case of persons born in French or Portuguese possessions. The increase is almost entirely in persons born in Asiatic countries. Against this there must be set off on account of emigration about one million persons who are estimated as having emigrated during the decade under review. Migration, however, is of more importance as affecting internal fluctuations of populations, varying in British India, from 1,244,249 (net) immigrants into Assam to 15,536 (net) immigrants into the North-West Frontier Province. These figures, however, include all those whose birth-place was outside the province, and do not refer to the decade 1921-31 only. If we take the actual increase due to immigration during the decade in Assam it is found to be only 121,648, consequently if a percentage be taken on the increase of population Assam owes only 10.5 per cent of its increase to immigration, though its immigration figure is the highest among all provinces. Conversely Bihar and Orissa with the greatest loss by emigration shows an increase of 10.8 a little more than that for all India, in spite of the fact that the total loss by emigration is equivalent to almost a

third of the actual figure of increase. Migration as between British India and the States has tended in the past to be from the latter to the former, but during the last decade this position has been reversed and the trend of migration on the whole is from British India to the States, where the density is generally lower. Bikaner, where the immigrants total 161,303, *i.e.*, 58 per cent of its increase in population, is a striking instance; the greater number of its immigrants (about 54%) come from British India, and while the natural increase of the population of Bikaner state plus the normal immigration as recorded in 1921 would have resulted in a general increase of 28 per cent, and thereby brought the population back to the 1891 level merely, the increase at this census is much in excess of that amount, and this excess may be put down entirely to the extension of irrigation.

**Mortality**

7. Another factor to be considered is the relation of the birth rate to the death rate and this factor is far from being the same in different sections of the population. How far the fecundity of different races and castes in India is the result of environment and how far it may have become an inherited racial trait fixed at some period in the past history of the people, and how far it depends on prevailing social practices, is extremely difficult to determine in the light of the existing information, but it is easy to show that there is marked variation in different parts of India and this question will be reverted to in the chapters on age and sex. Meanwhile it is enough to point out that in India the birth rate is everywhere much higher than in Europe, largely on account of the universality of marriage, the Parsis being perhaps the only Indian community in which late marriage and small families are the rule instead of the exception. The birth rate is lower among the Hindus than in most of other communities probably to some extent on account of the general disapproval of widow remarriage, resulting in larger number of women being unreproductive at the child-bearing age, and to some extent on that of the greater prevalence of immature maternity. On the other hand, the high birth rate of India is largely discounted by a high death rate, particularly among infants as also apparently among women at child-birth. Here again social factors have to be reckoned with, the custom of purdah perhaps exercising its worst effect among the poorer class of Muslims who appear to be more rigid in its observance than the corresponding class of Hindus. This effect is particularly noticeable in cerwed urban areas, in which the space available to a woman in purdah and poor circumstances is so small as seriously to affect her health. In the matter of epidemics and of deaths from famine or want, the decade has been particularly favourable to an increase in population. It is true that the influenza epidemic at the end of the previous decade is believed to have fallen most severely on the most reproductive ages and should, therefore, have had a much more lasting effect than the reduction caused by famine which takes the oldest and the youngest first. There has, however, been no serious famine in the decade under review, and every year sees improved methods of fighting such epidemics as cholera, plague or kala azar. Indeed a completely effective treatment for the latter pest has been perfected since the last census, and has made it possible to stamp out the disease. The antimony treatment of kala azar was discovered as early as 1913, but the original treatment took three months to apply and therefore did little to prevent the epidemic. The treatment with organic antimony compounds, introduced

about 1917, reduced the period of treatment to a month. The improved treatment introduced during the 1921-31 decade however cures the disease in ten days or even less.

A brief reference to vital statistics will be found in Section 76 (Chapter IV) below. In view of the admitted inaccuracy of these statistics in many provinces, the discrepancy between the 1931 population as it should have been according to those statistics and as it was found to be by the census is no cause for surprise. The figures are shown in the following table, and a calculation of the intercensal population will be found at the end of the chapter in subsidiary Table III, while subsidiary Tables VIII to XI contain additional material with reference to vital statistics.

*Comparison between deduced and enumerated population*

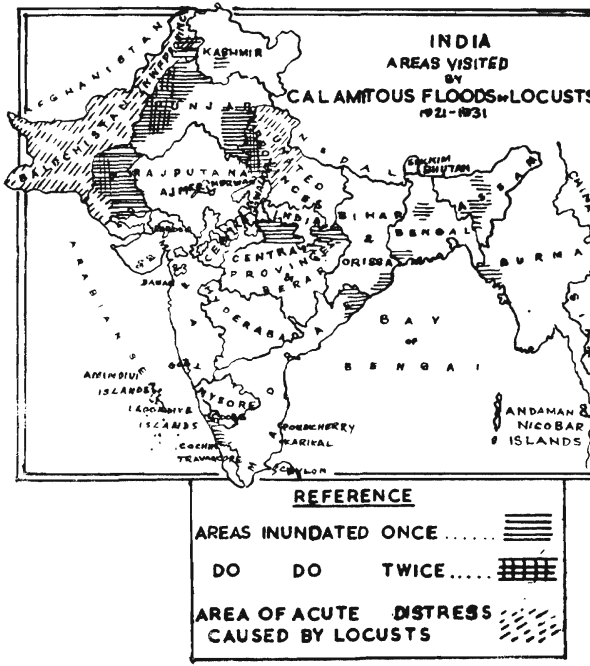
| Province (British Territory only) | Variation 1921-1930 according to Vital Statistics (excess of births over deaths +, deficiency—) | Variation 1921-1931 according to Census (excess +, deficiency—), total population | Difference Excess or defect of column 3 on column 2 | Population under registration 1921 | Difference per cent of population under registration |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Assam . . . | +450,854 | +1,163,123 | +712,269 | 6,852,242 | +10.39 |
| Bengal . . . | +1,463,484 | +3,411,695 | +1,948,211 | 46,522,293 | +4.19 |
| Bihar and Orissa . | +3,254,095 | +3,682,158 | +428,063 | 34,004,546 | +1.26† |
| Bombay* . . . | +1,728,161 | +2,587,404 | +859,243 | 19,165,614 | +4.48 |
| Central Provinces and Berar. | +1,423,608 | +1,594,963 | +171,355 | 13,912,760 | +1.23 |
| Burma . . . . | +715,458 | +1,454,954 | +739,496 | 10,822,618 | +6.83 |
| Delhi . . . . | +53,132 | +147,794 | +94,662 | 500,539 | +18.91 |
| Madras . . . | +4,398,902 | +4,421,122 | +22,220 | 41,002,696 | +0.05 |
| North-West Frontier Province. | +94,759 | +173,736 | +78,977 | 2,135,573 | +3.70 |
| Punjab . . . | +2,428,382 | +2,895,374 | +466,992 | 20,517,606 | +2.28 |
| United Provinces . . | +3,927,768 | +3,033,694 | —894,074 | 45,375,787 | —1.97 |
| **Total** . | **+19,938,603** | **+24,566,017** | **+4,627,414** | **240,812,274** | **+1.92** |

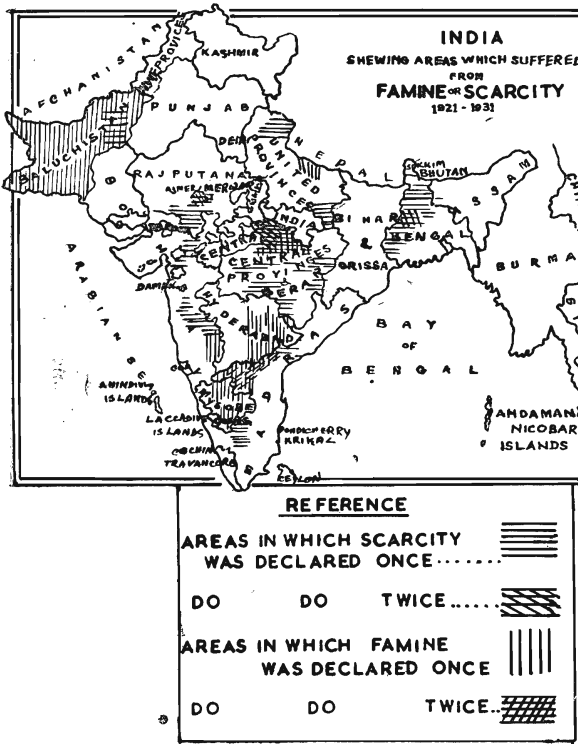
*Excludes Aden.

†The variation shown in this column would of course be less in the case of excess or more in the case of deficiency had the population under registration shown in column 5 been annually adjusted by deducting reported deaths and adding reported births.

8. As regards scarcity, improvements in communications and economic consequently in ease of distribution, now-a-days prevent anything like the famine mortality of a century ago, while taking India as a whole the decade ending in 1931 was a prosperious one in the matter of crops, the general economic depression that has supervened having been little apparent outside one or two restricted areas until 1931 itself, so that for a population mainly agricultural the conditions have been very favourable to an increase in population. Nevertheless the decade opened, as it has since closed, in gloom. The frontier was disturbed; the Moplahs were in rebellion; there was trouble

in the Madras Agency tracts; the effects of influenza and the bad monsoon of 1920 were still active; trade was depressed; prices were high; finances were embarrassed, and the non-cooperation movement was rampent. From this position there was a rapid recovery a series of good harvests followed almost as over India. In Bengal there were floods, it is true, and floods proved to be the principal cause of local distress and scarcity during the decade in India generally, as no province completely escaped the inundation of some portion in the ten years under review. But taking India as a whole the first five years were



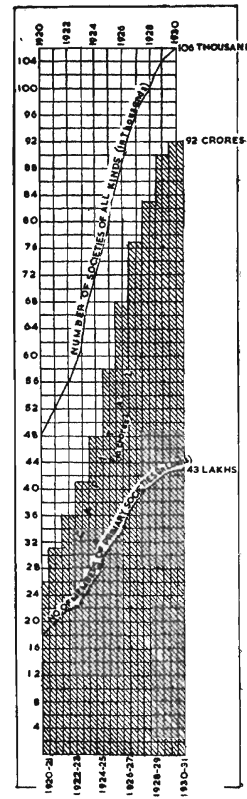

INDIA
SHEWING AREAS WHICH SUFFERED
FROM
FAMINE OR SCARCITY
1921 - 1931
AFGHANISTAN
KASHMIR
PUNJAB
RAJPUTANA
AJMER-MERWARA
BOMBAY
CENTRAL INDIA
CENTRAL PROVINCES
BERAR
HYDERABAD
BIHAR & BENGAL
ORISSA
NEPAL
SIKKIM
BHUTAN
ASSAM
CHINA
BURMA
ARABIAN SEA
BAY OF BENGAL
MADRAS
MALABAR
LACCADIVE IS LANDS
MINICOY IS LANDS
PONDICHERRY
KARIKAL
COCHIN
TRAVANCORE
CEYLON
ANDAMAN & NICOBAR ISLANDS
REFERENCE
AREAS IN WHICH SCARCITY WAS DECLARED ONCE.....
DO DO TWICE.....
AREAS IN WHICH FAMINE WAS DECLARED ONCE
DO DO TWICE...

| Census of population | Period | Increase | Increase due to: Inclusion of new area | Increase due to: Actual increase of population | Total increase per cent |
|---|---|---|---|---|---|
| 1881 . . 253,896,330 | 1872-81 | 47,733,970 | 33,139,081 | 14,594,889 | 23.2 |
| 1891 . . 287,314,671 | 1881-81 | 33,418,341 | 5,713,902 | 27,704,439 | 13.2 |
| 1901 . . 294,361,056 | 1891-01 | 7,046,385 | 2,672,077 | 4,373,308 | 2.5 |
| 1911 . . 315,156,396 | 1901-11 | 20,795,340 | 1,793,365 | 19,001,975 | 7.1 |
| 1921 . . 318,942,480 | 1911-21 | 3,786,084 | 86,633 | 3,699,451 | 1.2 |
| 1931 . . 352,837,778 | 1921-31 | 33,895,298 | 35,058 | 33,860,24 | 10.6 |
| TOTAL . .. | 1881-31 | 98,941,448 | 10,301,035 | 88,640,413 | 39.0 |

generally above the average, or little below it. Famines were local and no very serious, though one unfortunate district in Madras and famine declared in it officially in three seasons. Almost to the end of the decade the prices of cotton remained consistently remunerative. The end of the decade showed the most deterioration from this average of agircultural propserity. Scarcity in some parts, *e.g.*, in the United Provinces, and the heavy fall in the prices of agricultural produce recreated a position not unlike that of the beginning of the decade, but with the additional embarrassment of a population greatly increased by the intervening prosperity. Wages, however, did not fall as rapidly as prices, and up to the time of the census agricultural prosperity on the whole was greater than ten years before, though the increase in population had diminished the size of holdings.

Trade and industry followed much the same course, since the depression though severely felt by the tea industry as early as 1928, had only just become general by the time of the census. On the other hand much permanent improvement had been carried out in communications everywhere, and a new port for ocean-going steamers had been constructed at Cochin and another begun at Vizagapatam. Above all a number of large schemes of irrigation and hydro-electric power development have been completed, particularly in the north-west and south of India. Public health has been exceptionally good during the decade; cholera and plague took much less than their usual tol of life, and kala azar was suppressed by the perfection of an easy cure

PROGRESS OF
THE CO-OPERATIVE MOVEMENT IN INDIA
1920-21 to 1930-31



The general rise in prosperity throughout the decade is indicated by the comparative deposits in savings banks and state of co-operative societies in 1921 and 1931, tables of which are given in the statements below:

*Post Office Savings Bank Deposits*

| Post Office Circle | No. of Banks | | No. of Accounts | | Amount of deposits in Rs. | |
|---|---|---|---|---|---|---|
| | 1920-21 | 1930-31 | 1920-21 | 1930-31 | 1920-21 | 1930-31 |
| Bengal and Assam | 2,740 | 3,141 | 528,427 | 615,785 | 5,27,34,019 | 8,99,83,627 |
| Bihar and Orissa | 895 | 1,037 | 124,361 | 158,943 | 1,26,42,858 | 2,55,71,070 |
| Bombay* | 1,627 | 1,823 | 375,170 | 333,793 | 4,85,15,721 | 5,66,65,593 |
| Central | 801 | 1,234 | 95,569 | 129,045 | 1,27,62966 | 2,10,15,173 |
| Burma | 362 | 511 | 70,017 | 87,246 | 72,84,237 | 1,26,25,298 |
| Madras | 1,838 | 2,279 | 207,675 | 380,358 | 1,40,38,563 | 2,56,08,800 |
| Punjab and N. W F. P‡ | 997 | 1,076 | 241,494 | 358,563 | 4,48,87,062 | 6,76,83,111 |
| United Provinces | 1,453 | 1,485 | 235,244 | 347,269 | 3,57,68,516 | 5,90,40,642 |
| Sind and Baluchistan | .. | 260 | .. | 66,611 | .. | 1,20,66,560 |
| Total | **10,713** | **12,846** | **1,877,957** | **2,477,612** | **22,26,33,942** | **57,02,59,874** |

*Includes Sind in 1920-21 only.

‡Includes Baluchistan in 1920-21 only.

*Five Year Cash Certificates Issue*

| Post Office Circle | Cash price realised from Certificates | |
|---|---|---|
| | 1920-21 | 1930-31 |
| | Rs. | Rs. |
| Bengal and Assam | 1,325,583 | 1,69,42,242 |
| Bihar and Orissa | 2,72,753 | 39,59,736 |
| Bombay | 13,72,843* | 2,79,81,653 |
| Burma | 1,85,628 | 24,56,292 |
| Central | 3,01,080 | 80,80,370 |
| Madras | 2,90,114 | 69,37,890 |
| Punjab and N.W.F.P. | 7,25,353‡ | 2,63,83,786 |
| United Provinces | 7,13,908 | 1,53,60,699 |
| Sind and Baluchistan | .. | 97,24,748 |
| TOTAL | **51,87,262** | **11,72,27,416** |

*Includes Sind.

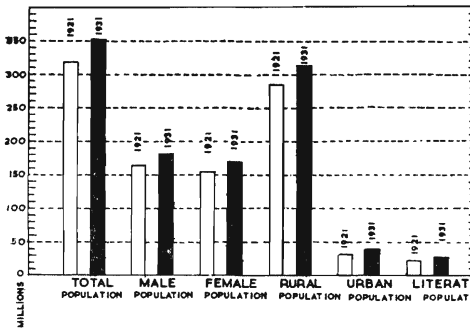
‡Includes Baluchistan.

*Five Year Cash Certificate Issue*—contd.

| Province or State | Share capital paid up | | Loans and deposits held at the end of the year | | Reserve and other funds | | Total | |
|---|---|---|---|---|---|---|---|---|
| | 1920-21 | 1930-31 | 1920-21 | 19 0-31 | 1920-21 | 1930-31 | 1920-21 | 1 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| India | 40,525 | 1,24,083 | 2),23,02 | 69,18,27 | 2,14,66 | 10,32,12 | 26,42,93 | 91,91,22 |
| British Provinces | .3,53,59 | 10,60,16 | 18,87,90 | 63,92,31 | 1,99,40 | 9,07,08 | 24,40,89 | 83,59,56 |
| Ajmer-Merwara . | 7,04 | 6,73 | 32,58 | 30,90 | 2,85 | 9,67 | 42,47 | 47,30 |
| Assam . . | 2,36 | 8,09 | 12,17 | 59,94 | 2.31 | 10,01 | 16,84 | 78,04 |
| Bengal . . | 42,28 | 1,98,92 | 2,64,63 | 12,04,27 | 26,37 | 1,59,32 | 3,33,28 | 15,62,51 |
| Bihar and Orissa . | 10,57 | 56,42 | 1,02,10 | 4,77,60 | 10,27 | 54,88 | 1,22,94 | 5,88,90 |
| Bombay . . | 46,18 | 1,77,46 | 2,70,62 | 11,08,35 | 17,77 | 1,04,91 | 3,34,57 | 13,90,72 |
| Burma . . | 55,23 | 88,78 | 2,23,25 | 1,05,19 | 28,42 | 75,07 | 3,06,90 | 2,69,04 |
| Central Provinces . Berar | 26,49 | 34,57 | 2,56,87 | 4,30,99 | 16,14 | 66,17 | 2,99,50 | 5,31,73 |
| Coorg . . | 99 | 2,75 | 53 | 5,81 | 60 | 2,47 | 2,12 | 11,03 |
| Delhi . . . | 13 | 2,59 | 82 | 20,37 | .. | 2,11 | 95 | 25,07 |
| Hyderabad (Administered Area) | 19 | 1,98 | 11 | 3,10 | .. | 26 | 30 | 5,32 |
| Madras . . | 64,87 | 2,42,16 | 407,66 | 14,39,78 | 18,37 | 1,27,94 | 4,90,90 | 18,09,88 |
| N.W.F.P. . | .. | 2,08 | .. | 10,44 | .. | 43 | .. | 12,95 |
| Punjab . | 69,52 | 1,81,15 | 2,33,03 | 13,72,21 | 57,99 | 2,50,93 | 3,60,54 | 18,04,29 |
| United Provinces | 27,74 | 55,61 | 83,53 | 1,23,36 | 18,31 | 42,91 | 1,29,58 | 22,278 |
| *States* . . | 51,66 | 1,80,66 | 1,35,12 | 5,25,96 | 15,26 | 1,25,04 | 2,02,04 | 8,31,66 |
| Baroda . | 1,85 | 5,80 | 21,08 | 59,45 | 2,78 | 6,69 | 25,71 | 74,94 |
| Bhopal . | 29 | 1,31 | 11,23 | 14,90 | 18 | 8,36 | 11,70 | 24,57 |
| Cochin . | .. | 3,03 | .. | 15,15 | .. | 3,06 | .. | 21,24 |
| Gwalior . . | .. | 15,03 | .. | 56,06 | .... | 20,53 | .. | 91,62 |
| Hyderabad . | 15,17 | 45,41 | 65,91 | 1,39,62 | 5,36 | 23,12 | 86,44 | 2,08,15 |
| Indore . . | .. | 3,51 | .. | 37,79 | .. | 13,46 | .. | 4,76 |
| Kashmir . . | .. | 24,42 | .. | 56,74 | .. | 16,57 | .. | 97,73 |
| Mysore . | 34,35 | 48,89 | 36,90 | 1,16,34 | 6,94 | 24,09 | 78,19 | 1,89,32 |
| Travancore . . | .. | 33,26 | .. | 29,91 | .. | 6,16 | .. | 69,93 |

The number of Co-operative Societies has more than doubled during the decade, which opened with 47,503 societies and closed with over 100,000 while the number of members of primary societies increased from 1,752,904 to 4,308,262 of whom more than two-thirds are agricultural. Five states which did not appear at all in the statements of 1920-21 have been added to the returns of 1930-31, *viz.*, Cochin, Gwalior, Indore, Jammu and Kashmir and Travancore. It will be seen therefore than inspite of the decline at the end of the decade into condition of low prices, trade depression non-cooperation and rebellion, this time in Burma, similar to that with which the decade opened if not worse, there still remained at its close many of the economic benefits accumulated during the interval, though they are subject to the greatly enhanced liability of the additional population of approximately 34 millions to the propagation of which the prosperous years had so greatly contributed.

| Province or State | Total No. of Societies | | Number of members (Primary Societies) | |
|---|---|---|---|---|
| | 1920-21 | 1930-31 | 1920-21 | 1930-31 |
| India | 47,503 | 106,166 | 1,752,904 | 4,308,262 |
| British Provinces | 43,366 | 90,064 | 1,600,476 | 3,681,300 |
| Ajmer-Merwara | 522 | 654 | 17,296 | 18,608 |
| Assam | 560 | 1,413 | 28,084 | 69,569 |
| Bengal | 6,366 | 23,614 | 232,001 | 760,812 |
| Bihar and Orissa | 3,580 | 9,404 | 107,514 | 254,462 |
| Bombay | 2,956 | 5,896 | 265,629 | 572,669 |
| Burma | 4,888 | 2,972 | 125,318 | 85,741 |
| C.P. & Berar | 5,011 | 4,109 | 79,638 | 76,615 |
| Coorg | 142 | 253 | 6,565 | 14,037 |
| Delhi | 103 | 275 | 2,011 | 7,795 |
| Hyderabad (Administered Area) | 5 | 18 | 205 | 6,173 |
| Madras | 6,287 | 14,878 | 395,284 | 979,745 |
| N.W.F.P. | .. | 257 | .. | 7,722 |
| Punjab | 8,453 | 20,698 | 230,311 | 679,616 |
| United Provinces | 4,493 | 5,623 | 110,620 | 147,736 |
| *States* | 4,137 | 16,102 | 152,428 | 626,962 |
| Baroda | 509 | 1,047 | 16,932 | 37,321 |
| Bhopal | 691 | 1,189 | 10,446 | 20,611 |
| Cochin | .. | 210 | .. | 24,328 |
| Gwalior | .. | 4,071 | .. | 70,307 |
| Hyderabad | 1,437 | 2,157 | 35,293 | 53,120 |
| Indore | .. | 506 | .. | 13,366 |
| Kashmir | .. | 2,899 | .. | 54,222 |
| Mysore | 1,500 | 2,213 | 89,757 | 134,428 |
| Travancore | .. | 1,810 | .. | 219,259 |




## SECTION IV

## POPULATION PROBLEM

**Nature of the problem**

34. Attention has already been drawn to the grave increase in the population of this country. The actual figure of the increase alone is little under thirty-four million, 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. The population now even exceeds the latest estimate of the population of China, so that India now heads the list of all the countries in the world in the number of her inhabitants. This increase, however, is from most points of view a cause for alarm rather than for satisfaction. The total literate population of India in 1921 was 22,623,651 and is now 28,131,315, so that the mere increase of population during the intervening period has exceeded the former figure by 11 million, that is by 50 per cent, and still exceeds the latter by 20 per cent. Even in Travancore State, where the percentage of literacy is much higher than in most parts of India, but where the population has increased by 27 per cent, the proportion of literacy has fallen from 24.2 per cent in 1921 to 23·9 per cent in 1931 though in India as a whole it has risen from 7 per cent to 8 per cent.

Recent writers on the population question in India, *e.g.*, Wattal and Ranadive, have directed their attention primarily to the question of food production. Their argument is that the population of India is already living permanently on the verge of scarcity and any increase is bound to result in an insufficiency of the food supply. Recent experience, however, throws doubt

on this theory; the general slump in the price of food, and the difficulty found by cultivators in selling their produce, suggest that the danger of a shortage of the food supply is not the most serious aspect of the question. It is not argued that this is not a danger to be reckoned with, and in any case the maximum population possible is very far from identical with the maximum population desirable, since the rise of population on the subsistence margin must reduce the standard of living, but it would seem that the point has not yet been reached at which the ability of the country to feed its occupants is seriously taxed. The position of economists in regard to the west now appears to be that "the devastating torrent of babies" is being reduced to a trickle, and that even if it were swelled again the rapid developments both mechanical and biological that are taking place in the world production of food, would be more than sufficient to cope with the flood, so that it is progressively easier to obtain subsistence. It may be doubted whether either supposition is yet applicable to Indian conditions. In the first place there are as yet no indications of any tendency on the part of the countryman to modify his view of the blessedness of the man who has a quiverful of sons and is not a shamed to meet his enemy in the gate, and, in the second little sign that agriculture is likely to be appreciably affected during the next decade by means such as those which have so greatly increased wheat production on the American continent. It is however obvious that apart from the law of diminishing returns the ability of agriculture to provide an occupation is limited. In Europe it has been estimated that the maximum population which can be supported by agricultural occupations is 250 to the sq. mile, while an estimate of somewhat higher density has been made in the case of the United States of America, and the island of Porto Rico in the West Indies has an agricultural population of nearly 400 to the sq. mile. The number is, as we have seen, very much greater than this in many parts of India and the rural population which attains the extraordinary density mentioned of parts of Bengal and of the Malabar Coast indicates the extent to which fertile land intensively cultivated together with fish-yielding waters could sustain a population whose material wants are to be reduced to the minimum by the natural environment of a tropical climate. These, of course, are extreme cases taken from the two most fertile parts of India,* but generally speaking the maximum density of the agricultural population can be far greater in India than in Europe, not only on account of the greater fertility of the land but on account of the diminution in the absolute necessities of life corresponding to a less rigorous climate. The real difficulty is that to cultivate on anything like economic lines the number of individuals that can work on a given area of ground is limited; and though the food product may be ample for many more than that number, a large in areas in the population, must either lead to the census sub-division of the areas cultivated and so to a diminution in production on account of uneconomic holdings, or on the other hand, to a floating population which is not engaged in agriculture and which has nothing to exchange with the producers for the food which it requires. The employment of this surplus in industrial activity would of course, meet the difficulty for a time, but can only prove a permanent cure if the increase of the population be limited not only to the food producible but also to the saturation point of the demand for industrial labour.

