

GENSUS OF INDIA

Paper No. 3

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**Probable Effect or Decrease in
Infantile Mortality on Future Population**

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INTRODUCTORY NOTE BY MR. M. W. M. YEATTS, C.S.I., C.I.E., I.C.S., CENSUS COMMISSIONER
FOR INDIA

This paper links directly with Section B (VI) of my report on the All India Census for 1941 and should be read if possible with it.

2. If we want to forecast trend or development in the physical world we first examine potential. And similarly in the field of population growth, potential is the prime point of study. Evidently an infantile mortality rate well up in the second hundred, combined with the formidable mass of the Indian population actuated by practically universal marriage and high fertility, offers a manifest and powerful increase potential.

It was with this in mind that I asked Dr. Swaroop in 1941, to investigate statistically the effects of the fall in infantile mortality in the shape of actual accretions to population. And when I was asked to return as Census Commissioner one of my first concerns was to take up again this branch of study and to get him to pursue the enquiry further so as (a) to relate it to the present frontiers of the Indian Union and (b) to bring it forward from the previous end-point, 1940. He has done so with characteristic thoroughness and his note and tables are given below.

3. The birth/death record in India varies in quality and degree of cover and does not possess an absolute value. On the other hand the dimensions involved and the fact that standards are not known or likely to vary violently from year to year gives to the indications of trend a value possibly above and certainly not inferior to that attaching to any specific annual figure for any one area.

Moreover, from the nature of things, *e.g.*, the difficulty of disposing of a dead body, deaths are less likely to escape notice than births and therefore if the record is incomplete, the direction of improvement in completeness is likely to show itself at the birth end of the chain. Here again I repeat a point I brought out in 1941.

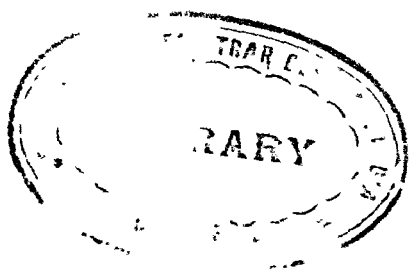
It is possible that the omission to record infant births is much the same as the omission to record infant deaths and if this is so then the infantile mortality rate achieves something like an absolute value. It is not possible to offer any proof of this but it is at least a possibility that the infantile mortality rate is of higher value as a measurement than the total mortality rate or certainly than the total birth rate.

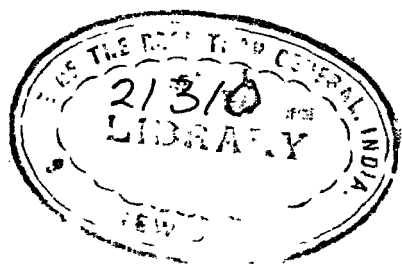
I have added to this paper also a chart (chart I) showing the trend of the annual "vital index" or percentage of births to deaths, from 1901 to 1946 which Dr. Swaroop has provided. The direction of this line, in the light of the comments already made on the birth/death record generally, could be taken to support the view that the increased potential of Indian population is itself on the increase.

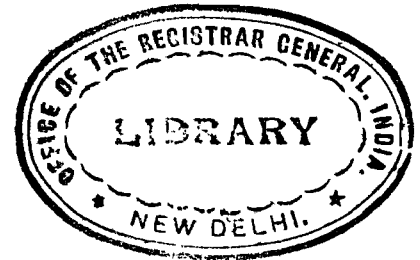
4. From one point of view human life knows only two time units, the day and the year. Others such as the week or the month are subsidiary, and some, such as the decade, are quite artificial in the sense that they have no organic connection whatever with the pulse of growth and decay. In the study of population however and particularly where prognosis enters one can recognise although one cannot exactly measure, a third unit, the generation. Population comes because women have children and women cannot have children all the time nor in fact before or after certain limits. We cannot measure this generation exactly because it varies with the region, milieu and habits. It is broadly the period within which a female child can be expected herself to take over the duties of reproduction. We have not enough knowledge of marriage ages, etc., in India to take this further but I venture the suggestion that the "generation" unit in India is tending to grow. That however will be the subject of a separate paper at some future date. But meanwhile we can say that the study which Dr. Swaroop has so ably carried out for me brings into very clear focus the fact that quite apart from the levels of the birth rate and the death rate over the whole population, drop in India's high infantile mortality cannot fail to affect substantially both the positive population at any future moment and the potential; in other words it is an influence of the second degree.