*An examination of the population question as regards Bengal by the Census Superintendent of the Province is printed as an appendix to this Chapter.

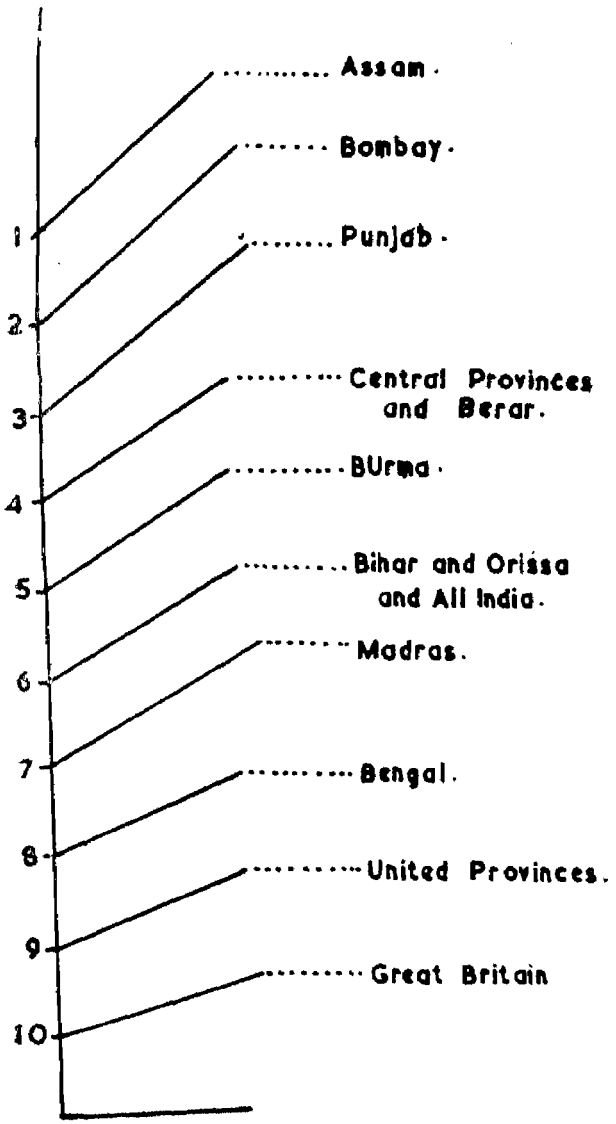
When the latter point is passed, as in the United Kingdom, where the increase in population during the last decade was approximately equivalent to the number of unemployed in 1931, unemployment will arise and the fact that food supply is adequate is to this extent irrelevant. As in some parts of Europe, life on the land as a cultivator is an end in itself rather than a mere means of production of victuals, hence the real danger of a growth of population which must suffer discomfort because this end becomes rapidly more difficult of realisation. The present problem in India would, therefore, seem to be less the actual total increse in population, than the increase of that portion of the population, by far the greater part of course, which is occupied in agriculture and allied pursuits, *i.e.*, the population represented by subclass I of the Occupation Table; and an additional complication of the problem appears in the fact that the cultivating classes in India generally lack the capital required for the extension of cultivation beyond the existing margin, particularly where the cultivation practised is already dependent on a somewhat problematic rainfall. Mechanical improvements which reduce the need for labour are a doubtful palliative, though no such doubt attaches to biological improvements, enabling a better crop to be obtained from a smaller area. Labour-saving devices will do little for a peasantry whose work takes up part only of the year and certainly they will not enable a greater number of peasants to live on the same area of land where there is neither demand nor market facilities for the minor products of agriculture which contribute to the income of the European small holder or on which, such as poultry, pigs or potatoes, he may principally depend.

**Remedies.**

35. It appears to be the general opinion of Indian economists who discuss the population problem of this country that the only practical method of limiting the population is by the introduction of artificial methods of birth control, though it is not easy to exaggerate the difficulties of introducing such methods in a country where the vast majority of the population regard the propagation of male offspring as religious duty and the reproach of barrenness as a terrible punishment for crimes committed in a former incarnation. It is justly pointed out by the Census Superintendent of Mysore State that the practice of universal and of early marriage is a social custom and is not in fact, followed from religious motives, but it is almost always religious arguments which are put forward in opposition to a change in social custom by any society anywhere, and though the religious sanction may be the result rather than the cause of the social custom, this fact only gives the sanction greater force. Nevertheless a definite movement towards artificial birth-control appears to be taking place and is perhaps less hampered by misplaced prulary than in some countries which claim to be more civilized; thus not only is artificial control publicly advocated by a number of medical writers but Madras can boast a Neo-Malthusian League with two Maharajas, three High Court judges and four or five men very prominent in public life as its sponsors. Meanwhile it would appear, in view of the present rate of increase that efforts to reduce the rate of infantile mortality should be preceded by precautions to reduce the birth-rate, and that if the luxury of baby weeks be permitted they should at least be accompanied by instruction in birth-control. A move in this direction has already been made by the Government

of Mysore State, which in 1930 sanctioned the establishment of birth-control clinics in the four principal hospitals of the State.

There are perhaps other methods of checking an excessive increase in population. It has been clearly demonstrated in Europe that a rise of the standard in living is normally accompanied by a fall in the birth-rate, and the same principle no doubt operates in this country; but, even while we must admit the truth of Bacon's aphorism that "Repletion is an Enemy to Generation", a mere superfluity of food supply is not enough, as it only enables the possessor to breed up to the subsistence level again. In order that a higher standard of living may affect the rate of reproduction it is apparent that not only is an increase in education and culture involved, since it seems definitely established that intellectual activity acts as a check upon fertility, but also the psychological appreciation of a higher probability of survival. Recent studies of the population problem in the Pacific by Rivers, Pitt-Rivers, Roberts and others have clearly demonstrated the importance of psychological factors as affecting the increase or decrease of the population, and although the environment is generally entirely different in India, that is no reason for supposing that psychology is any less important here in its action on the rate of reproduction. It is also likely that a changed outlook in which a greater value was attached to the goods of this world and less regard paid to the speculative possibilities of the next, would operate in the same direction; but it seems doubtful if a materialistic standpoint would commend itself to Indian culture.




Population Increase 1921–31

(with acknowleagments to the S.C.Q, Madras)

## APPENDIX TO CHAPTER I

*By A. E. Porter—The problem of population growth and an estimate of the future population of Bengal*

### Malthus and Doubleday

Starting with the proposition that population is necessarily limited by the means of subsistence there are in the field two principal rival theories of population growth. That deriving from Malthus has been* stated thus: first that population invariably increased where the means of subsistence increased unless prevented by some very powerful and obvious checks and secondly that these checks which repress the superior power of population and keep its effects on a level with the means of subsistence are all resolvable into moral restraint, vice and misery. In other words nature having arranged for population to increase at a rate at which it is bound to overtake and pass the means of subsistence periodically redresses the balance by famines, epidemics and other calamities unless human intelligence steps in and prevents the excessive increase either by moral restraint or by measures for limiting the birth rate or for despatching the excess of population. The other theory derives from Thomas Doubleday and gives nature a rather less sinister role. It is that when the existence of a species is endangered "a corresponding effort is invariably made by nature for its preservation and continuance by an increase of fertility, and that this especially takes place whenever such danger arises from a diminution of proper nourishment or food, so that consequently the state of depletion or the deplethoric state is favourable to fertility, and that, on the other hand, the plethoric state or the state of repletion, is unfavourable to fertility in the ratio of the intensity of each state". It has been thought that this statement lays too much stress upon food and the position has been thus †restated: "In circumstances of ease the birth-rate tends to fall: in circumstances of hardship the birth-rate tends to rise."

### Pell's Law of Births and Deaths

The recorded census figures of population in Bengal probably cover too short a period to offer clear suport to either one of these theories against the other. During the last sixty years the population of Bengal has become nearly half as large again as it was in 1872. There can be no question of intelligence checks having operated, and Bengal has been free from major calamities except in the decade before last when the influenza epidemic from which virtually the whole world suffered operated to reduce the rate of increse during the decade to a figure lower than any in its recorded census history. If the Malthusian doctrine holds, nature is not yet aware of any need to apply

*E. g., by W. S. Thompson—Population, A study in Malthusianism. 1915.

†By H. Sutherland, see Proceedings of World Population Conference 1927, page 58.

a check to the increase of population in Bengal. If the Darwinian theory holds and "fecundity is in direct relation to the chances of death", and if the "law" of Doubleday applies, nature still finds it necessary to maintain in Bengal a high birth-rate in order to replace with the high death-rate. In some points at least the Malthusian theory fails to explain the facts. In European countries and America, where most investigation has been carried out, it has been found* (a) that the birth-rate is negatively correlated with wealth and (b) that the indirect psychological and social effect of relative poverty as contrasted with relative wealth express themselves definitely as clearly in the sexual activity of human beings and through sexual activity in birth-rates. On the Malthusian theory in the wealthier classes where the means of subsistence are plentiful the population should increase more rapidly than in the poorer classes where they are less plentiful unless there were some voluntary interference with the rate of birth. The evidence of any such voluntary restriction is not conclusive and the theory generally held is that fertility itself decreases in the higher classes with increasing wealth and culture. The Malthusian doctrine also fails to account for the fact that a high birth-rate and a high death-rate are apparently invariably found together and that conversely where there is a low birth-rate there is also a low death-rate. This fact and the extreme doubtfullness of any evidence to show that conscious limitation of the family can account for the whole or a considerable part of the decrease in the birth-rate where it is low have led to the enunciation of the theory ** that "the net result of the variations of the degree of fertility under the direct action of the environment will bear an inverse proportion to the variations of the capacity for survival." Under this theory variations in the birth-rate are mainly due to the operation of a natural law which adjusts the degree of fertility to suit the death-rate of the race. The theory involves the postulate that the same conditions which lead to a reduction in the death-rate lead also to a decrease in fertility in some manner not yet known. The author of the theory suggests that the hormones assist in regulating the fertility of the germ cells, that the output of hormones by the endocrine glands is regulated by the nervous stystem which responds to the action of the environment and that the variations in the degree of fertility in response to the direct action of the environment will bear an inverse proportion to the development of nervous energy.

**Raymond Pearl's Logistic Curve**

What may be considered to be a development of the second of these two theories is that put forward by Raymond Pearl. †This theory deduces that populations gorw in size according to the same mathematical law that individual animals and plants follow in the growth of their bodies in size, and that human populations grow according to the same law as do experimental populations of lower organisms. The law of growth postulated on these

*Pearl —Biology of Population Growth, 1926.

**C. E. Pell, The law of Births and Deaths, 1921.

†R. Pearl, Studies in Human Biology, 1924; the Biology of Population Growth, 1926.

deductions may be expressed by an equation with three constants, and the curve representing this equation is called by Pearl a "logistic curve".

Equations have been worked out and fitted to the populations of fifteen countries of the world, the whole world and the populations of certain cities and have been shown to give over the whole recorded census history of each a very reasonable congruity with the recorded facts. Assuming the mathematical form of the curve this theory allows account to be taken of the fact that a population is necessarily confined to a certain area and therefore must have an upper limit of population as well as a lower (which may be nil) and for the fact that population growth takes place in cycles conditioned amongst other factors by cultural achievement. It is possible that over a restricted period the logistic curve may not give so accurate an approximatoin to the recorded population as a curve of some other form. As a method of predicting future growth also it is liable to the irruption of influences not previousy prevalent. Pearl states: "predictions of future growth may at any time be altered by the entrance into the situation of new economic or social factors of a different sort to those which have operated during that past period which the equation covers. The population may be stimulated to start upon a new cycle of growth or slighter but still in kind new factors may alter somewhat the upper limiting value of the present cycle." In certain instances however the logistic curve calculated by him gives astonishingly close approximations to the population actually recorded later. For the United States of America in 1930, for instance, a curve worked out before the Census of 1920 suggested a population within 5 per 1,000 of that actually enumerated.

Three curves of Pearl's logistic type have been fitted to the census population of Bengal and the population calculated from them ..... is compared with the observed population. The first is the equation worked out by Mr. P. J. Griffiths, I.C.S., and it was hoped to give in an appendix brief notes on the method by which it was calculated. Difficulties in setting up that rather complicated mathematical formulae involved, however, have presented them. Briefly however, that method consists in fitting a curve of the required type to three of the recorded census figures and then adjusting it by successive approximations to all the recorded figures. The desired approximation is one in which the algebraic sum of differences between the calculated and the actually recorded populations is nil and the sum of the squares of these differences is a minimum. Mr. Griffiths' curve was worked out for the population actually recorded in Bengal treating the interval between each census count as being exactly ten years and as suming that a negligible error only was introduced by this treatment and by neglecting to make an adjustment for change of area. For the other two calculations the recorded census population was adjusted to represent the estimated population in the area now constituting Bengal on the 1st March of each census year after 1881 and on the 1st March 1871. In making this calculation it was assumed that the population between any two census years changed at a uniform rate and that the rate of change between March 1871 and the date of the census in 1872 was the same as between 1872 and 1881. In arriving at the third equation allowance has been made for a small factor which Mr. Griffiths has noted as being disregarded in his calculation. The equations give a curve of reasonable fit and the last shown in the most accurate approximation for the observations in so far as the algebric sum and the sum

of squares of differences between the observed and calculated population at all census year including 1871 the sum of the d ifferences is least and the sum of their squares not indeed least but very near to it.

**General tendencies of population growth and upper limit of population suggested**

On the first equation the rate of increase was being successively enchanced till 1881 when it began to decline and the maximum population would be about 74 millions, which would be practically attained in 2063 A. D. On the third equation the point of maximum increase was passed 1872, the rate of growth is also diminishing and a maximum population of of about 68¾ millions would be expected which should be approximately reached in 2076 A. D. On neither equation is any lower limits of population implied, *i.e.*, the equations do not suggest that the present cycle of population growth began at any definite period, although on the third equation Bengal should have had a population of not less than two millions in 1668 A.D.

Mr. Griffiths also fitted curves to the population of Muslims and Hindus .....The correspondence of these figures, particularly for Hindus, is not so close as is obtained by the equation for the total population, but the Muslim equation gives a reasonable fit for the years 1881 to 1921. The total maximum population towards which the equations suggest that each community is tending would be for Muslims about 32 millions and for Hindus about 23¾ millions: in aggregate these figures fall short by 14 to 20 millions of the upper asymptotic population calculated for all communities. The Muslim and Hindu equations imply that the point at which the rate of increase ceased to be successively greater than in previous decades was passed in about 1886 by the Muslims and 1812 by the Hindus who are now approaching a stationary population. In any case the implication is that the Hindu community is further along its present growth cycle than the Muslim: in other words that it is approaching its maximum whilst by comparison the Muslim community is till rapidly growing. It is possible to find a suggested explanation, if this is actually true, in the fact that Muslims live mainly in the healthier regions of Eastern Bengal and Hindus in the less healthy and less progressive portions of West Bengal: but it would be interesting if similar calculations have been made, to know whether the implication arises also in the case of other provinces.

**Estimate of population in 1941**

The equations for total population suggest a population of between 53 and 53¾ millions in 1941. The communal equations appear (and Mr. Griffiths holds them) to be inappropriate. Equations of a more complicated form might give closer correspondence with the observed census figures, but the calculation involves very great labour, they might give no better estimates for the future and in any case they are scarcely worth making in view of the fact that only seven counts are on record. For the future all that can be said is that if the type of equation used is applicable to population growth and if the conditions influencing population growth in Bengal over the period to which it has been applied continue substantially unchanged for the future, the estimates of total population made by use of the equations deduced

should represent the population to be expected. The equation themselves suffer however by being fitted to so few observed counts and the conditions influencing population growth cannot be predicted and are difficult to discover if a change in the cycle suggests their existence. Thus after the formation of the German Empire and the institution of the present constitutions in Japan, Pearl found that the cycle of growth was, as it were, speeded up and Germany and Japan starting from the population of that critical time took a leap forward and continued their cycle as if they had been at an earlier stage when growth was more rapid. It is by no means impossible that constitutional change may have a similar effect in Bengal and may affect the different communities to a different degree.

**Can Bengal support a larger population ?**

The prospect or even the possiblity of so considerable an increase in a population already one of the densest in the world may lead to apprehension that the population of Bengal is rapidly approaching numbers which cannot be sustained at any reasonable standard of living upon the means of subsistence which Bengal can produce for long. If population actually does increase according to some such law as that illustrated by the logistic curve the fact that considerable increases are inevitable makes the apprehension futile. Pearl himself has pointed out that this inevitable increase need not necessarily increase the misery in the world since first this result has not happened up to the present, secondly "the orderly evolution of human knowledge justifies us in assuming that science will keep pace in discovering means of expanding opportunities of happy human subsistence", and thirdly the human organism is itself adaptable to an extent not yet imagined. It cannot be denied that a large part of the population of Bengal lives at a very low level of subsistence, and that any increase of population must lead to increased distress unless the potentialities of the province are developed. What is suggested here is that these potentialities are such that pessimism as to the future condition of its population if considerable increase take place is not necessarily justified. Like the rest of India Bengal is notable for its undeveloped resources and the inefficiency with which such resources as it has are exploited. The soil is probably unlikely to deteriorate further and the general opinion about areas such as Bengal, where scanty manuring necessitates small crops, is that a dead level of yield was reached long age and is conditioned by the rate at which plant food constituents are made available by weathering. The cultivator in Bengal practically ever enriches the soil with any manure and the use of manures together with an improvement in the implements of agriculture which would then be rendered possible would probably increase enormously the output of the soil. It has been* estimated that improved methods would result in a reasonable expectation of increased food output of 30 per cent throughout the whole of India. There is no doubt that any additional labour required under a more intensive form of cultivation could easily be obtained since the agriculturist in Bengal on

*G. Clarke, Proceedings of the XVIIth Indian Science Conference.

the whole probably works less than agriculturists in almost any other part of the world. Subsidiary Table I (Bengal Report) also shows that of the total area cultivable only 67 per cent is now actually under cultivation. If the total cultivable area were brought under cultivation and if improved methods of cultivation yielding an increase of 30 per cent over the present yield were adopted it is clear from a simple rule of three calculation† that Bengal could support at its present standard of living a population very nearly twice as large as that recorded in 1931. Fresh areas in course of time will be brought under cultivation as lands on the Bay of Bengal accrete and reach a stage suitable for cultivation. Even at present it is clear that by far the majority of the food stuffs consumed in Bengal are locally produced. During 1930-31 taking only grains, pulses and flour, salt, sugar and spices, provisions and oilman's stores Bengal imported goods of the value of Rs. 821 lakhs and exported goods of the value of Rs. 281 lakhs. But the balance of trade during the same year amounted to Rs. 34,52.41 lakhs or more than three times the aggregate export and import trade. The seaborne trade of Calcutta is not confined to goods originating in or meant exclusively for Bengal, but in the year 1930-1931 jute, tea and hides contributed 77½ per cent of the total and Bengal contributed all the jutes, nearly all the hides and a very considerable part of the tea. It is consequently clear that the favourable balance of trade to a very small extent only was dissipated outside Bengal and that the balance itself provides sufficiently for an enormously increased importation of food stuffs were it necessary to import them at any time. Not only agriculture but also industry is at present in Bengal practically in its infancy. Reviewing production in India a Bengali writer* in 1924 came to the conclusion that the "outstanding feature of the productive system of India is its inefficiency which is shown by the great wastage of resources on the one hand and the lower productivity of the industries on the other.... It is in sufficient production to which is due India's poverty, both absolute and relative.... The lack of capital is partly responsible for the present low productivity but could not.....be regarded as the fundamental cause of insufficient production in India .....Insufficient production is the result of inefficient labour, *i.e.* lack of capacity on the part of the people to mobilise the physical, intellectual and moral forces of the country and to organise land and capital effectively for national production". Improvement in methods of production both agricultural and industrial should therefore very easily make possible the subsistence of such an increased population as is suggested by the figures already discussed, and the considerations deduced in this paragraph also make it possible to hope that such an increase of population may be attended with a very considerable increase in the material condition of the people and in the standard of living. It is clear at least that it is not yet time to indulge in gloomy forebodings on the ground that Bengal is over-populated, provided full use is made of the available resources of the country by improved methods.

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† $\frac{100}{67} \times \frac{130}{100} = 194$

* Rajani Kanta Das, Production in India.

**Extravagent methods of population increase are a practical problem**

A final problem suggested by the growth of population in Bengal concerns the enormous wastage of life with which that growth is achieved. It is clear that what is of importance in population growth is the rate of increment. A high rate of increment can be achieved by a relatively low birth rate if the death-rate is also low, whilst on the contrary a comparatively low rate of increase results from even a high birth-rate if the death-rate also is high.....actually both the birth-rate and the death rate in Bengal are very high and.....there is consequently an appalling wastage of reproductive energy in maintaining the present increase of population. If the logistic theory of population growth is correct a retarded rate of increase is inevitable at the upper stages of the cycle of growth until finally a population is reached which to all intents and purposes is stationary. France in Europe where there is a notoriously low birth-rate probably illustrates this position best but an exhaustive* enquiry into the Arab population of Algilrs suggested to Pearl that the retardation of the rate of increase is in general affected at the upper stages of the population growth by decrease both in the birth-rate and in the death-rate. The Arab population of Algiers showed both a decrease in the birth-rate which would not be ascribed to improvement in public health measures since the traditional custom of the Arabs offer the utmost possible resistance to any changes in their habits which would improve sanitary conditions. Attempts to effect a retardation of the rate of increase by voluntary limitation of the birth-rate are almost certainly doomed to failure particularly in Bengal. They are repugnant to common sentiment in this country, the methods adopted are so expensive as to be beyond the reach of the great majority of the inhabitants and it is probably true to say that there are as yet none which can be relied upon as being absolutely certain and satisfactory. Figures for the different strata of society....show that there is no evidence to believe that contraceptive measures are used by the upper classes or those engaged in professions and the liberal arts; and it is certain that they are not practiced at all in the lower strata of soceity. What appears to happen, if the analogy of Western Europe may be accepted, is that a decrese in the death-rate is inevitably followed at some period by a corresponding decrease in the birth-rate. It is clear also that fertility in western countries decreases with the increse of wealth and intellectual interests. It is therefore possible to expect that a reduction of the birth-rate by the adoption of improved measures of public health accompanied by an improvement in the standard of living, an increase in the spread of education and perhaps principally by a further emancipation of women and their introduction to spheres of usefulness and activity from which they are now in Bengal generally debarred by social custom and by the institution of purdah will in due course result in a decrease in the birth-rate corresponding with the decrease in the death-rate which it is the object of public health measures to bring about.

*Biology of Population Growth.

## CENSUS OF INDIA 1941

### I—GENERAL

India proper has added over 50 millions to its population in ten years. In other words, the mere decade increment is itself greater than the entire population of any European country except Germany or Russia. This was not unanticipated by any means. More than one observer had predicted a population of these dimensions and between census observation had shown that it was on the way.

Undoubtedly this massive increase must impress forcibly and even come as a shock to those without knowledge of the factors behind it, and one can detect in some of the less instructed utterances a kind of despair, as if population increase was a kind of snowball which once started must rush on till some catastrophe arrests its momentum. The true position is very different. Ten years is a long time even to an adult and a kind of minor enternity to youth. But it is less than half a generation and the pulse of life beats, not by the year but by the generation. When one influences reproductive forces one cannot think in decades. When one reduces maternal mortality one does not only preserve so many women in the tale of heads; one also preserve a reproductive force and each Woman's contribution is not one, but two, three, four, etc., during the period of her married life. I have touched on this general aspect in a separate note and need only impress there the importance of the organic point of view. When one makes such reductions of maternal or infantile mortality, etc., one has added a reproductive force, which, in Indian conditions, will be applied. Everything that reduces the death rate from diseases which attack persons in youth or the prime of life to some extent performs the same feat.

All this is different in degree from changes which preserve persons of mature years longer in existence, although this effect also is apparent in India. In fact one is not operating by mere addition at all. We are in the realm of differentials and one of my ambitions was to attempt a differential expression of the second degree as a general statement of the Indian population problem at the present day. That possibility has gone, but the point remains that what has happened in India in the last twenty years has been not so much the preserving of life as a large accession of potential.

There are many variables in the reproduction equation and if this were more generally realied what is called the population problem would receive a readier and wider comprehension. Such an outcome is in itself greatly to be desired. Some of the variables are measurable, others are not. If the age at marriage rises we can, given reasonable statistics, measure its effect on population. As public health produces its effects of lowered maternal mortality, lower death rate from epidemic diseases, lower infantile mortality, etc., we can, again given reasonable statistics, measure them. And in fact the mathematics of large numbers has as one of its most interesting and valuable attributes the power to extend prognostic efforts beyond what would be possible on the limited scale of town or even district. So far the indirect, the intangible forces can be measured only by their effects. In other words,

if social or economic causes are operating on population growth then their measurement is from their result and we are really deducing causes after they have operated. That is the position in the many and varied discussions of the population problem in the West. The tendencies have been noticed and the effects measure and from the effects we have tried to deduce the operating causes. It would be a great advantage if our social observations could be so extended as to enable us to take these intangible causes before they had operated on the generations. It would be difficult to base such observations entirely on figures, but there are other lines which could be developed and figure would always help; thus a full system of birth, marriage and death registration in India would in itself be a great aid.

This time we have not in India even the age tables to work on, but possibly these will appear later for British India and in any case they will be forthcoming from the major states which here, as in other lines, should offer a most valuable field of information and study of all interested in India's population.

The increase is by no means uniform although, a greater figure than for the previous decades is practically universal. Rates are noticeably larger in the north than in the south and have two distinct peaks in the extreme west and north-west and in the east. In fact we have in the Punjab and Eastern Bengal two swarming areas. Both are comparatively young from a habitation point of view. The Punjab irrigation is by no means ancient and when applied was applied not to land with a substantial settled population and long local practice, but to a semi-desert. So, as it were, it started from scratch. The Punjab phenomena show themselves this time in Bikaner where the Sikh has followed the water and produced a 40 per cent. increase. Similarly in Bhawalpur, where you have an empty country suddenly presented with the means for filling it, the filling process starts at a high speed. In effect you have an open frontier. America had the open frontier too, although it presented itself there is a different form. In essence, however, the phenomenon was the same *i.e.*, empty lands suitable for habitation, or in other words for swarming. The difference is that in America the empty lands were suitable from the beginning. In the Punjab they were unsuitable till the water came. Once they were suitable, the human tide flowed.

When the frontier is closed the pace drops rapidly. The same will happen in the Punjab and in India. Frontiers are of many kinds, not only physical but also mental and social; their influence, however, is always the same.

In East Bengal, we have another kind of new country. From a habitation point of view it is far younger than West Bengal. It has a practically unfailing water supply and the river floods have a healthy and cleansing influence as well. We have, therefore, this land, whose inhabitants taken all over are on a lower level of living than West Bengal multiplying freely while increased capacity proceeds. In other words, their frontier is open too.

India as a geographical unit and as a home of civilization is old, but within that oldness it covers also much that is new, a point which it is important to bear always in mind. Moreover, though old it is not necessarily

static and when new circumstances come new affects will follow. The basic point remains that when a country is empty and the means of filling it come, it will be filled.

Another element was present behind the general increase which has some bearing on the differential rates as between North and South India. And indeed, the very existence of these differences squares with past experience which would have indicated them as to be expected. The factor in question is the degree of under-enumeration in 1931.

At that time Mr. Gandhi's civil disobedience campaign was in full swing and all over North India the census, as a governmental activity, incurred hostility as such. In Ahmedabad city, the census could not be taken at all and similar effects were undoubtedly apparent in Surat and other Gujarat areas. Likewise in the larger towns and particularly the cities, where enumeration in any case is always difficult, the risks of assault, intimidation or hostility in 1931 undoubtedly existed and were not such as to encourage unpaid enumerators to absolute thoroughness of discovery. The dimensions of the leak, as it were, are indeterminable, but we have several lines of indication which enable us at least to locate its more prominent appearance. For example, such is the quality of the Indian village staffs and rural population generally that there is no reason to suppose it reached any marked dimension outside towns except possibly in such areas as Guajrat; and in the South where heads are harder, it did not enter at all. It was undoubtedly present however, in the larger towns and other regions in Northen India.

Consequently if the adverse circumstances of 1931 no longer existed one would expect their removal to show an effect in an apparent greater increase in the regions where these causes had operated most at the earlier census. In other words, one would look for a larger increase rate for 1931-41 in such places as Ahmedabad, Surat then, say, corresponding cities elsewhere; and in genearal in North India than in the South. This has been borne out by experience; increase rates in the South are below those in the north, while the present figure for Ahmedabad bears no relation to the 1931 determination.

Much the same influence enters in another way, affecting this time rather the system as a whole than particular disturbing causes. Ten years ago, and indeed at all previous census, the people's attitude towards enumeration, might be described as passive. In 1941 it was extremely active. In past decades if some one were left out, the chances where against him taking any trouble to get himself put in. All that was changed in 1941, and we had for example the spectacle of a not particularly wealthy or healthy individual taking a substantial journey to the headquarters of a province in order to assure himself that he had been recorded. Thanks to the acute interest in community figures, practically all communities this time were census-conscious and took pains to see that their houses were in the lists and that they themselves were counted. In other words, the second and predominant item in any census was at work; the citizens wanted to be counted. Unfortunately their anxiety was not always guided by reason or consideration and their enthusiasms created great difficulties for the census staff in certain areas. Nevertheless, the fact remains that an appreciable though undeterminable slack has this time been taken up.

## VI—PUBLIC HEALTH AND ALLIED MATTERS

Another point meriting particular attention is the estimation aspect of India's population, and I had hoped to go fully into this, to examine the data existing, show what they offered and what they lacked, their zone and direction of variation, and in fact everything that would throw light on our capacity to indicate the probable growth of India's population, not in the next few years but in the next several decades and indeed generations. Apart from the necessity of the inquiry itself the question is one of great importance for India for the Commonwealth and for the world. Here and there an occasional fragment of the contemplated treatment will be seen in, for example, the emphasis laid on vital statistics. Perhaps someone else will be granted the time and the opportunity to take this synoptic view of a great issue.

Another fragment is discussed below and starts from a brief note by the Public Health Commissioner for India which he was good enough to give me on three points put to him, namely a summing-up over the last 20 years on—

(a) maternal mortality,

(b) infantile mortality,

(c) mortality rates for the main epidemic diseases.

Tables prepared by him are given below and also four diagrams for British India.

The general effect can be summed up as: a little changing but high birth-rate, a falling death-rate and a markedly dropping infantile death-rate accompany a downward trend in the death-rate from cholera an the continued diminution of plague as a cause of mortality. All these tendencies taken together point in one direction namely a substantial growth-rate in the population. They bear out in fact in a more specific way the general tendency described elsewhere.

The vital statistics in India are not complete and in some cases far from it. Their development however is in the direction of greater fullness and accuracy and consequently variations in the ratios of birth or mortality, etc., due to variations in the quality of the statistics will be only in one direction, *i.e.*, of apparently raising the ratio, since if in one year X births on Y population are reported or discovered and later on X+A births are discovered over the same population owing to improvements in methods, the birth ratio rises apparently from X/Y to (X+A)/Y in each case multiplied by a thousand. Consequenty although as the Public Health Commissioner says the downward trend in the death rate has not reached the extent of technical statistical significance it is justifiable to conclude that such a trend in fact exists.

Where infantile mortality is concerned the fall is significant as the graph shows. When one remembers what a large proportion of deaths actually occur in the first year of life, reduction of infantile mortality from 195 in 1920 to 160 in 1940 represents a substantial accretion to the population.

This can at once be appreciated if one applies the reduction to a birth-rate of say 33 per 1,000, on a population of 390 million modified by a death-rate of 22; the result is an annual accretion of the order of 3 lakhs and for the last decade 3 millions, from the single cause of a reduced infantile mortality.

This is of course a highly simplified statement but a full treatment will be found in a note attached to this report where Mr. S. Swaroop, Statistician in the Office of the Director General, Indian Medical Service, has made a series of ingenious calculations to estimate the probable additions to the population, as a result of the fall in infantile mortality, by the middle of 1931, 1941, 1951 and 1961 respectively. The following figures are reporduced from his note :

STATEMENT

| Sources of addition to population | Probable additions at the middle of each census year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1931 | 1941 | | 1951 | | 1961 | |
| | | (a) | (b) | (a) | (b) | (a) | (b) |
| Additional saving of infants each year | 807,470 | 3,052,985 | 3,052,619 | 5,919,061 | 6,512,904 | 8,732,929 | 10,993,458 |
| Births occurring among additional infants saved:— | | | | | | | |
| (i) First generation | .. | 21,595 | 21,595 | 531,276 | 531,276 | 2,382,618 | 2,394,202 |
| (ii) Second generation | .. | .. | .. | 16 | 16 | 11,486 | 11,486 |
| Total | 807,470 | 3,074,580 | 3,074,214 | 6,450,353 | 7,044,196 | 11,127,033 | 13,399,146 |

Thus even if the infant mortality rate continues to be 160 per mille (the figure for 1940) for the next two decades, substantial additions of 6.5 and 11.1 millions are likely to result by 1951 and 1961. If on the other hand, infant mortality should continue to decrease at the same rate as during 1920 to 1940, the corresponding figures will be 7.0 and 13.4 millions respectively.

These figures give some indication of the probable effect on population growth of one aspect of public health activity, *viz.*, the campaign for the saving of infant life; and the nature of the portent exposed for the attention of governments and citizens alike.

Registration of maternal mortality is so limited that a figure cannot be based on country-wide statistics. The public Health Commissioner however refers me to three specific enquiries conducted by medical men in Madras, Calcutta and Bombay which yielded figures respectively of 16.6, 24.4 and 8.9 per 1,000 total births. The variation is so wide as to call for a certain caution in using the figures or even in quoting them. Sir John Megaw's enquiry of ten years ago based on questions put to village dispensary doctors all over British India indicated a maternal mortality rate equal to the Calcutta figure above, *i.e.*, 24½ per 1,000. The Public Health Commissioner suggests that it would not be an unreasonable working assumption to take the figure for the country as a whole as being somewhere in the neighbourhood of 20 per 1,000. As soon as we compare this with the figure for England and Wales, 2.9, we see at once the effect on potential of a reduction in this rate. For it is women who represent the reproductive potential since it is they who bear the children. The scope for appreciable reduction of this figure of 20 per 1.000. is obvious even if we leave out of account for the present any question of approximation to figures comparable with that for England and Wales.

Supposing the maternal mortality were reduced by 10 per thousand We have no age figures unfortunately or this census. So we have no total of married women at the reproductive age to which to apply this concept Taking however the 1931 figures as giving dimensions at least, we find that the saving in female life per year would be 635,000 or in a decade over 6 millions. Even if maternal mortality is reduced only by 1 per thousand, 63,000 women should be added to the population in a year or 600,000 in a decade even allowing for the fact that the ordinary death rate would consequently apply to them. And all these women will be left not only to contribute their own quota of one but the additional elements represented by the children they will bear. If one multiplies the saving of mothers by a reproductive potential we can secure at least an idea of the accretion of population involved. Though every allowance may be made for the approximation of the statistics, and every caution observed in their discussion, there remains the incontestable fact of not only a probability but a certainty of increase on this account. Causes precede their effects, the time lag varying with the particular phenomenon. Likewise changes in potential. When you affect the infantile mortality rate you have an immediate straight forward addition and also a deferred addition of the second degree which will operate about 20 years later. When you affect maternal mortality you make the direct addition and in the immediately succeeding years, what I call the second degree of addition also. You also however make what I may call a third degree ddition in as much as you create the conditions in which later on the new reproductive sources will operate.

The Public Health Commissioner's figures show that in it the 20 years 1920-39 approximately 4 million died from cholera but more than half died in the first half of the decade and only 1/5 in the last quarter. Even as it stands therefore the figures show that taking the 1925-29 rates as a basis something like 5,00,000 persons fewer died from this disease than in the previous decade. Or in other words, ½ million people were added to our 1941 population, who otherwise would have not lived into it. If the apparent trend of the figures continues one observes immediately the likely effect. Plague has never been in recent years so great destroyer as cholera. But even so the diminution in its ravages represents the saving of a million lives as against the previous ten years, so marked has been the diminution in its lethal effect. Smallpox on the other hand shows a less marked decline and indeed over the last decade no decline at all although the figures are well below the black lustrum 1925-29. Taking however these two diseases, cholera and plague, both endemic to India, we see that going on the 1920-29 figures, the 1929-39 experience represents a saving of 1½ million lives. Remember that no public health statistics are as complete as we should wish them and make all allowances necessary; but even so we see here the effect of protective measures and can realise the greater scope of methods which affect potential as distinct from the more isolated occurrences of a year.

All of this makes a statistical problem as interesting as it is important. The value zone and the figures themselves need most careful determination before one could embark on any elaborate predictive enquiry and the gaps in Indian vital statistics are such as to make this at first sight an undertaking of every speculative value. Given, however, the time and the patience and a full acquintance with the information that is at hand one could achieve more in the way of prediction than is realised. It is particularly important in this sort of enquiry however to have an absolute familiarity with the orginal data. It is one thing to operate from constants or from figures of established validity within a definite zone; it is a very different matter to operate on figures themselves based on data of varying quality. A figure in itself means nothing, it may be a fact, a reasonable approximation, a guess, an error—or even for that matter a lie. It is very necessary therefore, to be able to attach the proper category to the figures from which we start and into such an estimate enters at once a clear knowledge of how they are obtained. For this knowledge it is necessary to see or note how the basic data are collected, for one of India's additional problems is that the methods or standards of collection vary widely as between different parts of the sub-continent. Hence the importance of a associating a skilled statistical treatment with a profound understanding of the quality of the original data. This applies in any scientific field in the sense that the two must never be divorced although they may be in different hands, but it is particularly important in a problem like that of using highly variable original data to produce efforts of prediction.

Vital statistics are primarily demographic in relevance, although of course their connection with the public health administration is obvious enough; and perhaps their importance from the demographic aspect has been obscured by the tendency to look at them as a purely departmental feature affecting the Public Health Commissioner and provincial Public Health Officers. The population developments in a country of this size are of much more than public Health significance however, for in one way or

another, the entire administration of the country is conditioned by them. Vital statistics therefore, wherever they are handled in the first place, should be immediately and directly related also to a central statistical authority which would be in constant touch with their development and be able to integrate them at once with the main statistical system of the country.

Thus to sum up this brief note the results of an increasingly wide application of preventive medicine to the life of the community will be positive accretions of population and a further lengthening of the span of life for the individual by the control of infectious disease and by the creation of an environment more conducive to healthful living than that which exists at present. These changes will in all probability be accelerated by a wide awakening of the public conscience that is likely to follow the ferment of ideas that the World War has brought into being. The substantial increases in population will create numerous and complex problems for solution and, if the country is to progress satisfactorily on the road of advancement, all thinking men and women should even now begin to turn their minds to an earnest consideration of these problems.

And in fact the population figures of any country should spring from systematic regular collection, not from the ten-yearly convusions of a census.

With a complete system of vital statistics it should be possible to introduce simplifications and economics in the country-wide enquiry, setting free thereby funds for more useful work, among which would be actual public health measures themselves.

TABLE I

*Birth, death and infantile mortality rates*

| Years | Birth | Death | Infantile mortality |
|---|---|---|---|
| 1920 | 33 | 31 | 195 |
| 1921 | 32 | 31 | 198 |
| 1922 | 32 | 24 | 175 |
| 1923 | 34 | 25 | 176 |
| 1924 | 33 | 28 | 189 |
| 1925 | 32 | 24 | 174 |
| 1926 | 33 | 25 | 189 |
| 1927 | 33 | 23 | 167 |
| 1928 | 34 | 24 | 173 |
| 1929 | 33 | 24 | 178 |
| 1930 | 33 | 25 | 178 |
| 1931 | 35 | 25 | 179 |
| 1932 | 34 | 22 | 169 |
| 1933 | 36 | 23 | 171 |
| 1934 | 34 | 25 | 187 |

TABLE I.—*Concld.*

| Years | Birth | Death | Infantile mortality |
|---|---|---|---|
| 1935 | 35 | 24 | 164 |
| 1936 | 36 | 23 | 162 |
| 1937 | 35 | 22 | 162 |
| 1938 | 34 | 24 | 167 |
| 1939 | 34 | 22 | 156 |
| 1940 | 33 | 22 | 160 |

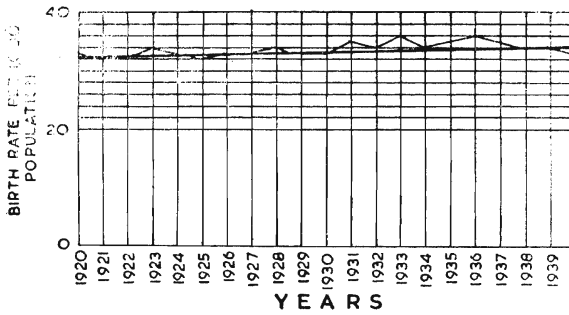
TABLE II

*Death rates for cholera, small-pox and plague*

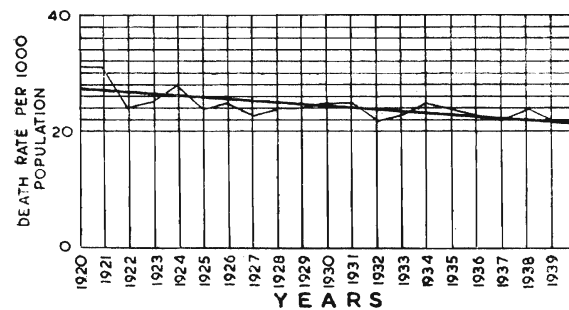
| Year | Cholera | Smallpox | Plague |
|---|---|---|---|
| 1920 | 0·6 | 0·4 | 0·4 |
| 1921 | 1·9 | 0·2 | 0·3 |
| 1922 | 0·5 | 0·2 | 0·3 |
| 1923 | 0·3 | 0·2 | 0·9 |
| 1924 | 1·2 | 0·2 | 1·5 |
| 1925 | 0·5 | 0·3 | 0·5 |
| 1926 | 0·5 | 0·5 | 0·8 |
| 1927 | 1·2 | 0·5 | 0·2 |
| 1928 | 1·4 | 0·4 | 0·5 |
| 1929 | 1·2 | 0·3 | 0·3 |
| 1930 | 1·3 | 0·3 | 0·3 |
| 1931 | 0·9 | 0·1 | 0·2 |
| 1932 | 0·3 | 0·2 | 0·2 |
| 1933 | 0·3 | 0·4 | 0·2 |
| 1934 | 0·8 | 0·3 | 0·3 |
| 1935 | 0·8 | 0·3 | 0·1 |
| 1936 | 0·6 | 0·4 | 0·04 |
| 1937 | 0·4 | 0·2 | 0·1 |
| 1938 | 0·9 | 0·1 | 0·06 |
| 1939 | 0·4 | 0·2 | 0·1 |
| 1940 | 0·3 | 0·3 | 0·7 |

N.B.—Rates (British India) have been calculated on estimated populations for between Census years —Burma has been omitted.

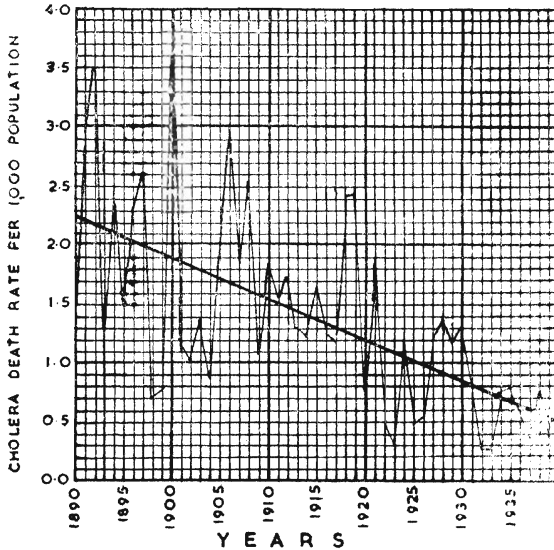
BIRTH RATES FOR BRITISH INDIA
1920-1940




DEATH RATES FOR BRITISH INDIA
1920-1940



## TREND OF CHOLERA MORTALITY IN BRITISH INDIA 1890–1940




Note: The equation of the trend line is Y 2·2544 0·0350 X where Y represents the cholera death rate and X the year The value of X is zero for 1890 and it increases by unity

## CENSUS OF INDIA—1941

### NOTE BY MR. SATYA SWAROOP, STATISTICIAN, OFFICE OF THE DIRECTOR GENERAL, INDIAN MEDICAL SERVICE, ON THE PROBABLE EFFECT OF A DECREASE IN INFANTILE MORTALITY ON THE FUTURE POPULATION OF INDIA

In British India the trend of the infantile mortality rate has been definitely downwards during the period 1920-40. This is clearly shown by the diagram on page 38 of the census report. This downward trend has been shown to be significant statistically. This decrease in infantile mortality results in an additional saving of infant life each year and in this note an attempt is made to estimate the probable effect of this saving of life on the future growth of India's population. The figures available for estimating this growth of population relate to British India alone but, by making the assumption that the British Indian rates may reasonably be applied to India as a whole, the increases in population set out in this note by the middle of the census years 1931, 1941, 1951 and 1961 give some idea of population growth for British India and Indian States.

The annual infantile mortality rates for British India are given in column 2 of Table 1. These have been smoothed by fitting a straight line by the method of least squares. The expected figure for infantile mortality is shown against each year in column 3 of the same table. The calculations of growth in population are based on these expected values for infant mortality. Column 4 presents the decrease in the rate for each year from that for 1920, if these annual decreases are multiplied by the total live births in each year the additional result of the declining infantile mortality rate are obtained for successive years.

The populations in British India of areas where registration of vital statistics was in force at the 1921 and 1931 censuses numbered 230,648,533 and 253,614,115 respectively while the corresponding populations for the whole of India, including the Indian States, were 305,730,288 and 338,170,632. In column 5 of table I are shown the annual births recorded in the registration areas of British India and in the next column are given the births for the whole of India obtained by increasing the births in column 5 in proportion to the increase in population. In making these calculations the population for the registration areas of British India and of India as a whole were estimated to the middle of each year.

The figures set out against each of the years, 1920-1940, in column 7 were obtained by multiplying the annual births in India (column 6) with the decrease in infantile mortality (column 4). These are the additional numbers of infants who survived their first year of life as the result of a continuous fall in infantile mortality.

It is difficult to predict the trend of infantile mortality in the coming years. The abnormal conditions that prevail as a result of the war add an element of uncertainty which makes any guess about the future



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hazardous. Nevertheless it must be remembered that even the rate of 160 per mille in 1940 was high and that in many countries of the world the rate was below 100 per mille. If this fall in the rate during 1920-40 were to be maintained in the coming years the rate for 1960 would still be as high as 132. The assumption that the infant mortality rate may continue to fall for the next two decades may not therefore prove to be unreasonable. However, in order to avoid the possibility of a wide margin of error if the projected decline in infant mortality did not take place, estimates of the survival of infants during each year from 1941 onwards have been made on two bases, *viz.*, (i) that the fall in infantile mortality recorded during 1920-1940 continued unabated in the next twenty years and (ii) that the rate of 160 per mille during 1940 continued at the same level till 1961. Estimates of births for the years 1941-61 have also to be made. These were done by fitting a straight line to the figures of column 6 for the years 1920-40 and by projecting it so as to cover the period, 1941-61.

In column 7, beginning with the year 1941 two sets of annual survivors of infants are therefore shown, the set (a) based on the assumption that the infantile mortality rate remains at 160 per mille and the other set (b) based on the idea of a continuous fall in the rate.

In discussing the probable effect of the saving of infant life on the growth of population we have also to take into account the contribution that the female section of these infants will make when they enter their reproductive life. For this purpose we must know the specific fertility rate by age as well as the numbers surviving in each year of the reproductive span of life. Specific fertility rates by age are not available for India because of the omission to record the age of the mother in the birth registration form. Mr. Yeatts has, for the first time in the census history of India, arranged to collect information which would throw some light on the fertility of women in different parts of India. It is understood that an analysis of these data for the whole of India has not yet been undertaken. The compilation of the numbers of children born to married women at individual ages, has however been carried out for a few randomly selected areas in different provinces. As the fertility rates required for the calculations carried out in this paper should be based on the total female population at each age (married, widowed and unmarried) it has not been possible to make use of Mr. Yeatts's figures. In part IV, Volume XXIV of the 1941 Census Report of Rajputana and Ajmer-Merwara, in the section relating to demographic survey, table 10 gives the actual numbers of women returned at each individual age and the children born to them. This information was collected from fifteen villages selected at random in Ajmer-Merwara. Our Second table shows in the first three columns the total numbers of females observed at each year of age and the total children born to them. Rates based on the recorded number of children born to the females at each year of age are set out in column 4 of table II. In view of the wide fluctuations in the rates their graduation was essential before they could be further utilised. This graduation presented some difficulty. Different methods of smoothing were employed and satisfactory results were obtained by fitting to these rates a curve of the form, $\log y = \log k + t/c \log g$ usually called after the name of Gompertz. The extent to which a satisfactory fit has been obtained may be seen from the diagram in which the fitted curve is superposed on the observed rates. The equation of the fitted curve was found to be $\log y = 3 \cdot 746,6516 - 2.\ 175,476$

(0·837,860)$^t$ were $^t$ is taken as zero for age 15 and its value increases by unity for each successive year of age. The expected values of y calculated from this equation are shown in column 5 of table II. These are the total numbers of children born to 1,000 women at individual ages. It is necessary to state here that, in the census report, against each person the age has been recorded only in completed years, the months being left out. The rates therefore show the children born to 1,000 women up to an age approximately half a year more than the age shown in column 5 of table II. Thus against age 24 the figure appearing in column 5 is 2013·56 which means that up to age 24·5 years a thousand women would have had 2013·56 children born to them. First order differences of the series of figures in column 5 are given in the next column and these show the numbers of children born in any one year to 1,000 women of any particular age. These are the specific fertility rates and have been used for estimating the numbers of children likely to be born to female infants who survive their first year of life.

The number of female infants surviving at each year of the reproductive life must be calculated. The total number of infants who survive their first year of life being known for each year from column 7 of table I, the number of females among them should first be estimated. The sex ratio of males to females at birth was 51,919 to 48,081 during the five years, 1929-1933. These years have been chosen because the year 1931 for which life tables showing rates of survival at different ages are available, falls in the middle of this range. By applying the 1931 life table rate of survival to the male and female infants, it is seen that 39,005 males and 36,910 females reached their first year of life. Therefore females formed 486 per thousand of the total children surviving to age one. The figures in column 7 of table I have therefore been multiplied by 0·486,203 to get the numbers of female infants surviving to their first year of life. These are shown in column 8 of table I. If the number of female infants surviving to age one is taken as 1,000, by the application of the survival rates of the All-India life tables for females (1931), the survivors of 1,000 women at age one are given in column 7 of table II. Starting with 1,000 females at age one, the product of the specific fertility rates at any age with the survivors shown in column 7 for the corresponding age gives approximately the total unmber of children born in that particular year. These figures are shown in column 8 of table II and can be considered to be the net fertility rates starting with 1,000 females at age one. By the repeated application of these net fertility rates of column 8 (table II) to the series of female infants showm in column 8 of table I the numbers of children born each year have been calculated and are shown in table HI. Thus in 1933 the 1921 group of 6,894 females passing through their age 13 will give birth to a certain number of infants and this number is, as will be seen from table III 17. ( 6·894×2·50=17). In 1934 the 1922 group of 13,640 females will also reach the reproductive age 13 and the births recorded in that year will be contributed by the 1921 group of 6,894 females as well as by the 1922 group. The total number of births in 1934 will therefore be 84, (6·89 ×7·24+13·640×2·50=84). In each successive year a new group of females will begin to contribute to the births in addition to the ones already engaged in active reproduction. The total numbers of children thus born in each year are shown in column 9 of table I. From 1946 onwards the survivors of the female children among those shown in column 9 of table 1 will also

begin to reproduce themselves. However, the numbers of females surviving to the earlier reproductive ages (13, 14, etc.) are so small that no real contribution by children born to them is made till 1949. The births of this second generation are shown in column 10 of table I. The details are available in table IV.