This has been stated before, for example by myself in the 1941 Report; but it will bear restating, as will anything of fundamental importance.

5. I propose to continue this series of studies into the effects on population, "potential" of achievements in public health, and to bring out in particular the differential aspects involved which are of such importance in forecasting. One hears often the phrase 'normal' increase; it is one for which I find no justification, for who has laid down the 'norm'? All increase rates are measurements of events after they have happened. What produces the phenomena is a mass of entirely individual reactions by men and women to economical, social and political influences of their time. About these we know so far in India very little; whether the reactions exist at all, what form they take and with what strength; there is here a great field for social study.







PROBABLE EFFECT OF A DECREASE IN INFANTILE MORTALITY ON THE FUTURE
POPULATION OF THE UNION OF INDIA—I

BY
DR. S. SWAROOP

In the Census Report for India for 1941 an examination was made of the saving of life in so far as only the reduction in respect of infant mortality was concerned. The effect of such infant survivors on the future growth of India's population was investigated. It was shown that if the trend in infant mortality rate continued at the same rate as in the past there would be on this account alone an addition of the order of 7 million persons in 1951 *e.g.* the increase alone would exceed the total population of the island of Ceylon. For the same reason, the addition in 1961 was estimated to be 13.3 million *i.e.*, almost as large as the total population of Argentina.

The partition of the country in 1947 has necessitated that revised estimates of such accretions to population be made for the areas now comprising the Union of India and that the vital statistical data of recent years, especially those affected by famines and the war or post-war conditions, be also taken into account. The figures available for making these estimates relate to the registration areas of those Provinces which formerly comprised British India, but by making the assumption that an average of such provincial rates may reasonably reflect conditions in the Union of India as a whole, the increases of population estimated in this note by the census years of 1931, 1941, 1951 and 1961 gives some idea of population growth resulting from a saving of infant lives for the entire area now falling in the Union of India.

The figures set out in this note therefore relate to the whole area now comprising the Union of India and cover a period of 1920 to 1946.

The trend of infant mortality rate in the Union of India is shown in Chart III. It is clear that in the earlier part of this period the infant mortality rate was of the order of 190; in 1946 it had been reduced to 150. In spite of this reduction the rate of infant mortality has remained five times as high as in countries such as New Zealand, Australia and Iceland. It is apparent from Chart III that in Germany the rate had decreased from 130 in the year 1920 to 57 in 1941. There is therefore considerable margin for further reduction and, considering the interest that the problem of health is now receiving in India, it may reasonably be argued that the mortality rate of infants will continue to decrease further in the coming years. It has, accordingly, been assumed that the reduction in infant mortality recorded during 1920—1946 will continue unabated in the coming years and that by 1961 this rate would consequently have fallen to approximately 130.

Annual rates of infant mortality per 1,000 live births are set out in column (2) of Table I. These have been smoothed by fitting a straight line by the method of least squares. The expected figures for infant mortality rate are shown against each year in column (3) of the same table. The calculations of growth in population are based on these smoothed values of infant mortality. Column (4) shows the cumulative effect of the decrease in rate for each year from that for 1920. If these annual decreases are multiplied by total live births in each year, the additional numbers of infants who survived their first year of life as the result of declining infantile mortality are obtained for successive years. In column (5) of table I are shown the annual births recorded in the registration areas of Indian Provinces and in the next column (6) are given the births for the whole of the Union of India obtained by increasing the births in column (5) in proportion to the increase in population. The figures set out in column (7) were obtained by multiplying the annual births in the Union of India (column 6) with the total decrease in infant mortality as shown in column (4). These then are the estimates of the total additional numbers of infants who survived their first year of life as the result of a continuous fall in infant mortality.

In discussing the probable effect of the saving of infant life on the future growth of population we have also to take into account the contribution that the female section of these infants will make when they attain reproductive ages. In estimating this contribution the same rates of fertility and survivorship have been taken into account as were used in the note which appeared on pages 41-50 of the Census of India Report for 1941.

In order to estimate the reproductive contribution of these additional survivors to the future growth of population the number of female survivors was first estimated in column (8) by applying a sex ratio of 513, 797 male infants of age one year to 486,203 female infants of age one year, the ratio being the same figure as was used in the study already referred to in this note. By applying the India life table rates of survivorship, the survivors among these at each individual age were calculated. These survivorship rates are shown in column (3) of Table II. Starting with 1,000 females at age one, the product of the specific fertility rate at any age (col. 2) with the survivors shown in column (3) for the corresponding age gives the total number of children born in that particular year. These net additions of fertility are shown in column (4) of Table II.

By the repeated application of the net rates of column (4) of Table II to the series of annual female infant survivors shown in column (8) of Table I, the numbers of children in the first generation born each year have been calculated in Table III. Thus the 1921 group of 5,678 female survivors on reaching the age of 13 years will give birth to 5,678 times 2.50 *i.e.*, 14 births in the year 1933. During the year 1934 the same cohort of 5,678 will give rise to 5,678 times 7.24 or 41 births to which must also be added the children born to 1922 cohort of 11,294 females who, during 1934, attain the age of 13 years. The latter figure will be 11,294 times 2.50 *i.e.* 28. Thus the total number of children born in the year 1934 to infant survivors will be 41 plus 28 *i.e.*, 69. In each successive year a new group of females will begin to contribute to 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 and details are set out in Table III.

Beginning from the year 1946, the survivors of the female children among those shown in column (9) of Table I will also begin to reproduce themselves in the second generation. The births occurring in the second generation are shown in column 10 of Table I. Details are set out in Table IV.

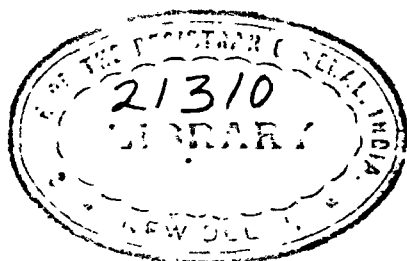
It remains now to estimate how many of the infants shown in column (7) and of the births in columns (9) and (10) of Table I will survive to be enumerated at each of the census years 1931, 1941, 1951 and 1961. These have been obtained by applying the India life table rates of survival for males and females separately to the survivors in column (7) and to the births of the first and second generation. The figures are set out in columns (11) to (19) of Table I. The total survivors at each of the census years are shown at the bottom of each series of figures in Table I.

The results are summarised as follows :—

| Source of addition to population | Numbers of additional persons likely to be enumerated at each census year | | | |
|--|--|-----------|-----------|------------|
| | 1931 | 1941 | 1951 | 1961 |
| 1. Additional saving of infants due to reduction in infant mortality rate. | 672,995 | 2,497,613 | 5,031,625 | 8,365,539 |
| 2. Births occurring among the surviving infant.— | | | | |
| (a) in the first generation | ... | 17,884 | 441,964 | 1,954,338 |
| (b) in the second generation | | | 12 | 9,532 |
| | 672,995 | 2,515,497 | 5,473,601 | 10,329,409 |

It is therefore likely that the decline in infant mortality which has occurred during the period 1920—1946 would alone have added approximately 2·5 millions to the population of the Union of India by the year 1941 *i.e.* as much as the total population of Ireland.

Looking ahead, if it is postulated that the decline in infant mortality will continue at the same rate as during the period 1920-1946, the addition to population by the census year of 1951 on account of the survivorship of infants alone is likely to be about 5·5 millions and in 1961 about 10·3 millions. In other words reduction in infant mortality alone will have resulted in 1961, in the addition to India of a population of the same dimensions as that of the dominion of Canada.