It remains now to calculate how many of infants shown in column 7 and of the births in columns 9 and 10 of table I will survive at each of the census years 1931, 1941, 1951 and 1961. These were obtained by applying the 1931 life table rates of survival for males and females separately to the survivors in column 7 and to the births of the first and second generations. The figures are set out in columns 11—19 of table I. The total survivors at each of these census years are shown at the bottom of each series of figures. All these estimates of survivors have been made to the middle of each census year and of the births occurring in each of these census years only half have been counted. The results are shown in table below :

| Sources of addition to population | Persons likely to be enumerated at the middle of each census year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1931 | 1941 | | 1951 | | 1961 | |
| | | (a) | (b) | (a) | (b) | (a) | (b) |
| Additional saving of infants each year | 807,470 | 3,052,985 | 3,052,619 | 5,919,861 | 6,512,904 | 8,732,929 | 10,993,458 |
| Births occuring among the additional infants saved : | | | | | | | |
| (i) First generation | .. | 21,595 | 21,595 | 531.276 | 531,276 | 2,382,618 | 2,394,202 |
| (ii) Second generation | .. | .. | .. | 16 | 16 | 11,486 | 11.486 |
| Total | 807,470 | 3,074,580 | 3,074,214 | 6,450,353 | 7,044,196 | 11,127,033 | 13,399,146 |

It is therefore likely that the decline in infantile mortality during the period 1920-1940 would have added approximately eight hundred thousand persons to the population of India by the middle of 1931 and over 3 millions by the middle of 1941. Looking ahead, if it is postulated that the decrease will continue at the same rate as in 1920-1940, the addition to the population by the middle of 1951 is likely to be about 7·0 millions and in 1961 about 13·4 millions. If, on the other hand, the infantile mortality rate continues to be 160 per mille (the figure for 1940), the corresponding figures for 1951 and 1961 are likely to be 6·5 and 11·1 millions respectively.

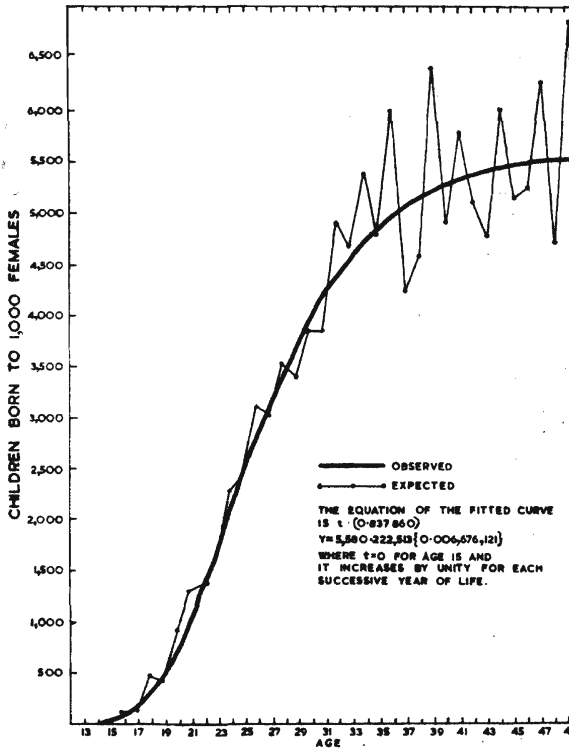

CHILDREN BORN TO 1,000 FEMALES
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49
AGE
OBSERVED
EXPECTED
THE EQUATION OF THE FITTED CURVE IS t (0·837 860)
Y= 5,580·222,513{0·006,676,121}
WHERE t=0 FOR AGE 15 AND IT INCREASES BY UNITY FOR EACH SUCCESSIVE YEAR OF LIFE.

TABLE I

| Year | Actual infantile mortality per 1,000 live births | Expected value of the Infantile mortality rate | Decrease in rate as compared with the 1920 level | Annual births in the registration areas of British India | Proportional births in the whole of India *i.e.* (including Indian States) | Number of additional infants who reach age one | Number of additional female infants who reach age one | Children born to female infants of col (8) when they reach reproductive stage (1st generation) |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1920 | 195 | 189·065 | .. | 7,532,400 | 9,979,928 | .. | .. | .. |
| 1921 | 198 | 187·630 | 1·435 | 7,453,230 | 9,880,908 | 14,179 | 6,894 | .. |
| 1922 | 175 | 186·195 | 2·870 | 7,369,185 | 9,775,296 | 28,055 | 13,640 | .. |
| 1923 | 176 | 184·760 | 4·305 | 8,146,676 | 10,813,066 | 46,550 | 22,633 | .. |
| 1924 | 189 | 183·325 | 5·740 | 8,020,818 | 10,652,337 | 61,144 | 29,728 | .. |
| 1925 | 174 | 181·890 | 7·175 | 7,850,764 | 10,432,678 | 74,854 | 36,394 | .. |
| 1926 | 189 | 180·455 | 8·610 | 8,097,125 | 10,766,443 | 92,699 | 45,071 | .. |
| 1927 | 167 | 179·020 | 10·045 | 8,245,304 | 10,969,969 | 110,193 | 53,576 | .. |
| 1928 | 173 | 177·585 | 11·480 | 8,602,659 | 11,452,193 | 131,471 | 63,922 | .. |
| 1929 | 178 | 176·150 | 12·915 | 8,279,339 | 11,028,302 | 142,431 | 69,250 | .. |
| 1930 | 178 | 274·715 | 14·350 | 8,378,248 | 11,166,655 | 160,241 | 77,910 | .. |
| 1931 | 179 | 173·280 | 15·785 | 8,814,836 | 11,755,494 | 185,560 | 90,220 | .. |
| 1932 | 169 | 171·845 | 17·220 | 8,718,620 | 11,634,052 | 200,338 | 97,405 | .. |
| 1933 | 171 | 170·410 | 18·655 | 9,317,918 | 12,441,094 | 232,089 | 112,842 | 17 |
| 1934 | 187 | 168·975 | 20·090 | 8,923,169 | 11,921 066 | 239,494 | 116,443 | 84 |
| 1935 | 164 | 167·540 | 21·525 | 9,299,021 | 12,430,521 | 267,567 | 130,092 | 274 |
| 1936 | 162 | 155·105 | 22·950 | 9,555,379 | 12,782,078 | 293,477 | 142,689 | 706 |
| 1937 | 162 | 164·670 | 24·395 | 9,388,457 | 12,564,875 | 306.520 | 149,031 | 1,565 |
| 1938 | 167 | 163·235 | 25·830 | 9,398,011 | 12,585,068 | 325,072 | 158,051 | 3,085 |
| 1939 | 156 | 161·800 | 27·265 | 9,346,145 | 12,522,980 | 341,439 | 166,009 | 5,533 |
| 1940 | 160 | 160.365 | 28·700 | 9,283,832 | 12,466,803 | 357,223 | 173,683 | 9,182 |

TABLE I—*contd.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (a) | (b) | (a) | (b) | (a) | (b) |
| 1941 | | | | | 13,086,934 | 375,595 | 374,863 | 182,615 | 182,260 | 14,267 | 14,267 |
| 1942 | | | | | 13,237,686 | 379,922 | 393,311 | 184,719 | 191,229 | 20,986 | 20,986 |
| 1943 | | | | | 13,388,438 | 384,248 | 411,759 | 186,823 | 200,198 | 29,482 | 29,482 |
| 1944 | | | | | 13,539,193 | 388,575 | 430,207 | 188,926 | 239,168 | 39,822 | 39,822 |
| 1945 | | | | | 13,689,942 | 392,901 | 448,655 | 191,030 | 218,137 | 52,039 | 52,039 |
| 1946 | | | | | 13,840,694 | 397,228 | 467,103 | 193,133 | 227,107 | 66,099 | 66,099 |
| 1947 | | | | | 13,991,446 | 401,555 | 485,551 | 195,237 | 236,076 | 81,967 | 81,967 |
| 1948 | | | | | 14,142,198 | 405,881 | 503,999 | 197,341 | 245,046 | 99,583 | 99,583 |
| 1949 | | | | | 14,292,950 | 410,208 | 522,447 | 199,444 | 254,015 | 118,859 | 118,859 |
| 1950 | | | | | 14,443,702 | 414,534 | 540,895 | 201,548 | 262,985 | 139,713 | 139,713 |
| 1951 | | | | | 14,594,454 | 418,861 | 559,343 | 203,651 | 271,954 | 162,038 | 162,038 |
| 1952 | | | | | 14,745,206 | 423,187 | 577,791 | 205,755 | 280,924 | 185,714 | 185,714 |
| 1953 | | | | | 14,895,958 | 427,514 | 596,239 | 207,859 | 289,893 | 210,584 | 210,583 |
| 1954 | | | | | 15,046,710 | 431,841 | 614,687 | 209,962 | 298,863 | 236,459 | 236,473 |
| 1955 | | | | | 15,197,462 | 436,167 | 633,135 | 212,066 | 307,832 | 263,123 | 263,197 |
| 1956 | | | | | 15,348,214 | 440,494 | 651,583 | 214,170 | 316,802 | 290,321 | 290,567 |
| 1957 | | | | | 15,498,966 | 444,820 | 670,031 | 216,273 | 325,771 | 317,768 | 318,410 |
| 1958 | | | | | 15,649,718 | 449,147 | 688,479 | 218,377 | 334,741 | 345,149 | 346,384 |
| 1959 | | | | | 15,800,470 | 453,473 | 706,927 | 220,480 | 343,710 | 372,136 | 374,973 |
| 1960 | | | | | 15,951,222 | 457,800 | 725,375 | 222,584 | 352,680 | 398,412 | 403,499 |
| 1961 | | | | | 16,101,974 | 462,127 | 743,823 | 224,688 | 361,649 | 423,691 | 432,117 |

TABLE I—*Contd.*

| | Children born to females of the first generation when they reach reproductive stage (2nd generation) | Survivors of column (7) to the middle of each census year | | | | Survivors of column (9) to the middle of each census year | | | Survivors of column (10) to the middle of each census year | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1931 | 1941 | 1951 | 1961 | 1941 | 1951 | 1961 | 1951 | 1961 |
| 1 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 1920 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | .. | 10,713 | 9,563 | 7,914 | 6,008 | .. | .. | .. | .. | .. |
| | .. | 21,368 | 19,212 | 16,012 | 12,278 | .. | .. | .. | .. | .. |
| | .. | 35,749 | 32,342 | 27,143 | 21,018 | .. | .. | .. | .. | .. |
| | .. | 47,423 | 43,064 | 36,395 | 28,450 | .. | .. | .. | .. | .. |
| | .. | 58,691 | 53,402 | 45,447 | 35,851 | .. | .. | .. | .. | .. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | .. | 73,678 | 66,907 | 57,368 | 45,653 | .. | .. | .. | .. | .. |
| | .. | 89,180 | 80,392 | 69,466 | 55,747 | .. | .. | .. | .. | .. |
| | .. | 109,171 | 96,859 | 84,372 | 68,258 | .. | .. | .. | .. | .. |
| Nil | .. | 122,771 | 105,892 | 92,993 | 75,820 | .. | .. | .. | .. | .. |
| | .. | 145,946 | 120,071 | 106,370 | 87,382 | .. | .. | .. | .. | .. |
| | .. | 92,780 | 140,197 | 125,155 | 103,566 | .. | .. | .. | .. | .. |
| | .. | 807,470 | 152,584 | 137,192 | 114,340 | .. | .. | .. | .. | .. |
| | .. | .. | 178,238 | 161,248 | 135,331 | 10 | 9 | 8 | .. | .. |
| | .. | .. | 185,751 | 168,675 | 142,554 | 50 | 45 | 39 | .. | .. |
| | .. | .. | 209,792 | 190,886 | 162,452 | 165 | 150 | 129 | .. | .. |
| | .. | .. | 233,257 | 211,822 | 181,623 | 434 | 391 | 338 | .. | .. |
| | .. | .. | 248,068 | 223,623 | 193,231 | 987 | 875 | 762 | .. | .. |
| | .. | .. | 269,933 | 239,490 | 208,616 | 2,019 | 1,741 | 1,529 | .. | .. |
| | .. | .. | 294,309 | 253,847 | 222,925 | 3,826 | 3,147 | 2,788 | .. | .. |
| 1940 | .. | .. | 325,354 | 267,673 | 237,130 | 6,970 | 5,266 | 4,701 | .. | .. |

TABLE I—*Concld.*

| 1 | 10 | 11 | 12 | | 13 | | 14 | | 15 | 16 | 17 | | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (a) | (b) | (a) | (b) | (a) | (b) | | | (a) | (b) | | |
| 1941 | .. | .. | 187,798 | 187,432 | 283,774 | 283,221 | 253,328 | 252,834 | 7,134 | 8,249 | 7,417 | 7,417 | .. | .. |
| | .. | .. | 3,052,985 | 3,052,619 | 289,361 | 299,558 | 260,172 | 269,341 | 21,595 | 12,235 | 11,069 | 11,069 | .. | .. |
| | .. | .. | .. | .. | 295,092 | 316,220 | 266,964 | 286,078 | .. | 17,359 | 15,763 | 157,563 | .. | .. |
| | .. | .. | .. | .. | 301,377 | 333,667 | 273,673 | 302,994 | .. | 23,703 | 21,567 | 21,567 | .. | .. |
| | .. | .. | .. | .. | 308,063 | 351,779 | 280,300 | 320,076 | .. | 31,399 | 28,514 | 28,514 | .. | .. |
| | .. | .. | .. | .. | 315,718 | 371,255 | 286,706 | 337,139 | .. | 40,610 | 36,608 | 36,608 | .. | .. |
| | .. | .. | .. | .. | 324,980 | 392,958 | 292.956 | 354,235 | .. | 51,670 | 45,843 | 45,843 | .. | .. |
| | .. | .. | .. | .. | 337,035 | 418,510 | 299,025 | 371,311 | .. | 65,163 | 56,204 | 56,204 | .. | .. |
| | 3 | .. | .. | .. | 353,586 | 450,332 | 304,974 | 388,419 | .. | 82,128 | 67,612 | 67,612 | 2 | 2 |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 6 | .. | .. | .. | 377,553 | 492,641 | 310,617 | 405,302 | .. | 106,063 | 80,134 | 80,134 | 5 | 3 |
| | 17 | .. | .. | .. | 209,431 | 279,672 | 316,462 | 422,602 | .. | 81,019 | 93,689 | 93,689 | 9 | 10 |
| | 42 | .. | .. | .. | 5,919,061 | 6,512,904 | 322.313 | 440,064 | .. | 531,276 | 108,272 | 108,272 | 16 | 24 |
| | 91 | .. | .. | .. | .. | .. | 328,319 | 437,895 | .. | .. | 123,990 | 123,989 | .. | 54 |
| | 189 | .. | .. | .. | .. | .. | 334.934 | 476,749 | .. | .. | 140,747 | 140,755 | .. | 112 |
| | 360 | .. | .. | .. | .. | .. | 341,987 | 495,425 | .. | .. | 158,761 | 158,806 | .. | 217 |
| | 654 | .. | .. | .. | .. | .. | 350,106 | 517,881 | .. | .. | 178,367 | 178,519 | .. | 402 |
| | 1,127 | .. | .. | .. | .. | .. | 359, 95 | 542,259 | .. | .. | 200,314 | 200,719 | .. | 710 |
| | 1,857 | .. | .. | .. | .. | .. | 372,962 | 571,689 | .. | .. | 225,851 | 226,790 | .. | 1,215 |
| | 2,938 | .. | .. | .. | .. | .. | 390,879 | 609,348 | .. | .. | 257,303 | 252,264 | .. | 2,031 |
| | 4,481 | .. | .. | .. | .. | .. | 461,959 | 660,663 | .. | .. | 302,453 | 306,315 | .. | 3,402 |
| | 6,607 | .. | .. | .. | .. | .. | 231,064 | 371,912 | .. | .. | 211,846 | 216,059 | .. | 3,340 |
| | .. | .. | .. | .. | .. | .. | 8,732,929 | 10,993,458 | .. | .. | 2,382,618 | 2,394,202 | .. | 11,486 |

TABLE II

| Age | Total females at each age | Total children born to females in col. 2 | Total children born per thousand females | Expected values of total children per 1,000 females | First order differences of column 5 specific fertility rates | Survivors of 1,000 females at age one | Children born each year to life table female population with 1,000 females at age one | Children born to life table female population with 1,000 females at age zero |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12 | 121 | .. | .. | 1.12 | .. | .. | .. | .. |
| 13 | 74 | .. | .. | 4.44 | 3.32 | 75,402 | 2.50 | 1.88 |
| 14 | 68 | .. | .. | 14.13 | 9.69 | 74,698 | 7.24 | 5.56 |
| 15 | 15 | 1 | 11 | 37.25 | 23.12 | 73,935 | 17.09 | 13.12 |
| 16 | 77 | 8 | 104 | 83.93 | 46.68 | 73,082 | 34.11 | 26.19 |
| 17 | 35 | 5 | 143 | 165.75 | 81.82 | 72,130 | 59.02 | 45.30 |
| 18 | 63 | 30 | 476 | 293.14 | 127.39 | 71,094 | 90.57 | 69.52 |
| 19 | 27 | 11 | 407 | 472.65 | 179.51 | 69,988 | 125.64 | 96.45 |
| 20 | 197 | 179 | 909 | 705.30 | 232.65 | 68.823 | 160.12 | 122.92 |
| 21 | 16 | 21 | 1,313 | 986.32 | 281.02 | 67 611 | 190.00 | 145.86 |
| 22 | 75 | 104 | 1.387 | 1,306.32 | 320.00 | 66,359 | 212.35 | 163.01 |
| 23 | 23 | 36 | 1,565 | 1,653.09 | 346.77 | 65,076 | 225.66 | 173.23 |
| 24 | 34 | 77 | 2,265 | 2,013.56 | 360.47 | 63,768 | 229.86 | 176.46 |
| 25 | 219 | 535 | 2,443 | 2,375.43 | 361.87 | 62,439 | 225.95 | 173.45 |
| 26 | 41 | 127 | 3,098 | 2,728.23 | 352.80 | 61,093 | 215.54 | 165.46 |

TABLE II—*Concld.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 27 | 19 | 57 | 3,000 | 3,063.86 | 335.63 | 59,733 | 200.48 | 153.90 |
| 28 | 37 | 130 | 3,514 | 3,376.66 | 312.80 | 58,362 | 182.56 | 140.14 |
| 29 | 21 | 71 | 3,381 | 3,663.20 | 286.54 | 56,981 | 163.27 | 125.34 |
| 30 | 230 | 879 | 3,822 | 3,921.92 | 258.72 | 55,591 | 143.83 | 110.41 |
| 31 | 16 | 61 | 3,813 | 4,152.70 | 230.78 | 54,193 | 125.07 | 96.01 |
| 32 | 48 | 235 | 4,896 | 4,356.49 | 203.79 | 52,789 | 107.58 | 82.58 |
| 33 | 11 | 51 | 4,636 | 4,534.91 | 178.42 | 51,380 | 91.67 | 70.37 |
| 34 | 13 | 70 | 5,385 | 4,690.02 | 155.11 | 49,965 | 77.50 | 59.49 |
| 35 | 140 | 668 | 4,771 | 4,824.06 | 134.04 | 48,545 | 65.07 | 49.95 |
| 36 | 13 | 78 | 6,000 | 4,939.31 | 115.25 | 47,121 | 54.31 | 41.69 |
| 37 | 9 | 38 | 4,222 | 5,037.99 | 98.68 | 45,693 | 45.09 | 34.61 |
| 38 | 12 | 55 | 4,583 | 5,122.19 | 84.20 | 44,263 | 37.27 | 28.61 |
| 39 | 5 | 32 | 6,400 | 5,193.82 | 71.63 | 42,829 | 30.68 | 23.55 |
| 40 | 188 | 917 | 4,878 | 5,254.60 | 60.78 | 41,396 | 25.16 | 19.31 |
| 41 | 14 | 81 | 5,786 | 5,306.08 | 51.48 | 39,968 | 20.58 | 15.80 |
| 42 | 22 | 112 | 5,091 | 5,349.60 | 43.52 | 38,552 | 16.78 | 12.88 |
| 43 | 4 | 19 | 4,750 | 5,386.33 | 36.73 | 37,151 | 13.65 | 10.48 |
| 44 | 4 | 24 | 6,000 | 5,417.30 | 30.97 | 35,766 | 11.08 | 8.50 |
| 45 | 92 | 474 | 5,152 | 5,443.39 | 26.09 | 34,402 | 8.98 | 6.89 |
| 46 | 9 | 47 | 5,222 | 5,465.35 | 21.96 | 33,062 | 7.26 | 5.57 |
| 47 | 7 | 44 | 6,286 | 5,483.81 | 18.46 | 31,746 | 5.86 | 4.50 |
| 48 | 13 | 61 | 4,692 | 5,499.33 | 15.52 | 30,456 | 4.73 | 3.63 |
| 49 | 7 | 48 | 6,857 | 5,512.37 | 13.04 | 29,194 | 3.81 | 2.92 |
| 50 | 182 | 788 | 4,330 | 5,523.31 | 10.94 | 27,960 | 4.06 | 2.35 |

TABLE III

CHILDREN BORN EACH YEAR DURING THE REPRODUCTIVE LIFE OF THOSE FEMASE INFANTS WHO SURVIVIE THEIR FIRST YEAR OF LIFE

| Year in which the infants survived | Number of female infants surviving their first year of life | year of birth | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1920 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1921 | 6,894 | .. | 17 | 50 | 118 | 235 | 407 | 624 | 866 | 1,104 | 1,310 | 1,464 | 1,556 | 1,585 | 1,558 |
| 1922 | 13,640 | | | 34 | 99 | 233 | 465 | 805 | 1235 | 1,714 | 2,184 | 2,592 | 2,896 | 3,078 | 3,135 |
| 1923 | 22,633 | | | | 57 | 164 | 387 | 772 | 1,336 | 2,050 | 2,844 | 3,624 | 4,300 | 4,806 | 5,107 |
| 1924 | 29,728 | | | | | 74 | 215 | 508 | 10,14 | 1,755 | 2,692 | 3,735 | 4,760 | 5,648 | 6,313 |
| 1925 | 36,394 | | | | | | 91 | 263 | 1,622 | 1,241 | 2,148 | 3,296 | 4,573 | 5,827 | 6,915 |
| 1926 | 45,071 | | | | | | | 113 | 326 | 770 | 1,537 | 2,660 | 4,082 | 5,663 | 7,217 |
| 1927 | 53,576 | | | | | | | | 134 | 388 | 916 | 1,827 | 3,162 | 4,852 | 6,731 |
| 1928 | 63,922 | | | | | | | | | 160 | 463 | 1,092 | 2,180 | 3,773 | 5,789 |
| 1929 | 69,250 | | | | | | | | | | 173 | 501 | 1,183 | 2,362 | 4,087 |
| 1930 | 77,910 | | | | | | | | | | | 195 | 564 | 1,331 | 2,658 |
| 1931 | 90,220 | | | | | | | | | | | | 226 | 653 | 1,542 |
| 1932 | 97,405 | | | | | | | | | | | | | 244 | 705 |
| 1933 | 112,842 | | | | | | | | | | | | | | 282 |
| 1934 | 116,443 | | | | | | | | | | | | | | |
| 1935 | 130,092 | | | | | | | | | | | | | | |
| 1936 | 142,689 | | | | | | | | | | | | | | |
| 1937 | 149,031 | | | | | | | | | | | | | | |
| 1938 | 158,051 | | | | | | | | | | | | | | |
| 1939 | 166,009 | | | | | | | | | | | | | | |
| 1940 | 173,683 | | | | | | | | | | | | | | |

TABLE III—*contd.*

| 1 | (a) | (b) |
|---|---|---|
| 1941 | 182,615 | 182,260 |
| 1942 | 184,719 | 191,229 |
| 1943 | 186,823 | 200,198 |
| 1944 | 188,926 | 209.168 |
| 1945 | 191,030 | 218,137 |
| 1946 | 193,133 | 227,107 |
| 1947 | 195,237 | 236,076 |
| 1948 | 197,341 | 245,046 |
| 1949 | 199,444 | 254,015 |
| 1950 | 201,548 | 262,985 |
| 1951 | 203,651 | 271,954 |
| 1952 | 205,755 | 280,924 |
| 1953 | 207,859 | 289,893 |
| 1954 | 209,962 | 298,863 |
| 1955 | 212,066 | 307,832 |
| 1956 | 214,170 | 316,802 |
| 1957 | 216,273 | 325,771 |
| 1958 | 218,377 | 334,741 |
| 1959 | 220,480 | 343,710 |
| 1960 | 222,584 | 352,680 |
| 1961 | 224,688 | 361,649 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TOTAL . | 17 | 84 | 274 | 706 | 1,565 | 3,085 | 5,533 | 9,182 | 14,267 | 20,986 | 29,482 | 39,822 | 52,039 |