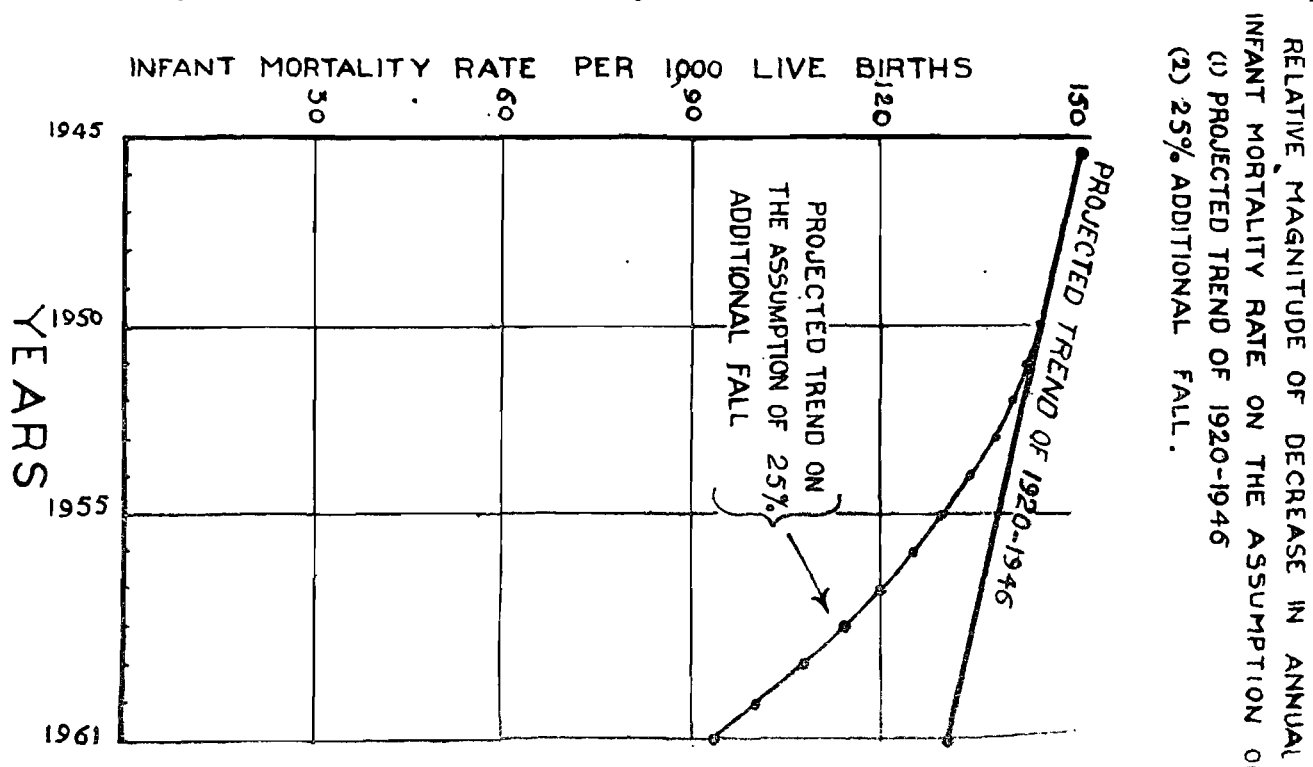


II

Dr. K.C.K.E. Raja, the Director General of Health Services has expressed the hope that India will soon settle down to constructive work in the field of public health on a sound basis and considers it likely that in future the rate of decrease in infant mortality will accordingly be faster than that recorded over the period of 1920 to 1946. He has suggested our making an assumption that between 1951 and 1961 there will be an additional fall in infant mortality to the extent of 25 per cent as compared with the trend indicated by the figures for 1920 to 1946.

If the 1920 to 1946 trend were to be projected into the future the infant mortality rate would decrease from 151 in 1946 to 130 in 1961. An additional fall of 25 per cent. should reduce the infant mortality rate to 94 in 1961.

The following diagram serves to illustrate the relative magnitudes of decrease on the basis of each of the two assumptions.



The estimated additional saving of life in the census year of 1961 on the assumption of 25 per cent. fall is summarised below :—

| Source of addition to population | Number of additional persons likely to be enumerated in the census year of 1961 | |
|--|---|---|
| | On the assumption of projected trend of 1920 to 1946 | On the assumption of an additional decrease of 25% in infant mortality rate |
| 1. Saving of lives due to reduction in infant mortality rate | 8,365,539 | 10,059,680 |
| 2. Births occurring among the surviving infants : | | |
| (a) in the first generation | 1,954,338 | 1,954,420 |
| (b) in the second generation | 9,532 | 9,532 |
| Total | 10,329,409 | 12,023,632 |

Thus a twenty-five per cent. additional fall in infant mortality rate during 1951 to 1961 would result in a further two millions being added to India's population at the census of 1961.

It must be pointed out that large as the estimates of additions are, they err on the side of *under* estimation; the important reason being that while we have taken into consideration the expected decrease in infant mortality rate no allowance has been made for decreases that may occur at the higher age groups also.

TABLES AND CHARTS

TABLE

| Year | Actual infantile mortality per 1,000 live births | Expected value of the infantile mortality rate | Decrease in infant mortality rate as compared with the 1920 level | Annual births in the registration areas of Indian provinces | Proportional births in the whole of the Union of India <i>i.e.</i> , (including, Indian States) | Number of additional infants who survive to 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) | Children born to females of the first generation when they reach reproductive stage (2nd generation) |
|------|--|--|---|---|---|--|---|---|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1920 | . | 195 | .. | 6,079,432 | 8,489,358 | .. | .. | .. | .. |
| 1921 | . | 199 | 1·388 | 6,025,777 | 8,414,434 | 11,678 | 5,678 | .. | .. |
| 1922 | . | 173 | 2·776 | 5,992,983 | 8,368,640 | 23,230 | 11,294 | .. | .. |
| 1923 | . | 175 | 4·164 | 6,564,805 | 9,167,136 | 38,169 | 18,558 | .. | .. |
| 1924 | . | 189 | 5·552 | 6,521,787 | 9,107,065 | 50,559 | 24,582 | .. | .. |
| 1925 | . | 169 | 6·940 | 6,527,962 | 9,115,688 | 63,258 | 30,756 | .. | .. |
| 1926 | . | 189 | 8·327 | 6,608,794 | 9,228,562 | 76,850 | 37,365 | .. | .. |
| 1927 | . | 164 | 9·715 | 6,812,872 | 9,513,538 | 92,427 | 44,938 | .. | .. |
| 1928 | . | 172 | 11·103 | 7,058,208 | 9,856,127 | 109,435 | 53,208 | .. | .. |
| 1929 | . | 176 | 12·491 | 6,766,063 | 9,448,174 | 118,018 | 57,381 | .. | .. |
| 1930 | . | 174 | 13·879 | 6,955,579 | 9,712,815 | 134,804 | 65,542 | .. | .. |
| 1931 | . | 180 | 15·267 | 7,227,881 | 10,093,060 | 154,090 | 74,919 | .. | .. |
| 1932 | . | 167 | 16·655 | 7,188,447 | 10,037,994 | 167,181 | 81,284 | .. | .. |
| 1933 | . | 165 | 18·043 | 7,648,451 | 10,680,346 | 192,702 | 93,692 | 14 | .. |
| 1934 | . | 185 | 19·431 | 7,316,401 | 10,216,669 | 198,516 | 96,519 | 69 | .. |
| 1935 | . | 164 | 20·819 | 7,507,550 | 10,483,591 | 218,253 | 106,115 | 225 | .. |
| 1936 | . | 161 | 22·206 | 7,652,475 | 10,685,965 | 237,297 | 115,375 | 582 | .. |
| 1937 | . | 160 | 23·594 | 7,461,598 | 10,419,423 | 245,839 | 119,528 | 1,292 | .. |
| 1938 | . | 165 | 24·982 | 7,553,721 | 10,548,065 | 263,514 | 128,121 | 2,550 | .. |
| 1939 | . | 157 | 26·370 | 7,477,501 | 10,441,630 | 275,347 | 133,876 | 4,578 | .. |
| 1940 | . | 159 | 27·758 | 7,351,492 | 10,265,671 | 284,954 | 138,545 | 7,606 | .. |
| 1941 | . | 157 | 29·146 | 7,562,468 | 10,560,265 | 307,788 | 149,647 | 11,831 | .. |
| 1942 | . | 160 | 30·534 | 6,999,835 | 9,774,615 | 293,456 | 145,110 | 17,424 | .. |
| 1943 | . | 160 | 31·922 | 6,328,315 | 8,836,900 | 282,089 | 137,153 | 24,499 | .. |
| 1944 | . | 166 | 33·310 | 6,308,609 | 8,809,382 | 293,437 | 142,670 | 33,118 | .. |
| 1945 | . | 153 | 34·698 | 6,755,915 | 9,434,003 | 327,336 | 159,152 | 43,304 | .. |
| 1946 | . | 138 | 36·085 | 6,811,675 | 9,511,867 | 343,240 | 166,884 | 55,027 | .. |
| 1947 | . | .. | .. | .. | 10,261,945 | 367,424 | 178,643 | 68,252 | .. |
| 1948 | . | .. | .. | .. | 10,303,881 | 380,947 | 185,218 | 82,917 | .. |
| 1949 | . | .. | .. | .. | 10,345,816 | 394,471 | 191,793 | 98,928 | 2 |
| 1950 | . | .. | .. | .. | 10,387,751 | 407,995 | 198,368 | 116,192 | 5 |
| 1951 | . | .. | .. | .. | 10,429,686 | 421,519 | 204,944 | 134,590 | 13 |
| 1952 | . | .. | .. | .. | 10,471,622 | 435,042 | 211,519 | 153,985 | 34 |
| 1953 | . | .. | .. | .. | 10,513,557 | 448,666 | 218,094 | 174,238 | 76 |
| 1954 | . | .. | .. | .. | 10,555,492 | 462,090 | 224,670 | 195,171 | 154 |
| 1955 | . | .. | .. | .. | 10,597,428 | 475,613 | 231,244 | 216,579 | 299 |
| 1956 | . | .. | .. | .. | 10,639,363 | 489,137 | 237,820 | 238,238 | 542 |
| 1957 | . | .. | .. | .. | 10,681,298 | 502,661 | 244,395 | 259,920 | 934 |
| 1958 | . | .. | .. | .. | 10,723,233 | 516,185 | 250,971 | 281,355 | 1,541 |
| 1959 | . | .. | .. | .. | 10,765,169 | 529,708 | 257,546 | 302,346 | 2,438 |
| 1960 | . | .. | .. | .. | 10,807,104 | 543,232 | 264,121 | 322,774 | 3,718 |
| 1961 | . | .. | .. | .. | 10,849,039 | 556,756 | 270,696 | 342,650 | 5,485 |