TABLE III—*Contd.*

| | Year of birth | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 |
| 1 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| 1920 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1921 | 1,486 | 1,382 | 1,259 | 1,126 | 992 | 862 | 742 | 632 | 534 | 449 | 374 | 311 | 257 | 212 | 173 | 142 |
| 1922 | 3,082 | 2,940 | 2,745 | 2,490 | 2,227 | 1,962 | 1,706 | 1,467 | 1,250 | 1,057 | 888 | 741 | 615 | 508 | 418 | 343 |
| 1923 | 5,202 | 5,114 | 4,878 | 4,537 | 4,132 | 3,695 | 3,255 | 2,831 | 2,435 | 2,075 | 1,754 | 1,473 | 1,229 | 1,021 | 844 | 694 |
| 1924 | 6,708 | 6,833 | 6,717 | 6,408 | 5,960 | 5,427 | 4,854 | 4,276 | 3,718 | 3,198 | 2,725 | 2,304 | 1,934 | 1,615 | 1,340 | 1,108 |
| 1925 | 7,728 | 8,213 | 8,366 | 8,223 | 7,844 | 7,296 | 6,644 | 5,942 | 5,235 | 4,552 | 3,915 | 3,336 | 2,821 | 2,368 | 1,977 | 1,641 |
| 1926 | 8,563 | 9,571 | 10,171 | 10,360 | 10,184 | 9,715 | 9,036 | 8,228 | 7,359 | 6,483 | 5,637 | 4,849 | 4,132 | 3,493 | 2,933 | 2,448 |
| 1927 | 8,579 | 10,179 | 11,377 | 12,090 | 12,315 | 12,105 | 11,548 | 10,741 | 9,781 | 8,747 | 7,706 | 6,701 | 5,764 | 4,911 | 4,152 | 3,486 |
| 1928 | 8,331 | 10,235 | 12,145 | 13,574 | 14,425 | 14,693 | 14,443 | 13,778 | 12,815 | 11,670 | 10,437 | 9,194 | 7,995 | 6,877 | 5,860 | 4,954 |
| 1929 | 6,272 | 8,701 | 11,088 | 13,158 | 14,705 | 15,627 | 15,918 | 15,647 | 14,926 | 13,883 | 12,642 | 11,306 | 9,960 | 8,661 | 7,450 | 6,348 |
| 1930 | 4,598 | 7,956 | 9,789 | 12,475 | 14,803 | 16,544 | 17,581 | 17,908 | 17,604 | 16,793 | 15,619 | 14,223 | 12,720 | 11,206 | 9,744 | 8,382 |
| 1931 | 3,077 | 5,325 | 8,171 | 11,335 | 14,446 | 17,142 | 19,158 | 20,359 | 20,738 | 20,385 | 19,446 | 18,087 | 16,471 | 14,730 | 12,976 | 11,284 |
| 1932 | 1,665 | 3,322 | 5,749 | 8,822 | 12,238 | 15,596 | 18,507 | 20,684 | 21,980 | 22,390 | 22,009 | 20,995 | 19,528 | 17,782 | 15,903 | 14,010 |
| 1933 | 817 | 1,928 | 3,849 | 6,660 | 10,220 | 14,177 | 18,068 | 21,440 | 23,962 | 25,464 | 25,938 | 25,497 | 24,322 | 22,623 | 20,600 | 18,424 |
| 1934 | 291 | 843 | 1,990 | 3,972 | 6,872 | 10,516 | 14,630 | 18,645 | 22,124 | 24,727 | 26,277 | 26,766 | 26,310 | 25,098 | 23,344 | 21,258 |
| 1935 | | 325 | 942 | 2,223 | 4,437 | 7,678 | 11,782 | 16,345 | 20,830 | 24,717 | 27,625 | 29,351 | 29,903 | 29,394 | 28,040 | 26,081 |
| 1936 | | | 357 | 1,033 | 2,439 | 4,867 | 8,422 | 12,923 | 17,927 | 22,847 | 27,111 | 30,300 | 32,199 | 32,798 | 32,241 | 307,755 |
| 1937 | | | | 373 | 1,079 | 2,547 | 5,083 | 8,796 | 13,498 | 18,724 | 23,863 | 28,316 | 31,647 | 33,630 | 34,256 | 33,674 |

TABLE III—*Concld.*

| 1 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1938 | | | | | 395 | 1,144 | 2,701 | 5,391 | 9,328 | 14,315 | 19,858 | 25,307 | 30,030 | 33,562 | 35,666 | 36,330 |
| 1939 | | | | | | 415 | 1,202 | 2,837 | 5,663 | 9,798 | 15,035 | 20,857 | 26,581 | 31,542 | 35,252 | 37,462 |
| 1940 | | | | | | | 434 | 1,257 | 2,968 | 5,924 | 10,251 | 15,730 | 21,822 | 27,810 | 33,000 | 36,882 |
| 1941 | | | | | | | | 457 | 1,322 | 3,121 | 6,229 | 10,778 | 16,539 | 22,944 | 29,240 | 34,697 |
| 1942 | | | | | | | | | 462 | 1,337 | 3,157 | 6,301 | 10,902 | 16,730 | 23,208 | 29,577 |
| 1943 | | | | | | | | | | 467 | 1,353 | 3,193 | 6,373 | 11,026 | 16,921 | 23,472 |
| 1944 | | | | | | | | | | | 472 | 1,368 | 3,229 | 6,444 | 11,150 | 17,111 |
| 1945 | | | | | | | | | | | | 478 | 1,383 | 3,265 | 6,516 | 11,275 |
| 1946 | | | | | | | | | | | | | 483 | 1,398 | 3,301 | 6,588 |
| 1947 | | | | | | | | | | | | | | 488 | 1,414 | 3,337 |
| 1948 | | | | | | | | | | | | | | | 493 | 1,429 |
| 1949 | | | | | | | | | | | | | | | | 499 |
| 1950 | | | | | | | | | | | | | | | | |
| 1951 | | | | | | | | | | | | | | | | |
| 1952 | | | | | | | | | | | | | | | | |
| 1953 | | | | | | | | | | | | | | | | |
| 1954 | | | | | | | | | | | | | | | | |
| 1955 | | | | | | | | | | | | | | | | |
| 1956 | | | | | | | | | | | | | | | | |
| 1957 | | | | | | | | | | | | | | | | |
| 1958 | | | | | | | | | | | | | | | | |
| 1959 | | | | | | | | | | | | | | | | |
| 1960 | | | | | | | | | | | | | | | | |
| 1961 | | | | | | | | | | | | | | | | |
| 66,039 | 81,957 | 99,583 | 118,859 | 139,713 | 162,038 | 185,714 | 210,584 | 236,459 | 263,123 | 290,321 | 317,768 | 345,149 | 372,136 | 398,412 | 323,691 | |

TABLE IV SECOND GENERATION

*Children Born Each Year to the Female Birth of the First Generation When they Reach Reproductive Life*

| Year in which children of the generation were born | Total children born (first generation) | Female births of the first generation | Year of birth of the second generation | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 1933 | 17 | 8 | | | | | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1934 | 84 | 40 | | | | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 7 | 7 | 7 | 6 |
| 1935 | 274 | 132 | | | | 1 | 2 | 3 | 6 | 9 | 13 | 16 | 19 | 22 | 23 | 23 | 23 | 22 |
| 1936 | 706 | 339 | | | | 1 | 2 | 4 | 9 | 15 | 24 | 33 | 42 | 49 | 55 | 59 | 60 | 59 |
| 1937 | 1,565 | 752 | | | | | 1 | 4 | 10 | 20 | 34 | 52 | 73 | 92 | 110 | 123 | 130 | 133 |
| 1938 | 3,085 | 1,483 | | | | | | 3 | 8 | 19 | 39 | 67 | 103 | 143 | 182 | 216 | 242 | 257 |
| 1939 | 5,533 | 2,660 | | | | | | | 5 | 15 | 35 | 70 | 120 | 185 | 257 | 327 | 388 | 434 |
| 1940 | 9,182 | 4,415 | | | | | | | | 8 | 25 | 58 | 116 | 200 | 307 | 426 | 542 | 644 |
| 1941 | 14,267 | 6,860 | | | | | | | | | 13 | 38 | 90 | 180 | 311 | 477 | 662 | 843 |
| 1942 | 20,986 | 10,090 | | | | | | | | | | 19 | 56 | 132 | 264 | 457 | 701 | 973 |
| 1943 | 29,482 | 14,175 | | | | | | | | | | | 27 | 79 | 186 | 371 | 642 | 985 |
| 1944 | 39,822 | 19,147 | | | | | | | | | | | | 37 | 106 | 251 | 501 | 867 |
| 1945 | 52,039 | 25,021 | | | | | | | | | | | | | 48 | 139 | 328 | 655 |
| 1946 | 66,099 | 31,781 | | | | | | | | | | | | | | 61 | 177 | 417 |
| 1947 | 81,967 | 39,411 | | | | | | | | | | | | | | | 76 | 219 |
| 1948 | 99,583 | 47,881 | | | | | | | | | | | | | | | | 92 |
| Total | | | | | 3 | 6 | 17 | 42 | 91 | 189 | 360 | 654 | 1,127 | 1,857 | 2,938 | 4,481 | 6,607 | |

## VII—AGE DISTRIBUTION OF WOMEN

In the brief discussion below, the object of which is to show the pre—1940 evidence indicating the likelihood of 1941 showing an augmented increase rate, I have made use of a paper by Dr. K.C.K.E. Raja, Deputy Public Health Commissioner, whose work in vital statistics and population problems generally is so well-known. The absence of age-sorting has of course prevented any extension of the tables for 1941.

I—*Proportion of women at each age group per* 10,000 *females for successive censuses*

| Ages | 1931 | 1921 | 1911 | 1901 |
|---|---|---|---|---|
| All ages | 10,000 | 10,000 | 10,000 | 10,000 |
| 15—19 | 938 | 815 | 826 | 835 |
| 20—24 | 985 | 881 | 930 | 892 |
| 25—29 | 868 | 885 | 909 | 895 |
| 30—34 | 756 | 833 | 835 | 851 |
| 35—39 | 595 | 565 | 556 | 557 |
| 40—44 | 505 | 621 | 631 | 652 |
| 45—49 | 389 | 346 | 338 | 339 |

Taking the child-bearing period for a women to be 15-49 the figures show at once that the 1931 census population was more favourable for growth than that of the three previous records. The difference is particularly noticeable in the first ten years of the reproductive span when fertility is greatest. Out of 10,000 women of all ages 1923 were aged between 15 and 24, perhaps the most favourable time of all for reproduction. The 1921 figure was 1696, 1911—1756. The percentage of difference over 1921—31 for this class is 16 per cent.

Marriage is more general in India than in Western countries but even so the proportion of married women at these ages is relevant.

II—*Proportion of married women at different age periods per thousand women at the same ages*

| Ages | 1931 | 1921 | 1911 | 1901 |
|---|---|---|---|---|
| 15—20 | 818 | 771 | | 777 |
| 20—25 | 886 | 877 | | 876 |
| 25—30 | 869 | 863 | 15—40 | 859 |
| 30—35 | 824 | 797 | 383 | 793 |
| 35—40 | 703 | 727 | | 722 |
| 40—45 | 627 | 599 | 401 | |
| 45—50 | 473 | 527 | 40 and over | 523 |

Here again we see that the numbers of married women in the reproductive span are greater in 1931 for every section except over 35. This in itself is a revealing point. We have no figures for India showing the differential fertility rates by age periods but it is practically certain, and figures from all countries bear it out, that the earlier years and 15-25 particularly are markedly more fertile than the later ones in the reproductive span.

We have no reproduction ratios for India since we have not the data to construct them but if accurate fertility rates calculated for other countries are applied to the tables below we can see dimensionally at least the accretions that might be expected to flow from the age distribution indicated in them. Dr. Raja did this for Swedish fertility rates and produced the tables below :

| Tables | 1931 | 1921 | 1911 | 1901 |
|---|---|---|---|---|
| For Table I . . . . . | 1,721 | 1,649 | 1,685 | 1,676 |
| For Table II . . . . . | 1,681 | 1,646 | .. | 1,642 |

Without pressing comparisons too far one may say that the figures indicate an increased productivity for 1941 over 1931 of between 5-6 per cent. The all-India increase rate for 1921-31 was 10·6, that for 1931-41, 15, a concordance of some interest.

An examination of the life tables has some light to throw also on this point. A female child in 1931 had 1·86 years greater expectation of life than in 1911. This circumstance too enters into the reproductive possibilities.

A consideration of straight age groupings in the significant ages is given in the small table below :

III—*Proportion of females per* 10,000 *females at specific age periods for different censuses*

| Ages | 1931 | 1921 | 1911 | 1901 |
|---|---|---|---|---|
| All ages . . . . . | 10,000 | 10,000 | 10,000 | 10,000 |
| 10—14 . . . . . | 1,124 | 1,081 | 997 | 1,082 |
| 5—9 . . . . . | 1,280 | 1,494 | 1,383 | 1,382 |

The higher quota for 10 to 14 would have entered the reproductive period in 1941 and thus represents an element tending towards increased fertility for the decade 1931-41. On the other hand the 5-9 quota for 1931 is markedly lower than that for 1921 which means that the element aged 15-19 would be proportionately weaker in 1941. The influence of this would

be a diminished figure for 1941-51 since this group is just towards entering upon its reproductive period. It would have been interesting to have the age tables available for 1941 to follow up this point. The Public Health Commissioner's reports show specific mortality rates for women and relevant elemants are extracted below and given for the same important age groupings :

| Age-groups | 1921 | 1931 | 1943 |
|---|---|---|---|
| 10—14 . . . . . | 10·34 | 6·60 | 5·8 |
| 5—9 . . . . . | 13·81 | 10·50 | 9·3 |

The decline in both is marked but more so for the 10-14 group. This of course ties in with the life table expectations but is of specific application for this second age group. In all figures derived from vital statistics something has to be allowed for their incompleteness in India. The dimensions are such however and the care applied in their treatment, that trends of this kind can be given a significance going beyond any disturbing effects from the quality of the vital statistics themselves.

Absence of the age figures for 1941 has rendered any elaborate discussion impossible but if this age tabulation is done the corresponding groupings thus discussed above will be of the highest importance and will presumably receive the close attention of all those interested in the figures who should include everyone interested in the future of India. This very general discussion is enough I think to show that there would be some ground for a view that in 1931 the reproductive position in India was more favourable than it had been in the past and may indeed have been at a peak. If so the marked increase which our figures show was to be expected. This discussion may also have helped to show the interest as well as importance of the whole topic and how much could be done by good vital statistics to illumine administrative and political problems and policies.

## CENSUS OF INDIA—1951

### CHAPTER IV

### BEFORE AND SINCE 1921

*A—Growth of population : Checked and unchecked*

THE PICTURE given in the last three chapters of the number and distribution of people on the land and the pattern of life and livelihood relates to 1951. But the picture does not remain the same, even for a day; it changes imperceptibly but nonetheless surely; and the rate of change has been quickening in recent decades. It is necessary that we should have a clear appreciation of how the picture changed in the past; and also in so far as it is possible to know this, why it changed as it did not otherwise. If we succeed in gaining a correct and complete appreciation of the way in which the wheels of life have been turning in the past, we shall be able to peer into the future and form a correct opinion about the changes which are likely to come about in the future. The future, of course, is not totally determined by the past. Neither is it (as some are apt to suppose) simply clay in our hands to be moulded as we may fancy. It lies within our power so to influence the course of events as to avert danger and promote welfare and happiness; but there are very definite limits to this power. Those who have the responsibility of governance have to distinguish between right and wrong action with reference mainly to these limits. The purpose of this chapter is to bring the past under review in such a way that the course of right action for the future may become at least a little clearer than it is.

2. As the census is taken at ten yearly intervals, our unit of time for the measurement of changes must be the decade. The minimum requirements for a review of changes must, therefore, be at least two decades before 1951, in order that the trend of change disclosed by two successive decades might give us an insight into the decade immediately following the 1951 Census.

This is, however, not long enough. Though we live in a fast-moving world, we need to look back longer in order to gain a clear perspective.

It is proposed in this chapter to review the changes which took place over six decades—three before and three after the 1921 Census. On the basis of this review, it is suggested that an attempt should be made to visualise the prospect for 1981.

As it happens, the choice of 1921 as the central year of the review period is not merely convenient—it is a necessity. There is a profound difference between the trend of growth after that year and the trend of growth in preceding decades. Dry figures of the census which record the growth of the people acquire meaning and significance only when the sharp contrast between the decades before and since 1921 is clearly understood and constantly borne in mind.

3. The Indian Census of 1891 was taken over a territory which comprised India of today as well as Pakistan and Burma. The internal territorial divisions were very different. But the figures of old censuses have been readjusted to the present limits and territorial divisions and the readjusted figures have been published. TABLE 1 shows the growth in numbers of the people inhabiting the territory where the 1951 Census was taken.

TABLE 1

| Census year | Number (in lakhs) | Increase(+) decrease(—) during preceding decade (in lakhs) |
|---|---|---|
| 1891 . . . . . | 2,359 | .. |
| 1901 . . . . . | 2,355 | —4 |
| 1911 . . . . . | 2,490 | +135 |
| 1921 . . . . . | 2,481 | —9 |
| 1931 . . . . . | 2,755 | +274 |
| 1941 . . . . . | 3,128* | +373 |
| 1951 . . . . . | 3,569 | +441 |

During the thirty years between 1891 and 1920 the number of the people increased by 122 lakhs—which is just a little more than the number of people living in the Punjab Plain division or the South Bihar Plain division and just a little less than the number of people living in the Northern division of Bombay Deccan.

During the ten years between 1921 and 1930 the number increased by 274 lakhs—that is to say, by much more than twice the increase which had occured during the preceeding 30 years. The addition to the population which took place during one decade was distinctly larger than the present population of West Bengal and not far short of the total number of people living in two major states, Rajasthan and the Punjab combined.

During the ten years between 1931 and 1940 the number increased by 373 lakhs—that is to say, by more than three times the increase which had occurred during the thirty years 1891-1920. This time, the size of the additional population exceeded the present population of Bombay state. It also exceeded the combined present population of all the North-West India states.

During the ten years between 1941 and 1950 the increase has been much larger than during the previous decades. The addition to the population—441 lakhs—is larger than the combined present population of the West India

*According to the 1941 Census count, this figure should be 3,148. It is necessary, however, to deduct 20 lakhs, as the estimated allowance for inflation of returns in West Bengal and Punjab.

states. It is larger than the present population of Bihar and not far short of the combined present population of West Bengal, Orissa and Assam.

During the thirty years following 1921, our numbers have increased from roughly 25 crores to 36 crores. The addition—of about 11 crores—almost exactly the number of people at present living in North India and Central India combined; or in South India and West India combined.

5. When we pause and think of these figures and their implications, the first reaction is one of wonder whether they could really be true, or whether something has gone wrong with the figures somewhere. It seems so difficult to believe that 1921-50 could have been so very diffierent, after all, from 1891-1920. Though the number of people who are old enough to remember all about 1891 from personal experience must be quite small now, yet almost every person who is over forty can recall enough facts from personal experience which might induce him to distrust these figures.

Reasoning based on common sense and personal experience would run on some such lines as follows :

"We know roughly how many children are born thesedays to womenfolk in our own families and friends. We also know the numbers born to the womenfolk of an older generation—our mothers and grandmothers. It is true enough that our womenfolk do not practise contraception as they do in western countries and so many have more children. We need not quarrel with the figures given in an earlier chapter; they are probably correct. But then this is nothing new. Our mothers and grandmothers did not practise contraception either. They bore as far as we can judge, just as many children—if not, indeed, more. So, it cannot be true that our number began to increase all of a sudden because of any sudden change in the child-bearing habits of our womenfolk. Well then, if we rule out a large increase of births, then we should assume a sensational decrease in the deaths to account for contrast between the two thirty-year periods. But has there been any such decrease? We have very grave doubts. There has, perhaps, been some decrease. It is true that hospitals and dispensaries have been springing up and doctors have increased in numbers. There are also the public health staffs. Something is being done about vaccination and inoculation and the rest of it. New medicines are advertised and sold in shops. Granted all this; how much do they all amount to? And what difference has it made to the villages of which we have personal knowledge? Is it true that many more people are living longer? Where is the evidence? We can recall so many people of an older generation who lived long. In some ways, perhaps, they were a much hardier type than the present generation. No, there must be something wrong about these figures."

The reasoning based on common sense and general experience is plausible to some extent it is also correct. Yet the conclusion is wrong. There is no reasonable doubt that the startling differences in the numbers added to the population during the two thirty-year periods are real. The explanation would be simple if we draw a distinction between what may be called 'normal deaths' and 'abnormal deaths'. It is correct that child-bearing habits have not materially changed. It is also correct that the incidence of normal deaths has slightly diminished, but not sensationally. The diminution in the incidence of normal deaths is wholly insufficient to account for the contrast between the two periods.

The main explanation is that 'abnormal deaths' used to claim a great many victims in the earlier period. They did not occur or were prevented from occurring during the later period.

6. Before we set out the evidence bearing on this explanation, let us follow the figures further and examine whether the contrast we are discussing is observable in all parts of India or is localised.

TABLE 2

(In lakhs)

| Zone | Number | | | Increase(+) Decrease(—) | |
|---|---|---|---|---|---|
| | 1891 | 1921 | 1951 | 1891-1920 | 1921-50 |
| North India . . . | 479 | 467 | 632 | —12 | +165 |
| East India . . . | 563 | 628 | 901 | +65 | +273 |
| South India . . . | 426 | 517 | 756 | +91 | +239 |
| West India . . . | 263 | 254 | 407 | —9 | +153 |
| Central India . . . | 359 | 373 | 523 | +14 | +150 |
| North-West India . . . | 269 | (242) | 350 | —27 | +108 |
| INDIA . | 2,359 | 2,481 | 3,569 | +122 | +1,088 |

The contrast, it is clear, is present in all the six zones. In three zones, there was no increase at all, but a reduction of population in the earlier period. In one zone, there was a very small increase—which was less than one-tenth of the increase in the later period. There was a sizeable increase of population during 1891-1920 only in two zones—South India and East India; even here the combined increase was less than one-third of the increase which occurred during 1921-50.

7. Figures of a similar nature are furnished below for the different sub-regions of India :

TABLE 3

(In lakhs)

| Sub-region | Number | | | Increase(+) Decrease(—) | |
|---|---|---|---|---|---|
| | 1891 | 1921 | 1951 | 1891-1920 | 1921-50 |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1·1 Western Himalayan . | 32 | 35 | 46 | +3 | +11 |
| 1·2 Eastern Himalayan . | 49 | 77 | 124 | +28 | +47 |
| 2·1 Lower Gangetic Plains . | 488 | 498 | 701 | +10 | +203 |
| 2·2 Upper Gangetic Plains . | 295 | 286 | 389 | —9 | +103 |
| 2·3 Trans-Gangetic Plains . | 201 | 183 | 259 | —18 | +76 |
| 2·4 The Desert . | 35 | 26 | 46 | —9 | +20 |

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 3·1 North-West Hills . . | 74 | 72 | 104 | —2 | +32 |
| 3·2 North Central Hills & Plateau | 115 | 107 | 138 | —8 | +31 |
| 3·3 North-East Plateau . . | 171 | 204 | 290 | +33 | +86 |
| 3·4 North Deccan . . . | 165 | 159 | 239 | —6 | +80 |
| 3·5 South Deccan . . . | 186 | 213 | 315 | +27 | +102 |
| 4·1 Gujarat-Kathiawar . . | 111 | 101 | 161 | —10 | +60 |
| 4·2 Malabar-Konkan . . | 114 | 142 | 238 | +28 | +96 |
| 5·1 North Madras and Orissa Coastal . . . | 136 | 157 | 211 | +21 | +54 |
| 5·2 South Madras . . . | 187 | 223 | 307 | +36 | +84 |

Seven of these fifteen sub-regions recorded no increase during 1891-1920 but suffered a reduction. To this group we should add the Lower Gangetic Plains where the increase was so small in relation to the population that the number may be regarded as having been practically stationary. There are thus eight sub-regions where we counted in 1951 nearly 20 crores of people out of 36 crores. In 1921, there were only 14 crores of people while in 1891 there had been 14½ crores of people. The contrast between a decline of half-a-crore in the first thirty years and an increase of 6 crores in the next thirty years is unmistakable.

Turning to the other seven sub-regions where popluation had grown during the first thirty years, the acceleration of this growth during the second thirty-years is unmistakable in every case without any exception.

8. The population of India decreased by 0·2 per cent in 1891-1900, increased by 5·6 per cent* in 1901-10 and again decreased by 0·4 per cent in 1911-20. On the other hand during the three decades after the 1921 Census, population increased by 10·4 per cent in 1921-30, 12·7 per cent in 1931-40 and 13·2 per cent in 1941-50. If the average rates for the two thirty-year periods are considered, population grew between 1891 and 1920 at the rate of 1·7 per cent per decade, while between 1921 and 1950 it grew at the rate of 12 per cent per decade. Every zone exhibits this contrast as shown in Table 4.

TABLE 4

| Zone | Mean Decennial Growth Rate | |
|---|---|---|
| | 1891-1920 | 1921-50 |
| North India . . . . . | —0·8 | +10·0 |
| East India . . . . . | +3·7 | +11·9 |
| South India . . . . . | +6·5 | +12·5 |
| West India . . . . . | —1·4 | +15·4 |
| Central India . . . . . | +1·2 | +11·2 |
| North-West India . . . . . | —3·6 | +12·2 |
| INDIA . . . . . | +1·7 | +12·0 |

*The rate of increase and decrease are expressed as percentages of the mean population of the period during which the increase or decrease occurred.

9. If we analyse the figures of increase and decrease during 1891-1900 division by division and group the divisions according to the rates of increase ordecrease recorded, the results are as follows :

Increases were recorded in divisions representing two-thirds of the country (on a population basis). The increase ranged between 5 per cent and 10 per cent over two-fifths of the country. Higher rates of increase were recorded in very small areas, while lower rates of increase were far more common.

The decreases occurred in the parts of the country inhabited by a third of the people. The rates of decrease were very heavy, exceeding 25 per cent in Rajasthan Dry Area, Rajasthan Hills, Rajasthan Plateau, Madhya Bharat Plateau, Madhya Bharat Hills, Bhopal and Bombay-Gujarat. Decreases ranging between 15 and 20 per cent occurred in Saurashtra and North Hyderabad; between 10 and 15 per cent in Ajmer, Kutch, Vindhya Pradesh, North-West Madhya Pradesh and East Madhya Pradesh; between 5 and 10 per cent in East Rajasthan Plain, Uttar Pradesh Hills & Plateau and the Northern division of Bombay Deccan; and less than 5 per cent in South-West Madhya Pradesh, East Uttar Pradesh Plain, South Bihar and Himalayan Punjab.

10. The principal reason for these decreases during the decade 1891-1900 must be found in the very severe famines which are known to have raged in the greater parts of these divisions during the decade. The following reference to these calamities is extracted from the 1901 All-India Census Report :

"In 1891-92 there was scarcity over a considerable area in Madras and Bombay and in parts of Bihar. In 1895 a weak monsoon led to extensive crop-failure in the southern districts of the United Provinces,and a sudden cessation of the rains of 1896 resulted in famine in the United Provinces, the Central Provinces and Berar and parts of Madras, Bombay, Bengal, the Punjab, Upper Burma, Rajputana, Central India and Hyderabad. Altogether an area of about 300,000 square miles with a population of nearly 70 millions was affected and on the average, two million persons were relieved daily during the twelve months from October 1896 to September 1897; the number rose to more than 4 million at the time of greatest distress."