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

Year

| 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 | | Year |
|---|------------------|------------------|------------------|---|----------------|------------------|--|--------------|------|
| 1931 | 1941 | 1951 | 1961 | 1941 | 1951 | 1961 | 1951 | 1961 | |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| 8,890 | 7,876 | 6,518 | 4,849 | .. | .. | .. | .. | .. | 1920 |
| 17,708 | 15,908 | 13,258 | 10,167 | .. | .. | .. | .. | .. | 1921 |
| 28,335 | 26,519 | 32,256 | 17,234 | .. | .. | .. | .. | .. | 1922 |
| 39,213 | 35,600 | 30,094 | 23,524 | .. | .. | .. | .. | .. | 1923 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | 1924 |
| 49,599 | 45,123 | 38,407 | 30,297 | .. | .. | .. | .. | .. | 1925 |
| 61,081 | 55,468 | 47,560 | 37,848 | .. | .. | .. | .. | .. | 1926 |
| 74,802 | 67,430 | 55,771 | 46,759 | .. | .. | .. | .. | .. | 1927 |
| 90,878 | 80,624 | 70,230 | 56,818 | .. | .. | .. | .. | .. | 1928 |
| 101,728 | 87,678 | 77,054 | 62,824 | .. | .. | .. | .. | .. | 1929 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 122,778 | 101,087 | 89,485 | 73,511 | .. | .. | .. | .. | .. | 1930 |
| 77,045 | 116,507 | 103,929 | 86,002 | .. | .. | .. | .. | .. | 1931 |
| .. | 127,426 | 114,487 | 95,416 | .. | .. | .. | .. | .. | 1932 |
| .. | 148,101 | 133,884 | 112,365 | 8 | 7 | 6 | .. | .. | 1933 |
| .. | 153,969 | 139,815 | 118,163 | 41 | 37 | 32 | .. | .. | 1934 |
| 672,095 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| .. | 171,127 | 155,684 | 132,511 | 136 | 123 | 106 | .. | .. | 1935 |
| .. | 188,605 | 171,273 | 146,855 | 358 | 322 | 270 | .. | .. | 1936 |
| .. | 198,959 | 179,353 | 148,340 | 815 | 723 | 629 | .. | .. | 1937 |
| .. | 218,830 | 194,139 | 169,111 | 1,669 | 1,440 | 1,264 | .. | .. | 1938 |
| .. | 237,340 | 204,562 | 179,774 | 3,166 | 2,607 | 2,307 | .. | .. | 1939 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| .. | 259,533 | 213,681 | 189,157 | 5,775 | 4,367 | 3,895 | .. | .. | 1940 |
| .. | 153,594 | 232,718 | 207,594 | 5,916 | 6,848 | 6,152 | .. | .. | 1941 |
| .. | .. | 227,484 | 204,384 | .. | 10,169 | 9,192 | .. | .. | 1942 |
| .. | .. | 216,799 | 195,987 | .. | 14,429 | 13,192 | .. | .. | 1943 |
| .. | .. | 227,589 | 206,667 | .. | 19,718 | 17,938 | .. | .. | 1944 |
| .. | 2,497,613 | .. | .. | 17,884 | .. | .. | .. | .. | .. |