"In 1899 the monsoon again failed, and the resulsts were even more disastrous, for though the population affected was slightly less than in 1896-97, famine conditions prevailed over an area half as great again and with less easy means of communications, the drought was much more severe, the people had not yet recovered from the previous visitation, the mortality amongst cattle for want of fodder and water was far heavier, and the tracts which suffered mostly for the greater part in Native States, where the relief organisation was necessarily less perfect than in British territory. In the height of this famine there were for weeks together over six million persons in receipt of relief, and the value of the agricultural production of the year was estimated to have been

60 millions sterling below the average : there was also a loss of some millions of cattle. It is impossible to say with any pretence to accuracy what was the actual mortality caused by these calamities. The Commission of 1901 thought that about a million deaths were attributable to the famine of 1899-1900 in British territory, and it would probably be safe to assume that another three millions must have occurred in the Native States, which contained more than three-fifths of the population afflicted and where the relief operations were generally far less successful. No estimate has been made of the excess mortality in 1896-97 but it cannot have been much less than a million. The total mortality due to the two famines may therefore be taken roughly at five millions. The diminished vitality of the people resulted also in a heavy fall in the birth rate, but this was to some extent counter-balanced by an unusually high rate of reproduction when the people had recovered their normal conditions."

11. Another cause of heavy mortality during the decade was plague. "Excluding a small tract in the Himalayas where it has long been endemic, bubonic plague made its first apperance in India in modern times in Bombay City in September 1896 and after spreading over the Western Presidency, notwithstanding the measures taken to prevent its dissemination, gradually recorded mortality was nearly half a million, to which Bombay contributed seven-tenths and Bengal two-thirds of the remainder ; Mysore with 33,731 reported deaths had suffered heavily in proportion to its population and so too had Baroda and Hyderabad. The extent to which the actual number of deaths exceeded that reported is uncertain, but it is known that the difference was very considerable and it may be assumed that the true mortality from plague was not less than three-quarters of a million and may possibly have been a million".

This brief account is supported by several references in local census reports describing the ravages of plague in different parts of the country and assessing their effect in arresting the growth of numbers.

Some parts of the country, e.g., Bihar, were visited by both famine and plague at the same time. The figures disclosed—even after full allowance for errors and uncertainties—an unmistakable stagnation of the rate of growth. The reports contain a detailed discussion and some difference of opinion as to which was the more effective check. One report cites a series of comparative figures tending to show that plague was the real killer and not famine; it seemed that the decline of population was closely correlated to the known severity of the incidence of the plague, while there was not only no decline, but some modest increase in areas where famine was known to have been severe. According to a different view it is "extremely probable that the reduction in the rate of increase of the population is very largely due to a decline in the birth rate induced by the general rise in the price of staple foodgrains. In South Bihar, common rice is dearer by 26 per cent, maize by 32 per cent and wheat by 29 per cent, while during the same period the wages of agricultural labourers have fallen by 3 per cent. Conditions such as these can hardly fail to affect the reproductive energy of the large class of unskilled labourers who own no land and have not participated in the profits arising from the enhanced prices of agricultural produce. Nor are they confined to South Bihar. They extend in varying degrees to all parts of Bengal and although their influence on the birth-rate may not always be traceable, we may be sure that it is there".

12. While famine and plague raged over very extensive areas there are also references to the localised deadliness of epidemics of malaria, kala-azar and other fevers. Thus, in the United Provinces, excessive and badly distributed rainfall in the early years of the decade "led to a severe outbreak of malarial fever which in 1894, raised the death rate to an exceptional height and sapped the vitality of the people to such an extent that the birth rate in 1895 was unusually low". In Western Bengal, the natural growth was normal in areas which were "recovering from a cycle of malaria" but it was only 1·4 per cent in Hooghly "where fever is rife and the population would have been stationary but for the influence of the mills and factories of Serampur". In Assam, "kala-azar entered Kamrup and reduced the population of the southern part of the district by nearly 12 per cent. Having spent its force there, it passed on in 1892 to Nowgong where its tract is marked by deserted villages, un-tilled fields, a land revenue reduced by 23 per cent, and a disheartened population which after 19 years of steady increase has now receded to the figure at which it stood nearly 30 years ago".

13. During the next decade (1901-10) the seasonal conditions were much more favourable. The local census reports refer frequently to 'agricultural conditions' being 'normal' or 'prosperous'. Droughts appear to have visited their usual haunts in the brown and yellow belts—followed by scarcity, sometimes even by famine. There is also an isolated reference to crop failure in the Coastal division of Orissa. But the days when people died in large numbers because of local crop failures, seemed to have been ended. To forsee the approach of scarcities and famines, to take measures to prevent or mitigate their actual incidence, and to organise and administer relief so as to save life with certainty and yet do it economically—all these tasks had been accepted, learnt and reduced to routine administrative operations. The reports of this decade contain no suggestion of mortality or other ill-effects arising out of famine. But there were other checks on the growth of population. The reports show clearly that plague was continuing to take even heavier toll than in the previous decade. "The mortality from it rose from about a quarter of a million in 1901 to 1·3 millions in 1907. It fell below a quarter of a million in each of the next two years, but in 1910 it exceeded half-a-million. The total number of deaths from plague during the decade was nearly "6·5 millions, of which over one-third occurred in the Punjab and two fifths in the United Provinces and Bombay taken together. The disease fortunately has failed to establish itself in Bengal, Assam and on the East Coast and in the extreme south of the peninsula. This, moreover, is only the recorded mortality. As is well known, when epidemics are raging the reporting agency breaks down and a large number of deaths escape registration. The omissions are most numerous in the Native States, where registration is usually far less accurate than in British territory." Plague was not the only killer during the decade. "Epidemics of malarial fever decimated the irrigated tracts of the Eastern and Central Punjab and the Ganges-Jumma Doab in the United Provinces, where, in 1908 alone, the reported mortality from fevers was nearly two millions." The reference in these cases is not to the areas where the disease is endemic; but to outbreaks of the disease in epidemic form. A report from the United Provinces explains that the "malaria epidemic appears to have made most headway in those districts where the disease is not as a rule specially prevalent and least in those in which it is in a high degree endemic."

14. The differences in conditions, thus described, between the two decades is reflected in the pattern of growth. Whereas in the earlier decade increases were recorded in two-thirds of the country, they occurred during this decade in about three-fourths of the country. Areas in which the increase exceeded 10 per cent contained only 4·3 per cent of the population in the earlier decade, they contained 26·4 per cent of the population in the later decade. The area in which decreases occurred, was limited to three divisions of Uttar Pradesh, the Punjab, the Patiala and East Punjab States Union and the Southern division of Bombay Deccan. In the country as a whole, population grew from 2,355 lakhs to 2,490 lakhs.

15. The next decade (1911-20) was extraordinary in many ways. The opening year was unhealthy—a sharp increase in attacks and deaths from plague, cholera and malaria occurred in widely different parts of the country. Then for five years, there were good seasons and good crops and public health was much better. The First World War began and ended. The last three years of the decade turned out to be deadly. Economic disorganisation—the aftermath of war—coincided with two successive bad seasons and extensive crop failures. Plague and cholera resumed their way. Assam reported a re-incidence of 'kala-azar'. In Bengal "malaria was specially severe throughout the period, which was characterised by a low birth rate and a mortality which in several districts steadily exceeded the births". But all these misfortunes paled into insignificance when a world-wide epidemic of influenza swept the country from one end to the other in two waves, one closely following the other. A full account of this terrible visitation will be found among the papers printed in Appendix IV. The account includes a 'conservative estimate' of the mortality at "between 12 and 13 millions for India, a large part of which occurred in the space of three or four months".

In general, the coastal areas escaped with a low mortality. So also East India. Uttar Pradesh, Punjab, Bombay and Madhya Pradesh suffered heavily. The rural areas were most severely infected, "the reasons probably being that while villages have no advantage over towns in the matter of overcrowding, sanitation and ventilation, the urban areas have the benefit of qualified medical aid and organised effort."

The pattern of growth during the decade 1911-20 reflected the conditions thus described. There was an overall decrease from 2,490 lakhs in 1911 to 2,481 lakhs in 1921. In the two earlier decades the divisions in which decreases occurred were one-third and one-fourth of India (on a population basis). In this decade, decreases occurred in divisions which contained more than one-half of the total population of India. Even where increases occurred they were small the divisions where increases exceeded 5 per cent represented only about one-tenth of India. The natural checks which restrain the growth of population were seen at their worst during this decade.

16. We now reach the turning point. We hear no longer about abnormal deaths—until we come to the Bengal Famine of 1943.

Already, as mentioned before, famine had lost its terror. In 1921, the Census Commissioner wrote : "Famine relief organisation is now so highly perfected in India that scarcity is not necessarily accompanied by high mortality".

His successor in 1931 could say : "There was, however, been no serious famine in the decade under review.....Improvements in communications, nowadays prevent anything like the famine mortality of a century ago....Famines were local and not very serious, though one unfortunate district of Madras had famine declared in it officially for three seasons."

It was not merely the fruits of victory over famine that the country was enjoying. A new note of confidence in the fight against epidemic diseases was beginning to be heard. According to the 1931 Census Report, "Every year sees improved methods of fighting such epidemics as Cholera, Plague, or kala-azar. Indeed, a completely effective treatment for the latter pest has been perfected since the last Census, and has made it possible to stamp out the disease".

Detailed accounts of the course of the seasons and conditions of public health during the last and earlier decades are given in state census reports published separately. They need not be recounted here.

Though the usual cycles of vicissitudes of the seasons continued and the brown and yellow belts of the country continued to suffer from droughts which caused severe scarcities and sometimes, famines, there was no extraordinary calamity (except the Bengal Famine of 1943). By about 1921, the freedom movement acquired a genuinely national character; and the British Government were carrying out reforms which culminated in the transfer of power in 1947. There was a conscious effort to develop 'nation building' services and a spurt of activity occurred in the 'transferred' departments which dealt mainly with public health and education. For a few years before the outbreak of World War II, when Provincial Autonomy arrived and popular ministries took charge of Provincial Governments, further advances were registered. In the result, the organisation of public health establishments has been steadily strengthened and their methods of combating epidemic diseases—especially through control of fairs and festivals—have become increasingly efficient. Mention has been made already of the distinction between outbreaks of malarial fever in the form of epidemics and their perennial prevalence in many parts of the country where the disease is endemic. It seems likely, that in these areas the death rate must have been consistently higher and the birth rate consistantly lower than elsewhere. Though the data are not conclusive there are indications to the effect that the lethal effects of endemic malaria were getting progressively reduced during the last thrity years and this progress has been substantially accelerated during the last decade.

17. We may now go back to our question—Are the figures really true?—and our answer that they are. There is no doubt that during the thirty years before the 1921 Census severe checks of one kind or other were in operation which tended to increase deaths abnormally. Such checks also had the effect, in some cases, of diminishing the births abnormally. The natural checks on population growth fall in three groups as below :

(i) Famines (including famine diseases)

(ii) Epidemic diseases, and

(iii) Endemic diseases.

These three groups of natural checks were responsible for keeping the 'mean decennial rate of growth' during the first thirty-year period as low as 1·7 per cent, and actually bringing about a reduction of population in three zones out of six. Even during 1891-1900, when the first of these checks, viz., famines (including famine diseases) were at their height, human intelligence was already devising and perfecting the counter-checks by which the natural checks could be prevented from operating. These counter-checks comprised : First, the creation of conditions in which the development of agricultural production could be both possible and profitable and take place of its own accord ; Secondly, the development of transport and communications (so as to open up all areas liable to scarcity and famine and thereby ensure the availability of commercial supplies of foodgrains); and Thirdly, the organisation of efficient administrative arrangements for provision of employment and wages to the landless rural people in those places and at those times when prolonged and severe droughts occurred and they were unemployed and without purchasing power. So much for the counter-checks on one group of natural checks.

The counter-checks devised for dealing with the other natural checks are more obvious. They consisted of hygiene and medicine brought to bear on the problem through departments of public health,and the gradual growth in numbers of the medical profession. There can be no doubt that the counter-checks proved effective and succeeded in eliminating the operation of one of these natural checks and materially diminished the incidence of others.

18. It would, however, be an excessive claim to attribute the whole of this improvement to human intelligence. Nature also seems to have been kindlier. Some statistics compiled by the Meteorological Department, which are shown in the diagrm facing this page* appear to show that as between the two thirty-year periods under study, the earlier period was worse favoured by nature than the later one. Droughts were clearly more frequent and more widespread in the earlier period. The difference is also reflected in the occurrances of excessive rain which not only cause floods but help to start outbreaks of epidemic diseases.

19. The Bengal Famine of 1943, as is well known, marked a tragic reversal of this trend towards elimination of abnormal deaths. The circumstances in which this reversal took place are recorded in the report of a statutory Commission of Inquiry. Relevant extracts from the report of this Commission will be found in Appendix IV.

Notwithstanding the very full account given in this report, there is very little public realisation of the fact that the occurrence of this famine marks a new phase in the effort to combat famine in this country.

A basic assumption underlying the classic methods of prevention and relief of famine has been the presence within the country (which formerly included not only India and Pakistan but Burma also) of an overall surplus of foodgrains. The presence of this surplus was a guarantee that commercial supplies of foodgrains would become available at any place and at any time in the quantities needed. A physical shortage of supplies was not a contingency to be guarded against. So long as the basic assumption remained valid, the old methods which were designed merely to inject purchasing power proved successful in saving life. But the growth of population (induced in part by the success

*Not reproduced here.

of these very methods) has brought the country and the people face to face with a new situation in which this assumption is no longer valid. The implications of this change are far reaching. Let us note that fact; we shall revert to it later.

20. We may conclude this section with a comparison of the rates of population growth experienced in India with those of other countries of the world and other times.

The 'mean decennial growth rate' in India, as already explained, was 10·4 per cent in 1921-30, 12·7 per cent in 1931-40, and 13·2 per cent in 1941-50. The last mentioned rate is the difference between a 'mean decennial birth rate' of 40 per cent and a 'mean decennial death rate' of 27 per cent.

The 'mean decennial growth rate' in the United States of America appears to have been 19·0 (1910), 13·9 (1920), 14·9(1930), 7·0(1940) and 13·5(1950). In the United Kingdom, the rate was 9·6 between 40 and 50 years ago and 4·4 during the last twenty years. Recent figures for France indicate a decline; increases were registered during 1921-30 at the rate of about 6 per cent. The figures for Italy yield rates in the neighbourhood of 6, 7 or 8 per cent for several decades. The rates for Japan appear to be running consistently higher than the rates for India—in the neighbourhood of 14 per cent.

In general, Western European rates of growth are distinctly lower than in India even though their death rates are lower than in India. This is due to the fact that Western European peoples practise contraception and thus succeeded in keeping the birth rate at a much lower level than ours; though, if they imposed no such checks, their women-folk are likely to have at least as many children as our womenk-folk do have. In the United States of America the people practise contraception. But their birth rate (though distinctly lower than in India) it higher than in Western European countries. Their death rate is very low. In the result, they are keeping up a rate of growth similar to ours and much higher than in Western European countries.

21. This is the position in recent years. It is necessary, if possible, to ascertain how the present total strength of mankind has grown, in order to determine whether there is such a thing as a 'natural' rate of growth. As might be excepted, we have very little statistical information of the kind we have been discussing so far. Yet, we are not entirely ignorant on the subject; there are a number of books where the results of expert study of all available data about world population are set out. It is true that much of this study consists of piecing together fragments of ascertained fact with a good deal of guesswork. But the guesswork is not arbitrary; it rpresents the best judgement of scholars who are well qualified to form an opinion also free from conscious bias. A brief summary of relevant information of this nature is given below.

Round about 1750, the total strength of mankind consisted only of 73 crores of people. Our own number—it will be recalled—is 36 crores today. Thus two hundred years ago, the whole world contained only twice as many human beings as there are in India alone today.

Out of these 73 crores only 1½ crores lived in what was then a New World (America and Oceania), 71½ crores of people lived in the Old World—48 crores in Asia, 14 crores in Europe, and 9½ crores in Africa.

Fifty years later (about 1800), the world population had increased to something between 90 and 91 crores. This was a modest rate of growth—only 4·4 per cent per decade. The New World was growing faster—the rate was 12·4 per cent mainly because its growth was being fed by migration from Europe. Asia and Europe grew by 4·5 and 5·7 per cent respectively. It is worth noting that even then, Europe was sending migtrants to the New World and yet growing slightly faster than Asia. Africa was not increasing; there was in fact a slight decline in numbers.

Fifty years after(about 1850)the population of the world was nearly 117 crores—the rate of growth was 5·1 per cent per decade. The New World was growing more than three times as fast—15·5per cent per decade. The tempo of European growth was getting faster—it was now 7·0 per cent against Asia's 4·4 per cent. Africa, too, was beginning to add to its population, though at a very slow rate—1·8 per cent.

After another fifty years about (1900), the population of the wrold was 161 crores. The rate of growth shows a definite sign of acceleration; the world average rate was now 6·3 per cent per decade. It is, however, still the New World and Europe moving ahead—the former was growing at the rate of 16·8 per cent per decade and the latter at 8·1 per cent. Asia stayed behind with 4·5 per cent;but Africa had now caught up to that rate.

When the present century opened, the distribution of world population had changed as shown in TABLE 5 below :

TABLE 5

| Country | 1750 | | 1900 | |
|---|---|---|---|---|
| | Number (in crores) | Percentage of world poplation | Number (in crores) | Percentage of world population |
| Africa . . . . . | 9·5 | 13 | 12·0 | 8 |
| Asia . . . . . | 47·9 | 66 | 93·7 | 58 |
| Europe . . . . . | 14·0 | 19 | 40·1 | 25 |
| New World . . . . . | 1·4 | 2 | 15·0 | 9 |
| WORLD TOTAL . . . . | 72·8 | 100 | 160·8 | 100 |

The population of Europe and the New World had grown from being about one-fifth of the world population on 1750 to about one-third in 1900. The population of Asia and Africa had also grown in absolute numbers, but since their rates of growth were so much slower than in Europe and the New World their relative proportion diminished from about four-fifths to two-thirds.

This was the position in or about 1900. During the last fifty years the practice of contraception has grown, and become part of the normal mode of conjugal life among the majority of the peoplein Western Europe and people of their stock inhabiting the New World. As a result, their birth rates have been falling fast. Their death rates had already begun to fall much earlier during the last century. Tnis was the result partly of the fact tnat the masses of the people had begun to eat more food and better food tnan they nad ever known before, and partly of the fact tnat water supply and sanitation, hygiene, and medicine nad begun to make progress. So long as the birth rates remained stationary while tne death rates fell, the growth rate was well ahead of the rest of the world. Hence the difference in the figures of Asia and Europe already observed. But when the European peoples started contraception and the habit grew, tne birth rates fell faster tnan the death rates—with he result tnat the European rate of growth has been falling. During the last half-century tne mean decennial growth rate of Europe nas been 6·0 per cent per decade; while tnat of Asia is higher, viz., 6·8 Africa has forged ahead with 9·3 while the rate in the New World has dropped from 16·8 to 15·1.

The latest position (round about 1950) seems to be as follows. World population is now 239 crores—well over three times the number of 1750. Europe and tne New World have about 88 crores which is well over a third of the population of the world. Asia and Africa have 151 crores wnich is well below two-thirds of the population of the world. If the trends of the last fifty years continue to operate during the next fifty years, the numbers of the European peoples should become stationary (it not declining) and Asia and Africa should keep growing even faster than at present—the rate of growth in the New World falling to the same level. But, there are good reasons to think (as will appear later in this report) that the 'if' is a very big one, and the assumption is unlikely to hold good.

22. In the account given above, it has been asserted that the decline during the latest half-century of the rate of growth of Western European people and people of the same stock in the New World—which is an observed fact which admits of no doubt—has been caused by the development of the practice of contraception. Until recently, this statement—though widely suspected to be probably true—could not be regarded as firmly establisned by adequate evidence. During the tnirties, a theory was in vogue : that the observed fall in the birth rate was a biological phenomenon—independent of conscious human volition. There was, it was asserged, a law of nature which induces a fall in the birth rate among people who achieved rising standards of living. Even now one still comes across this idea, in some form or other. But it is no longer necessary to invoke an unproved biological law in order to explain something which needs no furher explanation, if the practice of contraception is now available. The Royal Commission on Population in the United Kingdom has collected and analysed a mass of evidence and the findings of that Commission are conclusive. Revevant extracts from the papers of this Commission will be found in APPENDIX VII. The findings of the Commission confirm what is also indicated by a good many other enquiries conducted in the United States of America and certain Western European countries) that the practice of contraception by sufficiently large numbers of people is the main operative cause of falling births rates. They also indicate that the alleged

biological law is unlikely to be true and that an improvement of the nutritional standard or other standards of living is by no means incompatible with the maintenance of a high rate of child-bearing, if the people so desired.

23. One more comment is necessary on the figures showing the rate of growth of population in different parts of the world. It may be agreed that *an increase of population of the order of between* 10 *and* 15 *per cent per decade is biologically natural* and has been experienced by many of the advaned countries of the world and is still experienced by some of them. Whether or not this can continue indefinitely in future is a question of high importance for mankind as a whole. The question is at present involved in acute contraversy into which we need not enter at this stage. One thing, however, is certain. It could not have been a normal characteristic of human history for an indefinite period in the past.

Within the last two hundred years mankind has more than trebled its numbers—and this has happened while the rate of growth per decade was very much less than 10 per cent. We can easily see that even the rate which actually prevailed during the last two centuries—trebling intwo centuries—must be regarded as abnormal and very much faster than in proceding centuries. On any other supposition, we must be led to the conclusion that, when Emperor Asoka ruled (273-232 B.C.), and was sending his missionaries to various countries of the world, the whole of mankind must have numbered only a few tens of thousands—which is absurd. We shall not see the picture of human growth in its proper perspective unless we realise tnat what we feel to be a '*biologically natural' rate of growth is by no means natural in the sense of having regularly occurred at all places from time immemorial. The exact opposite is nearer the truth.* The rates of growth which we are discussing should, therefore, be regarded as an episode in an altogether exceptional epoch in human history. This epoch is probably now drawing to its close. With this observation, we may leave the world figures alone for a while; and return to India and limit ourselves again to a review of changes which occurred during a much shorter period—viz., thirty years before and since 1921.

## CHAPTER II

### *F—Birth Rates and Death Rates*

BIRTHS AND DEATHS are among the most important events which occur in the life of every household. Our knowledge of how the number and the living pattern of our people have changed in the past and, therefore, our opinion about how they may be expected to change in the future are bound to be vague and sketchy, if not incorrect, unless we achieved a clear understanding of the relations hip between these vital events and the changing pattern of life.

70. Government have made arrangements for securing that births and deaths are reported as and when they occur and the occurences are placed on record together with essential minimum information regarding date and place and parties concerned. There is the system of official registration of births and deaths. The primary data thus secured are then compiled and returns showing the numbers of births and deaths in different parts of the country as well as birth rates and death rates computed from them, are published at regular intervals by State Governments, for each State and by the Central Government, for India.

If reporting is complete and the basic records are correctly maintained, the changes in numbers recorded by the census at ten-yearly intervals should tally with the balance of births and deaths during the ten-year period, leaving only a relatively small margin to be explained by the net balance of migration of perople, in and out of the territory in question.

71. Let us take Uttar Pradesh as an illustration. In 1951 the state had a total population of 632 lakhs. Ten years earlier, according to the 1941 Census, there were 565 lakhs of people in the same territory. The number had grown by 67 lakhs in ten years. There were arrangements for registration of births and deaths in most villages and towns of the state—but some small bits of territory (of the princely states which were 'merged' in Uttar Pradesh shortly before the 1951 Census) did not have them. This is a complication but a small one—because the population of the area where there was no registration was a little under one fortieth of the whole state and we may make allowances accordingly.

During ten years preceding the 1951 Census the authorities of Uttar Pradesh registered 145 lakhs of births. They also registered 97 lakhs of deaths. The excess of births over-deaths being 48 lakhs, the population must have increased by that number. According to the census, the increase was 67 lakhs. How are we to account for the remaining 19 lakhs? Were they displaced persons who had come into the state from Pakistan? No, we have counted them; they are only 5 lakhs. We also know that at about the time they came in, others migrated to Pakistan from Uttar Pradesh. Though we do not know this number precisely, we have reasons to believe that it was not perhaps far short of the number who came in. So the question about the 19 lakhs remains to be answered. Evidently, a great many births escaped registration; and so also, no doubt, deaths. The basic record is materially incomplete.

This incompleteenss is indicated by census results in another way also. The births registered during 10 years work out to a rate (in round figures) of 25 thousand people per annum. We have already noted in the last section, however, that the count of infants in this state yielded 33 per thousand. May be, this number was somewhat swollen by counting 13 month old babies also, as infants, But, even so, if we make allowance for the number of infants who must have died during the year preceding the census, the census count of infants is a clear indication that actual births must have exceeded registered births fairly substantially.

The problem is—how are we to have a reasonably close estimate of the actual number of births and the actual birth rate is against the registered birth rate? There is a similar problem about deaths and death rates.

The importance of solving this problem cannot be overstressed. To illustrate, the registration figure of Uttar Pradesh show that in each of the two previous decades 1931-40 as well as 1921-30, registered births were working out to an average rate (in round figures) of 34 per thousand people per annum. There is a sharp difference between 25 (the registered birth rate during 1941-50) and 34 (at each of two preceding decades). If this difference is real and if similar drops were observed in other states, the figures will prove that there is no such thing as a population problem in India; and if there was, the problem was solving itself. That is, in fact, what a number of people think and say. But suppose the difference is due merely to the fact that the registration system has become less efficient than before; and so more births escaped registration during the last decade than during two previous decades. Suppose further, that we could form a reliable estmate of the extent of omission in different decades. Then the inferences to be drawn from the figures will be very different. Our appreciation of the problem and our approach to its solution will turn out to be very different.

72. Uncertainties of this kind are present in every state. Among the major states, Madras, Bombay, Madhya Pradesh and the Punjab are the only four states where the registration system functions reasonably well and omissions are not unduly large. The other states fall into three groups—those for which figures are available over a long period, though they are not very good figures; those for which figures (not very good) are available now for some recent years but not over a long period; and those for which there are no figures at all even now. If we exclude the last two categories, we are left with a territory which contains roughly three-quarter of India's population.

It was no use merely saying that we do not have complete information and can, therefore, come to no conclusion. It will take a long time before we get data which are free from all uncertainties. Meanwhile, we have to form as good a judgement as we can—on all the materials before us—about how the observed growth of population as disclosed by censuses should be split up into births, deaths, and the net balance of migration. To this end, it was necessary to bring together all available data thrown up by registration of births and deaths as well as by the census and subject them to close and careful study and use every scrap of collateral information which can help us to piece together this jig-saw puzzle.

73. Such a study has been carried out, and it has yielded results which serve our present purpose. The nature of this study, and the results, are set out in detail in a self-contained paper* which is printed an APPENDIX II to this report. The conclusions reached in this paper may be thus stated :

I. The India picture is as follows :

(i) Births have occurred (during the ten years 1941-50) at an average rate of 40 per thousand per annum.

(ii) Deaths have occurred (during the ten years 1941-50) at an average rate of 2 7 per thousand per annum.

(iii) Hence, the natural increase of the population has been occurring (during the ten years 1941-50) at an average rate of 13 per thousand per annum.

We may refer to these rates as the birth rate (40), death rate(27) and natural increase rate (13). They relate to India within her present boundaries during the decade preceding the 1951 Census.

II. The zonal variations of the India picture are as follows :

(i) The highest birth rate is found in Central India (44). and the lowest birth rate in South India (36 or 37). The birth rates of other zones in order, are; West India (42), North-West India (41 or 42), North India and East India (for of which the birth rates are 38 or 39).

(ii) The highest death arate is found in Central India (34), and the lower death rate in South India (21 or 22). The death rates of other zones in order, are : North India (27 or 28), East India (26 or 27 or 28) West India (26) and North-West India (24 or 25 or 26).

(iii) The highest natural increase rate is found in North-West India (16 or 17) and West India (16), and the lowest natural increase rate is found in Central India (10). The natural increase rates of other zones, in order, are: South India (15), East India (11 or 12) and North India (11).

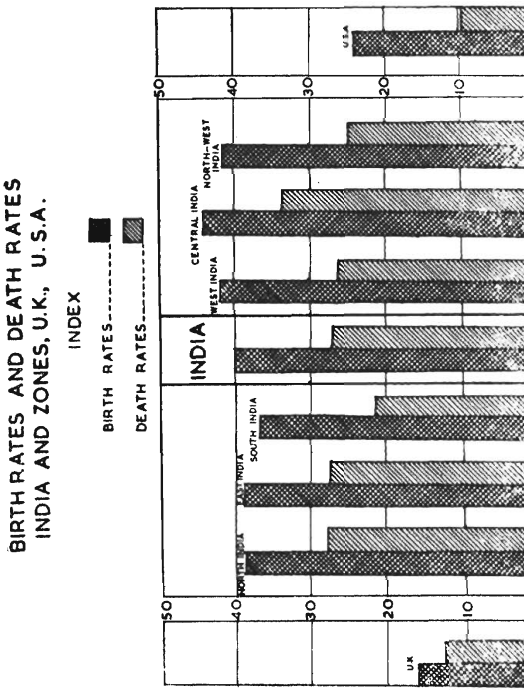
74. The foregoing figures do not represent a simple computation from census data or registration data or both. They are something more complex than a computation, they constitute a judgement. They represent what the present writer considers to be most probably what occurred during 1941-50 in India and the six zones. All the evidence which has led him to form this judgement is fully set out in print; so, it is possible for readers (if they disagree with the conclusions) to form their own judgement.

It will be noted that in some cases, more than one figure have been given—his represents what seems to the present writer to be the unavoidable residuum of uncertainty, which has to be accepted.

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*The paper is not unduly technical and it is hoped it will be read. A technical analysis made by Shri S. P. Jain, the Census Actuary, who prepared the Age and Life Tables of the 1951 Census, is printed as an Annexure this paper.

The diagram below shows the birth rates and death rates of India and the zones and compares them with the rates for the United Kingdom and the United States of America. The diagram tells its own story of the avoidable waste of life occurring among us all the time.



WHY DOES the birth rate vary from 44 in Central India to 36 or 37 in South India ? The birth rate—by definition—is the number of births which occur among 1,000 people during one year. But as births occur only to married women of certain ages it is their number which is really relevant. It is true that the limiting ages cannot be precisely laid down. It is also possible that some births occur to women who are not married. But where we are striking a rate for 1,000 people, we do not base ourselves on the actual occurrences of birth among 1,000 people only, but among lakhs and even crores of people. We may, therefore, disregard exceptional occurrences and treat married women of age 15 to 44 as the people who alone are relevant in this context.

It would follow that if one part of the country contained more married women of age 15 to 44 per 1,000 people than another, then, other things being equal, the former would have a bigher birth rate than the latter. The same would be true of the same territory at different times—a change in the proportion of married women of age 15 to 44 would, other things being equal, be accompanied by similar change in the birth rate.

76. What is the meaning of this escape caluse—'other things being equal' ? In what circumstances could be have the same proportion of married women of age 15 to 44 in different parts of the country (or at different times in the same part of the country) and yet have different birth rates ? Two sets of circumstances may be named. First,—the age structure within this group may be materially different. Thus, if we have one lakh of married women of age of 25 to 34 and another lakh of married women of age 35 to 44 drawn from the same part of the country, we may be fairly certain that the number of births occurring among the first group in the course of a year will be larger than the number of births occurring among the second group. Secondly,—it does not follow that if we compared two groups of married women of the same number and the same age-group (say 25 to 34)—but selected the groups from two different parts of the country, we would get the same number of babies born among them in any one year. Apart from purely accidental and personal differences between one woman and another, it seems possible that there are statistically significant differences between different groups of women ; but why should they be ? It is difficult to be sure—there may be something in the blood, or the climate, and there may be more in thes prevailing habits of conjugal life.

At this census we have been able to collect some information on these matters—in part, through a local census question (which was put in some states only); and in part, through an 'Experimental Census of Births and Deaths carried out in a few states, sometime after the main censsus was over.

Let us begin with a review of the facts which we have ascertained in Travancore-Cochin, about all women who have had at least one child-birth and who remained married on census day.

77. Among these mothers, those who were 45 years old or older were separated. The total number of children born to all of them was divided by the total number of such mothers. The result was 6·6. This shows that on an average, a Travancore-Cochin mother who lives to complete her

child-bearing period gives birth to more than 6 children but not more than 7. Out of this number (6·6), the average number actually alive on census day was 4·6. Among the children born alive 2 had died, predeceasing their mothers. Let us call these figures—the child birth index (6·6) the child survival index (4·6), and the child loss index (2·0).

78. These indices relate to what may be called the completed maternity expsrience. The numbers, naturally, increase gradually with age. If we isolate all mothers of age 20 or under the child birth index is 1·2, the child survival index is 1·0, and the child loss index is 0·2. The indices increase at five-yearly intervals as shown in TABLE 30.

TABLE 30

| | Age-group of mothers | Child birth rate | Child survival rate | Child loss index |
|---|---|---|---|---|
| | Under 20 | 1.2 | 1.0 | 0.2 |
| Incomplete maternity experience | 20 to 24 | 1.8 | 1.4 | 0.4 |
| | 25 to 29 | 2.9 | 2.3 | 0.6 |
| | 30 to 34 | 4.2 | 3.2 | 1.0 |
| | 35 to 39 | 5.3 | 4.0 | 1.3 |
| | 40 to 44 | 6.2 | 4.6 | 1.6 |
| Completed maternity | 45 and over | 6.6 | 4.6 | 2.0 |
| AVERAGE FOR ALL AGES | | 4.3 | 3.2 | 1.1 |

Note how the tempo of child-bearing accelerates. The addition to the family between about 17 (the mean of the under 20 group) and about 22 (the mean of the 20—24 group) is 0·6. Between 22 and 27, the addition is 1·1. Between 27 and 32 it is 1·3. Then the retardation begins. Between 32 and 37 it is 1·1. The additions to the family tend to become fewer as age advances after what may be called a mid-maternal age-round about age 30.

79. Information was available about the means of livelihood of these mothers. So it is possible to separate them into three groups as members of (i) agricultural land-holders and tenants' families, (ii) agricultural labourers families, and (iii) non-agricultural families. It was also possible to separate the mothers who lived in villages from those who lived in towns. The child birth indices were separately calculated for these groups and are shown below:

TABLE 31

| Maternal group | Child birth indices: Age 45 and over | Child birth indices: All ages |
|---|---|---|
| Agricultural land-holders and tenants' families | 6.7 | 4.5 |
| Agricultural labourers' families | 6.3 | 4.1 |
| Non-agricultural families | 6.6 | 4.2 |
| Rural | 6.6 | 4.3 |
| Urban | 6.4 | 2.4 |

It is sometimes stated—on the basis mainly of European experience—that the classes which are at the bottom of the social scale have more children and grow in number faster than others. There is little doubt the place of the agricultural labourer in he social scale any where in India. The figures for agricultural labourers' families in Travancore-Cochin do not show that this generalisation is true in that State.* The urban index is slightly smaller than the rural. But the difference is so small that it is probably not significant.

80. One other separation was effected among the mothers ; those who commenced child-bearing during ages 15 to 19 and those who commenced child bearing during ages 20 to 24. Let us call them Maternity Types A and B. Their child brith indices differed from age-group to age-group as shown in the table below :

TABLE 32

| Age-group | Child birth indices | |
|---|---|---|
| | Maternity Type A | Maternity Type B |
| Under 20 | 1.2 | .. |
| 20 to 24 | 2.0 | 1.3 |
| 25 to 29 | 3.6 | 2.3 |
| 30 to 34 | 4.8 | 3.7 |
| 35 to 39 | 6.0 | 4.9 |
| 40 to 44 | 6.8 | 5.8 |
| 45 and over | 7.3 | 6.4 |

The figures of this table indicate the result to be expected if by raising the age of marriage (or by other means) the first maternity of all mothers of Type A got postponed uniformly by five years. The result would be a reduction of maternity among mothers of Type A by approximately one-eighth. The reduction in the birth rate will be even smaller, this depending on the proportion which mothers of Type A bear to the total number of mothers.

81. The child birth indices were also calculated for mothers who had become widows by census day. It was found that on an average for all ages the child birth index of widowed mothers was larger—4·9 against 4·3 of the still-married. This is, of course, due to the fact that the higher age-groups predominate among widows. The comparison for ages 45 and over yields 5·5 as the index for widowed mothers against 6·6 for mothers who remained married on census day.

82. Data of the same nature as those reviewed above were also collected and compiled for three divisions of Madhya Pradesh. The comparison is shown below in respect of compeleted maternity experience of still-married mothers (age 45 & over) :

TABLE 33

| Natural division | Child birth index | Child survival index | Child oss index |
|---|---|---|---|
| East Madhya Pradesh | 6.1 | 3.6 | 2.5 |
| North-West Madhya Pradesh | 6.3 | 3.6 | 2.7 |
| South-West Madhya Pradesh | 6.6 | 3.6 | 3.0 |
| Travancore-Cochin | 6.6 | 4.6 | 2.0 |

*Nor is it true of any of the three divisions of Madhya Pradesh vide para 83. Two features of this table are noteworthy :

First,—It will be seen that the number of children borne by mothers aged 45 and over is not higher in any of the divisions of Madhya Pradesh than in Travancore-Cochin. In fact, the figure is slightly smaller in two divisions of Madhya Pradesh. Yet there is no doubt that the birth rate in Madhya Pradesh is very distinctly higher than in Travancore-Cochin. It is clearly verifiable that the difference is caused by differences in the proportion of married women of different age-groups to the total population.

Secondly,—The child loss index is unmistably higher in all the three divisions of Madhya Pradesh than in Travancore-Cochin. This fact is in accord with much other evidence which points to Madhya Pradesh as having a very high death rate.

83. A comparative study of the figures of Madhya Pradesh with those of Travancore-Cochin indicates that the features already noticed in Travancore-Cochin are also observable in Madhya Pradesh divisions. The tendency for the tempo of child-birth to accellerate until a mid-maternal age is reached and then to relax as age advances, is clearly observed. In general, the 'rural/urban differentials' and 'social class differentials' do not appear to be important. There is a diminution in the total number of children born when the age of commencement of child-birth is postponed, but the difference is not very striking.

It may be mentioned that a sample enquiry made in villages in two groups of districts of West Bengal also brought out data which exhibit the same features. The child birth index of mothers aged 45 and over came out to be 6·3 in both groups of districts.

The extent to which the census figures of Travancore-Chochin and Madhya Pradesh divisions, as well as the sample enquiry figures of West Bengal might be affected by error has not been studied in detail. It is noticed, however, that they hang together so well as to justify confidence. In general, it may be observed that there is little likelihood of significant error in the child survival index. It is practicably certain that the child birth indices are not overstated. At older ages, some women may have forgotten to count the number of children borne by them, completely. The true figures might, therefore, be somewhat higher than those given above. But judging from the graphs furnished in the diagrams given earlier in this section it seems likely that the allowance required to be made on account of such error is probably not large.

(For fuller information on all these data, reference may be made to the brochure on 'Maternity Data—1951 Census' issued as Census of India Paper No. 5 of 1953. (Some extracts are also given in APPENDIX II.)

84. Information of this kind is not available for many countries of the world. But very detailed data have been published for the United Kingdom among the papers accompanying the Report (issued in the year 1949) of the Royal Commission on Population. The relevant figures of that country have been extracted and included for reference in APPENDIX VII.

It would be seen that the child birth index, *i.e.*, average number of live births per mother after completion of her child-bearing period, exceeded six- in much the same way as in India—for those mothers of the United Kingdom who married in or about 1860. The index has fallen steadily since. It was reduced to 4·0 for women who married in the first decade of this century and is now about 2·4 or not more than two-fifths of the figures observed in different parts of India. It will be noted that the relation between the India Birth Rate (40) and the U. K. Birth Rate (16) is more or less of the same order.

85. There is another—and even more instructive—way in which the salient features of the maternity pattern can be expressed.

Out of all the births which take place during one year, how many are first births, how many are second births, how many are third births, and how many are births of the fourth and hiher order ? In a paper* published in 1951 by Shri S. P. JAIN, these questions have been answered on the basis of an analysis of registration data in thirty municipal towns of India. The 'Experimental Census of Births and Deaths' has yielded some more data or 27 districts of South India, 7 districts of West India, 22 districts of Central India and 5 districts of North-West India. These data relate to the population as a whole—including villages and towns—people in due proportion.

The results are shown in the table below :

TABLE 34

| | Number per 1,000 births which are | | | |
|---|---|---|---|---|
| | First births | Second births | Third births | Fourth births and birth of higher order |
| South India (27 districts) | 228 | 215 | 181 | 376 |
| West India (7 districts) | 209 | 180 | 167 | 444 |
| Central India (22 districts) | 210 | 189 | 162 | 439 |
| North-West India (5 districts) | 231 | 206 | 151 | 412 |
| Thirty Municipal Towns of India | 209 | 196 | 167 | 428 |

*"A study of birth order statistics of India" published in the Indian Journal of Medical Research No. 39, April 1951.

The figures hang together very well indeed and there is little doubt that we may place confidence in the correctness of the picture which emerges. South India presents a slightly different pattern from West, Central and North-West India, but the difference is consistent with the known differences in birth rates. Speaking generally, first births account for rather more than one-fifth of all births ; second births account for very nearly another one-fifth; third births account for about one-sixth of all births ; well over two-fifths of all births are fourth births or births of a higher order. We can put the matter even more simply. The total number of births which occur in the course of one year among about 1,000 people of India is 40. Among these 40 births, 8 births are first births, 16 births are either first births or second births ; 23 births are either first, second or third births ; and 17 births out of 40 are either fourth births or births of higher order.

86. For reasons which should be sufficiently obvious and which we shall discuss in the last chapter of this report, we may refer to births occurring to mothers who have already given birth to three or more children as "improvident maternity" (except in the altogether exceptional circumstance where all previously born children are dead). We may refer to the percentage of such maternities to all births as the 'Incidence of improvident Maternity'. It is extremely important that the attention of the people should be focussed on this factor—the incidence of improvident maternity. The figures for all those countries of the world for which this information is available have been extracted and furnished in APPENDIX VII. It will be seen that the latest figures compare as shown in TABLE 35. In most of these countries, moreover, the incidence of improvident maternity is steadily decreasing. We are not aware of any evidence that this is happening in India.

TABLE 35

| Country | Incidence of Improvident maternity |
|---|---|
| India . . . . . | 42.8 |
| U. S. A. . . . . | 19.2 |
| U. K. . . . . | 14.3 |
| France . . . . . | 19.7 |
| Germany (Federal Republic) . . . . . | 12.3 |
| Japan . . . . . | 33.9 |

## CHAPTER V

## THE PROSPECT — 1981

### *A—Future Growth of Population*

OF ALL COUNTRIES in the world, Great Britain has perhaps the largest assemblage of the most reliable population data, extending in a systematic time series over the longest period in the past. Yet when the Royal Commission on population set out to "examine the facts relating to the present population trends in Great Britain; to investigate the causes of these trends and to consider their probable consequences ; to consider what measures, if any, should be taken in the national interest to influence the future trend, of population and to make recommendations", it found the data insufficient in material particulars. So, arrangements were made for special enquiries to be conducted in order to provide the additional information required by the Commission.

After a thorough analysis and prolonged study of abundant material, the Commission achieved a forecast of the future growth of populations Before setting out and discussing the forecast, the Commission made the following preliminary observations :

"In this and the following chapter we shall try to follow the trend of population some way into the future. Our first and main concern will be to explore the prospects of natural increase. Making the assumption that there is no net migration, we shall seek to find out how the population might develop under the influence of fertility and mortality alone...."

"We shall have to begin by looking at the existing population, which naturally conditions future possibilities. We shall be led thereby into a consideration of the number of probable survivors at various future dates of the population now living, and for this purpose it will be necessary to make some assumptions about future deaths. We shall have, therefore, to consider in the light of past history and present knowledge what seems likely to be the trend of mortality rates in future. To complete the picture it will be necessary to have figures for the numbers in the age-groups not yet born, and this involves forecasting future fertility rates. The analysis we have made of the past suggests that this will have to be taken in two stages—(1) forecasting the number of married couples and (2) forecasting marital fertility rates. We must emphasize that we do not use the word 'forecast' here in sense of confident prediction ; the procedure will rather be to work out the consequences of various allernatives within the bounds of reasonable probability. It is when we come to the forecasting of births that these bounds are widest and the prediction of the numbers of any group containing persons as yet unborn is, therefore, particularly difficult."

2. The passage has been reproduced because it explains clearly what is involved in the attempt to peer into the future in order to form an opinion about future numbers, the nature of data required for the attempt and the strictly conditional nature of the results to be expected. We shall presently see the application of these observations to ourselves. It is, however, not irelevant for purposes of this report to set out at this stage the forecast made by the Commission of the future of the British population.

3. The total population of Great Britain had been 105 lakhs in 1801. This had grown, at an enormously rapid rate, to 370 lakhs in 1901. The 1951 Census showed the number had grown further (though more slowly) to 488 lakhs. The Commission (making its calculations in 1947) looked into the future for a century ahead. It made three different assumptions which led to three different conclusions as below :

TABLE 1

(In lakhs)

| Year | First assumption | Second assumption | Third assumption |
|---|---|---|---|
| 1962 | 502 | 499 | 508 |
| 1977 | 507 | 486 | 518 |
| 2007 | 489 | 415 | 523 |
| 2047 | 455 | 296 | 527 |

All the three assumptions relate to the future of the 'family size' (by which term, the Commission refers to the average of the total number of children born to every married woman, on completion of her child-bearing period). If the present level (indicated by the actual experience of women who married during the years 1927 to 1938) remained unaltered infuture, the rate of growth of population will slow down and stop sometime towards the end of this century and a reduction of numbers will begin. But the reduction will be small—there would be 455 lakhs in 2047. But if the tendency to reduction of the 'family size' continues further and stability is attained only at four-fifths of the present level, then the reduction of numbers will start much earlier and occur more rapidly. There would be only 296 lakhs in 2047. If, however, the present level is slightly increased—by 6 per cent only—and stability is attained at this slightly higher level, a slow rate of growth may be kept up for a very long time and the possibility of absolute decline in numbers postponed for at least a century. Accepting these conclusions as data, the Commission then proceeded to discuss the social, economic and other implications of these different possibilities for the future.

4. From what has been said earlier in this report, it will be observed that we do not possess population data which can be compared even remotely with those available to the Royal Commission. Our attempt to peer into the future must, therefore, be limited to a relatively short time ; and our conclusions must be based on methods of deduction of a much less regorous nature. To make two simple alternative assumptions, first, let us suppose that during each of the three decades 1951—60, 1961—70 and 1971—80 the mean decennial rate of growth of population will be—(a) the same as that of the average of the three decades 1921—50 ; (b) the same as that of the latest of the same three decades (when the growth rate was highest). These two assumptions may be regarded as yielding the lower and upper limits (Table 2) of the probable future figures.

TABLE 2

| Year | Lower limit | Upper limit |
|---|---|---|
| 1951 . . . . . | 3,613 | 3,613 |
| 1961 . . . . . | 4,077 | 4,119 |
| 1971 . . . . . | 4,585 | 4,697 |
| 1981 . . . . . | 5,276 | 5,355 |

5. The foregoing table shows the results of a very simple calculation. Another line of approach—which involves somewhat more complicated calculations—yields the figures of TABLE 3 on next page. They represent a forecast for the years 1961, 1971 and 1981 of the population of three states (Uttar Pradesh, Madras and Madhya Pradesh) showing the total number, its division into three broad age-groups (*viz.*, under 15, 15 to 54 and 55 and over) and their sub-division by sexes. The forecast is based on the following assumptions :

First—Apart from the disappearance of child marriages, there will be no material change in marital or conjugal habits ; married women of the same number and the same age will be giving birth to approximately the same number of children during each of the thirty years 1951-1980 as on an average of the thirty years 1921-50.

Secondly—The mortality rates in every age-group will be approximately the same during each of the next thirty years 1951-1980 as on an average of the thirty years 1921-50.

TABLE 3

POPULATION
(In Thousand)

| Year | All ages | | | 0—14 | | 15—54 | | 55 and over | |
|---|---|---|---|---|---|---|---|---|---|
| | Persons | Males | Females | Males | Females | Males | Females | Males | Females |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **Uttar Pradesh** | | | | | | | | | |
| 1921 | 46,669 | 24,451 | 22,218 | 9,233 | 8,237 | 13,531 | 12,287 | 1,687 | 1,694 |
| 1931 | 49,777 | 26,147 | 23,630 | 10,181 | 9,189 | 14,371 | 12,870 | 1,595 | 1,571 |
| 1941 | 56,532 | 29,639 | 26,893 | 11,292 | 10,225 | 16,211 | 14,635 | 2,136 | 2,033 |
| 1951 | 63,216 | 33,098 | 30,118 | 12,648 | 11,696 | 17,715 | 15,836 | 2,735 | 2,586 |
| 1961 | 70,017 | 36,641 | 33,369 | 14,316 | 12,851 | 19,275 | 17,683 | 3,050 | 2,835 |
| 1971 | 78,036 | 40,677 | 37,359 | 15,953 | 14,671 | 21,473 | 19,733 | 3,251 | 2,955 |
| 1981 | 87,437 | 45,644 | 41,793 | 18,124 | 16,303 | 24,132 | 22,439 | 3,388 | 3,051 |
| **Madras** | | | | | | | | | |
| 1921 | 40,593 | 20,060 | 20,533 | 7,672 | 7,648 | 10,763 | 11,252 | 1,625 | 1,633 |
| 1931 | 44,650 | 22,091 | 22,559 | 8,744 | 8,641 | 11,771 | 12,302 | 1,576 | 1,616 |
| 1941 | 49,831 | 24,796 | 25,035 | 9,773 | 9,633 | 13,233 | 13,575 | 1,790 | 1,827 |
| 1951 | 57,016 | 28,419 | 28,597 | 10,334 | 10,291 | 15,599 | 15,804 | 2,486 | 2,502 |
| 1961 | 64,231 | 32,028 | 32,203 | 12,234 | 12,122 | 16,915 | 17,172 | 2,879 | 2,909 |
| 1971 | 70,173 | 35,023 | 25,150 | 13,055 | 12,937 | 18,831 | 19,033 | 3,137 | 3,180 |
| 1981 | 79,429 | 39,648 | 39,781 | 15,279 | 15,086 | 20,986 | 21,306 | 3,383 | 3,389 |
| **Madhya Pradesh** | | | | | | | | | |
| 1921 | 15,797 | 7,891 | 7,906 | 3,285 | 3,194 | 4,070 | 4,085 | 536 | 627 |
| 1931 | 17,792 | 8,899 | 8,893 | 3,596 | 3,543 | 4,759 | 4,721 | 544 | 629 |
| 1941 | 19,632 | 9,837 | 9,795 | 3,813 | 3,711 | 5,325 | 5,271 | 699 | 813 |
| 1951 | 21,248 | 10,663 | 10,585 | 4,137 | 4,014 | 5,758 | 5,627 | 768 | 944 |
| 1961 | 23,453 | 11,745 | 11,708 | 4,585 | 4,467 | 6 293 | 6,172 | 867 | 1,067 |
| 1971 | 25,811 | 12,934 | 12,877 | 5,011 | 4,907 | 6,958 | 6,768 | 965 | 1,202 |
| 1981 | 28,636 | 14,340 | 14,296 | 5,632 | 5,492 | 7,693 | 7,512 | 1,015 | 1,293 |

NOTE—All persons who were aged 10 and over at the Census of 1931 were all alive in 1921 and must have been counted at the 1921 Census. It is possible to identify the corresponding numbers age-group by age-group. Thus we may compare the number aged 15 to 24 in 1921 with the number aged 25 to 34 in 1931 and express the latter as a proportion of the former. This can be done for three successive ten-year periods (1921—30, 1931—40 and 1941—50) and an average struck. In this manner an average (which may be called the 'surviving population rate') can be struck for every age-group into which all persons aged 10 and over are divided and for the two sexes separately. This is the first step.

All persons who were under age 10 at the Census of 1931 must have been born after the 1921 Census. They may be divided into four groups : under age 5 and between ages 5 to 9, separately for males and females. These are the four 'new population' groups at each Census. It is assumed that their numbers are co-related directly to the mean of the numbers of women aged 15 to 44 at two successive censuses. The multiplying factors which when applied to the latter will yield the former are then worked out for each of the three decades. Their average is then struck for the three decades—they may be called the 'new population rates'. This completes the second step.

We then proceed to the third step which consists of three stages. First the surviving population rates are applied to the 1951 Census figures and we get the age-groups by sexes for 1961 of all persons aged 10 and over. The application of the new population rates then completes the 1961 figures by yielding the numbers of males under age 5, males aged 5 to 9, females under age 5 and females aged 5 to 9. The process is repeated with reference to the 1961 figures thus obtained, and the 1971 figures are secured. By a repetition of the same process in relation to the 1971 figures, 1981 figures are obtained.

We shall consider presently whether these assumptions are reasonable and likely to hold good. But assuming they do the results for the three states may be fairly expected to be as indicated in TABLE 3. We may (by a further deduction) arrive at a minimal estimate of the future growth of population for the country as a whole up to 1981 as shown in the table below :

TABLE 4

| Year | Growth of population (Past actuals since 1891) | | Year | Growth of population (Minimum estimal upto 1981) | |
|---|---|---|---|---|---|
| | Population (in lakhs) | Increase during preceding 10 years | | Population (In lakhs) | Increase during preceding 10 years |
| 1891 . . . | 2,384 | .. | 1951 | 3,613 | 445 |
| 1901 . . . | 2,384 | 0 | 1961 | 4,078 | 465 |
| 1911 . . . | 2,522 | 138 | 1971 | 4,527 | 449 |
| 1921 . . . | 2,514 | Decrease | 1981 | 5,157 | 630 |
| 1931 . . . | 2,791 | 277 | | | |
| 1941 . . . | 3,168 | 377 | | | |
| 1951 . . . | 3,613 | 445 | | | |

NOTE.—The figures include the state of Jammu and Kashmir and allow for 'inflation' in the 1941 Census by an estimated 20 lakhs.

The calculations which yielded the forcasts furnished in Table 3 for the three states are explained in the note below the table. Calculations of the same nature were not attempted for the country as a whole because of difficulties in reconstructing age/sex details with reference to territorial changes. The forecast for India was deduced from the forecast for the three states*.—Uttar Pradesh, Madras and Madhya Pradesh. These three states—which had added to their population during 1921-50, 384 lakhs—will add 540 lakhs during 1951-80. India had added to its population during 1921-50, 1,099 lakhs. Assuming that its growth during 1951-80 will bear the same proportion to its growth during 1921-50 as the three states combined, the addition during 1951-80 should be 1,544 lakhs. The figures for growth upto 1971 and 1961 are also arrived at by like reasoning.

6. Both types of calculations are of a rough and ready nature. One type of calculation makes some sort of allowance for differences in rates of growth likely to be caused by changes in the age-sex pattern ; the other type does not.

The important thing to note is not the exact figures—for it is no use attempting to forercast in units smaller than a crore. What should be noted is the fact that, if we start with the assumption that the future growth will be limited by the experience of 1921-50 we get by different methods numbers of much the same order—41 crores in 1961, 46 crores in 1971 and 52 crores in 1981. We should also note from TABLE 2 that the figures we are likely to get by assuming that future growth will reproduce the experience of 1941-50 throughout the next thirty years would be higher, but not very much higher. Are we right in assuming that maternity rates and mortality rates will be the same during the next thirty years, as during the last thirty years ? Do we have any indications from the past experience which would help us to answer this question? Let us review the past briefly from this point of view. In doing so, we should make a distinction between two quite different sets of questions. We have already seen that the period of thirty years before 1921 differed sharply from the thirty-year period since 1921. The difference, as we have seen, consists in the virtual elimination (barring one exception) of deaths from famine and pestilence ; and the commencement of a process of significant reduction in what may be called normal mortality. May we assume that these gains are permanent ? Or should we accept as a possibility that famine and pestilence may return and the level of normal mortality may rise again, within the next thirty years ? Let us dismiss this possibility

*It is possible to compute forecasts for Bombay, in the same manner as for the three states mentioned above. But it was not considered safe to apply the same calculations to that state in view of the large part played by migration in the growth of population of that state. If it is justifiable to assume that migration would continue on the same scale up to 1981 (this is not very likely) the forecast for Bombay would be a steady growth from 360 lakhs in 1951 to 427 lakhs in 1961, 507 lakhs in 1971 and 607 lakhs in 1981. When these figures were added to those of other three states and alternative forecasts for India were deduced by comparison with the total of all the four states and alternative forecasts for India were deduced by comparison with the total of all the four states inclusive of Bombay, the results were as follows : 4,072 lakhs in 1961, 4,585 lakhs in 1971 and 5,276 lakhs in 1981. These figures (which are not so very different from the minimal estimates furnished in TABLE 4 above) give an indication of the order of magnitude of the uncertainty involved in our necessarily rough calculations.

from our mind for the present and assume that the gains are permanent. We shall enquire whether on a comparison of 1921-30 with 1931-40 and the latter with 1941-50 there is such a definite trend as regards changes either of mortality rates or of maternity rates or both that we should expect the growth of population during 1951-80 to be substantially faster or substantially slower than during 1921-50.

7. For information on these trends we have to return to the statistics of registration of births and deaths—which, as already explained are defective in many ways. In the country as a whole, the system of registration has been in force throughout the period 1921-50 in roughly three-quarters of the country (on a population basis). The following table shows the numbers of births and deaths which were registered in each of the three decades, as well as the average birth rates and average death rates for each decade derived therefrom :

TABLE 5

| Decade | Registered births (in lakhs) | Registered deaths (in lakhs) | Mean decennial birth rate (Registered) | Mean decennial death rate (Registered) |
|---|---|---|---|---|
| 1921-30 . . . . . | 669 | 502 | 33.7 | 25.3 |
| 1931-40 . . . . . | 753 | 512 | 38.8 | 23.0 |
| 1941-50 . . . . . | 680 | 486 | 27.2 | 19.4 |

Before proceeding to draw any inferences from these figures we should observe that the birth rate is deduced to be 27.2 for the decade 1941-50 when we have already in an earlier chapter, concluded that the correct level is 40. Evidently, 32 per cent of all births escaped registration during 1941-50 (apart from the fact that the births occurring among a quarter of the population were not attempted to be registered at all). Similarly, the registered deaths yield a death rate of 19·4 when we have reason to believe the true death rate was 27. It follows that 28 per cent of all deaths escaped registration during 1941-50 in the areas where registration was being effected.

8. It is usual to assume that the rates derived from the registration data for different years may be compared with one another and correct conclusions drawn regarding time-trends even though the absolute values are incorrect The assumption would be justified so long as we are dealing with areas in which the omissions are not unduly large and with periods during which the system was worked with much the same degree of efficiency year after year, without any material improvement or deterioration. Whether this assumption holds good of the comparison between 1921-30 and 1931-40 is doubtful ; it is certain that it is wholly inapplicable to the comparison between 1931-40 and 1941-50 even in those states where the omissions are not unduly large. This negative conclusion is so important that the reasons should be placed on record :

*First*—We may observe from the figures of TABLE 5 that it is not merely the registered birth rate and registered death rates which have fallen ; the absolute numbers of registered births and registered deaths have also fallen. This raises the suspicion that what we are witnessing may not be a fall in the number of births but a rise in the number of births which have escaped registration.

*Secondly*—The suspicion is confirmed when we compare the difference betweenthe birth rate and death rate, with the growth rate ascertained by the census. The difference is 7.8 during 1941-50 against a growth rate 13.1 whereas it had been 10.8 during 1931-40 against a growth rate of 12.7. To put the matter in another way, the registered rates show the birth rate to have fallen more rapidly than the death rate. If we may ignore the effects of migration, this would mean a substantial reduction of the rate of growth. But the census figures show that there was no reduction of the rate of growth. We have good reasons to believe that migration cannot have affected the rate of growth in the country as a whole by even as much as one per cent (though the position is different in certain zones). The figures confirm the suspicion that the system of registration of births and deaths might have been working much less efficiently during 1941-50 than in 1931-40. The comparison between the decades may be bringing to light a fall in the registration of births and not necessarily a fall in the actual number of births.

The point was specially examined by every Superintendent of Census Operations in relation to conditions in his state. The converging testimony of all officers—which will be found in the State Census Reports—confirms the view that there has been a definite deterioration in the efficiency of registration. This conclusion need not cause any surprise. During the war and for some years thereafter, the districts administrative establishments were loaded with too much new work in connection initially with the prosecution of the war and later increasingly with the problem of keeping food supplies moving and prices under control. 'Routine' work of every description suffered, including the maintenance of adequate supervision over the staff entrusted with the duties of registration of births and deaths and submission of returns relating to them.

Comparison of the data relating to 1921-30 with those of 1931-40 is not vitiated in the same way ; though, even here, it seems possible that special efforts undertaken in some areas to improve the efficiency of the system may have also introduced an element of non-comparability.

9. We may now make the following observations on the figures for India in Table 5 :

(i) The registered birth rate was the same during 1931-40 as during 1921-30. This is probably true also of the actual birth rate.

(ii) The registered death rate during 1931-40 was smaller than that of 1921-30. There was probably a genuine fall in the actual death rate.

(iii) There are large reductions, both in the registered birth rates and registered death rates, when we compare 1941-50 with 1931-40 ; the reduction of the registered birth rate actually exceeding that of the registered death rate. It should not be supposed that the true birth rates and true death rates changed in this manner. It is not possible to say, from these figures alone, whether they changed at all ; and if so, how.

10. Among the states where births and deaths are registered, there are only four in which it has been computed that the omissions are fewer than one in four during 1941-50 and consequently, even smaller, in earlier decades. These are, in order of efficiency of registration : Punjab, Madras Madhya Pradesh and Bombay. Let us observe the trends disclosed by the registration data in these states, as shown in the table below :

TABLE 6

| State | Natural division | Registered birth rate | | | Registered death rate | | |
|---|---|---|---|---|---|---|---|
| | | 1921-30 | 1931-40 | 1941-50 | 1921-30 | 1931-40 | 1941-50 |
| Punjab | Himalayan | 34.7 | 35.8 | 34.1 | 31.4 | 26.9 | 23.8 |
| | Plain | 41.2 | 43.6 | 40.0 | 30.3 | 26.3 | 23.9 |
| Madras | Deccan | 35.7 | 38.5 | 33.1 | 25.7 | 26.1 | 22.7 |
| | West | 35.8 | 35.0 | 31.3 | 22.2 | 20.6 | 18.3 |
| | North | 30.9 | 34.7 | 30.5 | 21.3 | 22.4 | 20.7 |
| | South | 31.0 | 34.0 | 30.4 | 21.9 | 21.9 | 20.7 |
| Bombay | Deccan Northern | 38.9 | 39.5 | 35.3 | 27.7 | 26.0 | 24.4 |
| | Deccan Southern | 37.4 | 38.5 | 36.0 | 27.2 | 26.3 | 24.5 |
| | Gujrat | 36.2 | 38.9 | 36.2 | 26.7 | 26.6 | 24.8 |
| | Greater Bombay | 18.8 | 25.4 | 23.1 | 28.1 | 21.1 | 16.0 |
| | Konkan | 33.9 | 33.0 | 27.0 | 23.3 | 21.3 | 18.3 |
| Madhya Pradesh | North-West | 41.2 | 43.7 | 36.8 | 32.5 | 35.0 | 31.5 |
| | East | 39.4 | 39.2 | 35.2 | 29.8 | 27.8 | 28.1 |
| | South-West | 43.8 | 41.1 | 39.4 | 33.3 | 33.6 | 32.1 |

Though we have had to exclude all the areas where the registration data are too defective for purposes of assessing trends, we are left in TABLE 6 with figures for sufficiently large and widely dispersed areas in the country. Whatever inferences are legitimately drawn from these figures would probably reflect the true position in the country as a whole. The following inferences seem credible to the present writer :

(i) Changes between 1921-30 and 1931-40—The general picture is made up of two features : one—a definitely rising or stationary birth rate ; and the other—a significant, though rather small, fall in the death rate. The rise in the birth rate was probably associated with a passing change in the age structure, reflecting the abnormal consequences of selective mortalities of influenza, plague and famine in earlier decades. In some places (e.g., North Madras and South Madras) the rise may be probably deceptive and indicative merely of the results of special efforts to improve the efficiency of registration.

(ii) Changes between 1931-40 and 1941-50—The general picture is made up of two features : first,—there is a fall in the birth rate which consists in part of the cancellation of the rise which had occurred in the earlier decade and in part also of a further fall below the levels reached in 1921-30 ; and secondly,—there is a further drop in the death rate between 1931-40 and 1941-50 which is a shade more pronounced than the drop which had occurred between 1921-30 and 1931-40.

Where an earlier increase in the birth rate (or death rate) had been due to improvement in the registration of births and deaths, it is almost certain that the improvement was not maintained and a set-back occurred. To this extent, there was no real change in either decade. It is also possible that—even where there was no special improvement originally—deterioration in registration has occured in the last decade and has exaggerated the trends. After making due allowance for such vagaries of registration, it is difficult to rule out the possibility that the true birth rate of 1921—30, might have been a little higher than the true birth rate of 1941—50, (viz., 40). We should accept it as probable that there has, in fact, been a small reduction of the birth rate. We are on much firmer ground about the death rate. The trend of the death rate differs from that of birth rate in two ways; the former has fallen in both decades successively, whereas the latter has moved up and down; and, the drop in the death rate is clearly visible to the naked eye, while that of the birth rate is microscopic.

The expectation of life, at any particular age, is a good index of the next result of the incidence of mortality at all subsequent ages. But the nature of the data used for purposes of calculation is such that a good deal of guess-work enters into this factor at very young ages. The values of expectation of life at birth must, therefore, be treated with some reserve; but the

values for expectation of life at higher ages may be relied upon more confidently. The relevant figures are shown below :

TABLE 7

| | 1921—30 | 1941—50 | Increase in expectation of life during 20 years |
|---|---|---|---|
| Expectation of life at birth | 26 years and 11 months | 32 years and 5 months | 5 years and 6 months |
| Expectation of life at age 10 | 36 years and 5 months | 39 years | 2 years and 7 months |

These figures leave no room for doubt that there has been a significant decline of mortality rates. This conclusion indicates a trend of which we should take notice when making estimates of future growth. But before following up that point, a brief digression is necessary in order to prevent the possibility of any sense of complacency arising out of our finding that the death rate has, in fact, fallen and the expectation of life has increased.

12. The expectation of life at age 10 is 59.0 to 60 in England and Wales, Australia and New Zealand. It is 56 in the United States of America, about 50 in Japan and 47 in Egypt. It is now 39 in India. We continue to retain the unpleasant distinction of having the lowest expectation of life among all the people for whom figures are available.

13. We should also remember that preventable deaths continue to occur in especially heavy numbers among infants and young children under age 5. Our information about mortality rates at different ages is very poor. The best judgment which the present writer is able to form on this subject from available data is furnished in Table 8 given below :

TABLE 8

| | Number of deaths occurring among 1,000 persons of all ages during any one year (1941—50) | | | |
|---|---|---|---|---|
| | All ages | Under age 5 | Ages 5 to 54 | Ages 55 and over |
| South India (Madras) | 21 or 22 | 8 or 9 | 7 or 8 | 6 |
| West India (Bombay) | 26 | 11 | 9 | 6 |
| North India (Uttar Pradesh) | 27 or 28 | 11 | 10 or 11 | 6 |
| Central India (Madhya Pradesh) | 34 | 15 | 13 | 6 |
| INDIA | 27 | 11 | 10 | 6 |

In all the four zones for which available data permit a judgment, it will be seen that the number of deaths occurring under age 5 equals or exceeds the number of deaths occurring at all ages between 5 and 54 ; and is substantially in excess of the deaths occurring among elderly persons aged 55 and over.

14. The mortality of children under age 5 is heavy. Among them the mortality of infants, who die before they complete one year of age, is especially heavy. It is true that our infant mortality rate is diminishing. During the decade ending 1931, it was 176 infant deaths per 1,000 births. During he next decade, it was 164. During the last decade, it was 152. These are the figures based on registration. When we allow for omissions in registration (which are almost certainly more numerous among infants who die shortly after birth than among infants who survive), the true rates would probably be higher than these figures (which are, even as they stand, extremely high). We have seen that out of 27 deaths of persons of all ages (which occur annually among 1,000 persons in India) 11 deaths occur among children under 5 years of age. Out of these 11 deaths, it is almost certain that 7 occur among infants who have not completed one year of age. This appalling waste of life and maternal suffering so largely preventable, goes on day after day in all parts of the country. Madhya Pradesh seems to have an unenvitable distinction. Whereas in the country as a whole, 40 child briths occur every year among 1,000 people, Madhya Pradesh has 44. Whereas in the country as a whole, 7 infants die before they are one year old, the number in Madhya Pradesh is 11. The entire excess of births is matched by an equal excess of infant deaths.

15. Let us now leave these unpleasant figures behind and resume our discussion of trends during the last three decades. We may be satisfied that there has been a real drop in the death rate from decade to decade. The drops are real though they are small. They reflect the modest success, which has undoubtedly been achieved in successive decades, in reducing the incidence of premature death of the type which is normal in our country.

What about the rise and fall of the birth rates, from which we concluded that there was perhaps a net diminution of the birth rate to a small extent during 1941—50 as compared with the level of 1921—30 ? The changes would appear to be attributable to two causes of which one is indicated by the figures in the table below :

TABLE 9

| Decade | Age-group | Number of married females per 1,000 persons of both sexes and all ages in | | | |
|---|---|---|---|---|---|
| | | Uttar Pradesh | Madras | Bombay | Madhya Pradesh |
| 1 | 2 | 3 | 4 | 5 | 6 |
| 1921—30 | 15—24 | 74 | 73 | 72 | 7 |
| | 25—34 | 71 | 71 | 69 | 73 |
| | 35—44 | 42 | 38 | 37 | 43 |
| | 15—44 | 187 | 182 | 178 | 191 |

TABLE 9—*Contd.*

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| 1931—40 | 15—24 | 76 | 74 | 78 | 80 |
| | 25—34 | 72 | 70 | 70 | 75 |
| | 35—44 | 43 | 38 | 36 | 42 |
| | 15—44 | 191 | 182 | 184 | 197 |
| 1941—50 | 15—24 | 73 | 67 | 74 | 69 |
| | 25—34 | 70 | 69 | 71 | 76 |
| | 35—44 | 46 | 42 | 40 | 46 |
| | 15—44 | 189 | 178 | 185 | 191 |

NOTE.—The figure for each decade is arithmetical mean of two figures computed from the data relating to the censuss at the beginning and end of the decade.

It will be observed that the figures of Madhya Pradesh, Bombay and Uttar Pradesh show significant increases in the numbers of married women of child-bearing age from 1921—30 to 1931—40, while those of Madhya Pradesh and Madras show significant decreases from 1931—40 to 1941—50. A detailed analysis of such changes in Madhya Pradesh (the analysis took into account changes within natural divisions) shows that they must be due to the distortions caused by selective mortality inflicted by the great influenza epidemic on a generation whose age structure has been distorted by the great famines of the decade 1891—1900. There is little doubt that, where there are real ups and downs in the birth rate (and not only merely ups and downs in the efficiency of registration of births), the principal operative cause has been the changes in the age-sex structure arising in the manner just described. That is probably the correct explanation of the ups and downs of the birth rate. But it is a complete explanation also of the finding that there is a net resultant drop ? It is very difficult to say. It is not impossible that the average age of marriage of girls may have risen somewhat and caused this net resultant drop. The rise in the age of marriage may have come about, as a result of the Child Marriage Restraint Act of 1929—even though (as pointed out in an earlier chapter) the law still continues to be disregerded by quite considerable numbers of people in many parts of India. It must be borne in mind, however, that the net resultant drop, for which an explanation is sought, is so very small that the reality of its existence has to be established by elaborate argument.

16. In the light of this review of the past what do we infer about the future? So far as maternity is concerned, our assessment of the past does not indicate a trend which would justify us in assuming any very materially different future unless something happens which leads to the wide-spread adoption of contraception—a contingency which we shall reserve for later discussion. The position is different about mortality. Our assessment of the past would justify us in assuming that a further decline of mortality might take place in the next thirty years. It is perfectly obvious that a large proportion of

deaths which occur at present are preventable. There is, therefore, quite considerable scope for reduction of mortality, especially among infants and very young children.

*It follows that (unless the rate of growth of population is checked by contraception or a breakdown of food supply of such a serious nature as to entail a return to the abnormal mortality conditions of* 1891—1900) *population will increase during* 1951—80 *at a faster rate than during* 1921—50. *Nevertheless, it is expedient for purposes of further discussion that we should accept a forecast which errs on the side of under-statement rather than the contrary. With reference to the two sets of figures already mentioned in (TABLE* 2 & 4) *let us finally assume that the future growth of population will be as shown in Table* 10.

TABLE 10

| Year | Population (In Crores) |
|---|---|
| 1951 | 36 |
| 1961 | 41 |
| 1971 | 46 |
| 1981 | 52 |

### C—*Improvident Maternity : Reducing Targets*

53. Our appraisal of the possibilities of development of agricultural productivity has led us to the conclusion that it might be possible to achieve an overall increase of agricultural productivity by about one-third of its present level —and this would correspond to the needs of a total population strength of 45 crores. This may be reached sometime round about 1969. That would give us a maximum of about 15 years for planned measures to limit births, to become effective and yield results. It is not a very long period for such a large enterprise; but it cannot also be said to be far too short. Let us define our general aim to be : *so to limit the number of births that they do not materially exceed the number of deaths and thus achieve a substantially stationary population before our number exceeds 45 crores.* That would be the first step towards a crystallisation of ideas on targets and priorities.

54. Though the objective as thus defined is clear enough, it will serve the purpose of indicating the needed practical measures much better, if it can be put in a form in which every one may perceive his or her own share of the collective obligation. It is in this context that the conception of 'improvident maternity', which was touched upon in an earlier chapter, acquires practical importance. The birth rate is something for which responsibility can be fastened on no one. But the number of births which occur to a married couple are, ex-hypothesi, controllable by them. Is it possible to sepecify a maximum number of child-births which every married couple can have without creating a national problem regarding the future of their offspring? There are reasons to believe that this is possible ; and that the number is three. *Let us, therefore, define 'improvident maternity' as a child-birth occurring to a mother who has already given birth to three or more children, of whom at least one is alive.* Let us also define the 'incidence of improvident 'maternity' as the figure obtained by expressing the number of births of this nature as a percentage of all births occurring in any particular area during any particular period of time. *A relatively simple calculation shows that if we can put an end to improvident maternity as thus fined, or at any rate, reduce its incidence drastically, the excess of births over deaths will be reduced to negligible numbers and a substantially stationary population achieved.* As this conclusion is important, the relevant calculation should be explained.

55. It has been estimated that the incidence of improvident maternity is, at present, somewhere between 40 per cent and 45 per cent in our country. Out of every 40 births which occur among every 1,000 people in the course of one year, 17 births are of this nature. Suppose we succeed in inducing

the people to avoid such births. Our national birth rate would then fall from 40 to 23. Our national death rate is at present 27. Out of the 27 deaths which occur among 1,000 people in the course of one year there are 11 children under 5 years of age, of whom 7 are infants who have not completed one year of age. A reduction in the number of births from 40 to 23 is likely, therefore, to be followed by a reduction of these 11 deaths to 6. In other words, avoidance of improvident maternity will not only reduce the national birth rate from 40 to 23* but it will also reduce the national death rate from 27 to 22 at the same time. The net result will be to reduce the rate of growth of population from about 13 per cent per decade to about one per cent per decade. If improvident maternity is not avoided altogether, but its incidence is very substantially reduced—to (say) 5 per cent—, we shall still get a birth rate of 25 and a death rate of 23 and a growth rate of only two per cent per decade. When that stage is reached, it is no doubt likely that further diminution of the death rate might be expected to occur as a result of general improvement of health standards. We may confidently expect this to be offset by further diminution of the birth rate. This will happen because the people who have got rid of improvident maternity will, ex-hypothesi, have acquired effective control over child-bearing. It will then be easy and natural for them to pass over from avoidance of 'improvidence' to positive 'prudence'. An increasingly large proportion of mothers will limit themselves, of their own accord, to two children without being urged to do so. Thus the fall in the birth rate may be expected to keep pace with the fall in the death rate.

56. Let us, therefore, define our objective, not in the general terms already mentioned in paragraph 53, but specifically in relation to improvident maternity. The task before the nation is first of all to bring about such a change in the climate of public opinion that every married couple will accept it as their duty (to themselves, to their family, and to that larger family—the nation) that they should avoid improvident maternity. The occurrence of improvident maternity should evoke social disapproval, as any other form of anti-social self-indulgence. This is necessary ; but not enough. There should be standing arrangements for ensuring that advice is given to every married couple on the various ways open to them for discharging this duty and to make available the necessary facilities. In order to regulate the scale and tempo of planned measures designed to achieve this purpose, the following target should be fiexd : *The incidence of improvident maternity should be reduced from its present level of over 40 per cent to under 5 per cent within 15 years.*

57. It will be noted that we are moving beyond the general statement that it is desirable for mothers to limit the total number of births, to space births, and so on. Approaching the subject from the point of view of national necessity, a single common limit is suggested for all. Consistently with this approach it is immaterial if, in a particular case, the pecuniary circumstances of the family or the state of health of the mother are such that further maternity may be allowed to occur and the offspring supported without much difficulty. Whether or not the individual can afford it, the nation cannot—and hence it is 'improvident maternity' all the same. While this must be made clear beyond doubt, it is also necessary to point out that there is, in fact, no conflict in this matter between the interests of the individual, of the family,

*Earlier in this report (of Chapter II, para 80), the view has been expressed that such measures as raising the age of marriage will have only a very limited effect, and cannot bring about large reduction of the order indicated by these figures.

and of the nation as a whole. No elaborate argument is necessary in order to show that if improvident maternity were universally avoided, no one will be unhappy or worse off. On the other hand, mothers will live longer, healthier and happier lives ; and children will be better fed, better looked after and acquire an altogether better start in life. There will be an enormous reduction in the numbers of infants who die within a year of their birth. If we can convert ourselves to the view that improvident maternity is a form of anti-social self-indulgence which all of us should avoid—and if we can equip ourselves with the knowledge and the material means of avoiding it—, we shall have done more to reduce human suffering and promote human happiness than by all measures of economic and social planning combined.

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