| .. | .. | 256,656 | 233,496 | .. | 26,135 | 23,733 | .. | .. | 1945 |
| .. | .. | 272,809 | 247,739 | .. | 33,815 | 30,484 | .. | .. | 1946 |
| .. | .. | 297,358 | 268,056 | .. | 43,034 | 38,182 | .. | .. | 1947 |
| .. | .. | 316,394 | 280,656 | .. | 54,267 | 46,811 | .. | .. | 1948 |
| .. | .. | 340,021 | 293,062 | .. | 68,411 | 56,332 | 1 | 1 | 1949 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| .. | .. | 371,597 | 305,947 | .. | 88,217 | 66,711 | 4 | 3 | 1950 |
| .. | .. | 210,760 | 318,710 | .. | 67,295 | 77,898 | 7 | 8 | 1951 |
| .. | .. | .. | 331,591 | .. | .. | 89,865 | .. | 20 | 1952 |
| .. | .. | .. | 344,745 | .. | .. | 102,617 | .. | 45 | 1953 |
| .. | .. | .. | 358,396 | .. | .. | 116,201 | .. | 92 | 1954 |
| .. | .. | 5,031,625 | .. | .. | 441,964 | .. | 12 | .. | .. |
| .. | .. | .. | 372,916 | .. | .. | 130,710 | .. | 180 | 1955 |
| .. | .. | .. | 388,769 | .. | .. | 146,403 | .. | 333 | 1956 |
| .. | .. | .. | 406,806 | .. | .. | 163,882 | .. | 589 | 1957 |
| .. | .. | .. | 428,655 | .. | .. | 184,141 | .. | 1,009 | 1958 |
| .. | .. | .. | 456,591 | .. | .. | 209,080 | .. | 1,686 | 1959 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| .. | .. | .. | 494,769 | .. | .. | 245,061 | .. | 2,823 | 1960 |
| .. | .. | .. | 378,378 | .. | .. | 171,325 | .. | 2,743 | 1961 |
| .. | .. | .. | 8,365,539 | .. | .. | 1,954,338 | .. | 9,532 | .. |

TABLE II

| Age | Specific fertility rates per 1,000 | Survivors of 1,000 females at the age of one year | Children born each year to survivors of 1,000 females at the age of one year | Children born each year to survivors of 1,000 females at age zero (birth) |
|-----|------------------------------------|---|--|---|
| 1 | 2 | 3 | 4 | 5 |
| 12 | .. | .. | .. | .. |
| 13 | 3.32 | 75,402 | 3.50 | 1.92 |
| 14 | 9.69 | 74,698 | 7.24 | 5.56 |
| 15 | 23.12 | 73,935 | 17.09 | 13.12 |
| 16 | 46.68 | 73,182 | 34.11 | 26.19 |
| 17 | 81.82 | 72,130 | 59.02 | 45.30 |
| 18 | 127.39 | 71,094 | 90.57 | 69.52 |
| 19 | 179.51 | 69,988 | 125.04 | 96.45 |
| 20 | 232.65 | 68,823 | 160.12 | 122.92 |
| 21 | 281.02 | 67,611 | 190.00 | 145.86 |
| 22 | 320.00 | 66,359 | 212.35 | 163.01 |
| 23 | 346.77 | 65,076 | 225.16 | 173.23 |
| 24 | 360.47 | 63,768 | 229.86 | 176.46 |
| 25 | 361.87 | 62,439 | 225.95 | 173.45 |
| 26 | 352.80 | 61,093 | 217.54 | 165.46 |
| 27 | 335.63 | 59,733 | 210.48 | 153.90 |
| 28 | 312.80 | 58,362 | 182.56 | 140.14 |
| 29 | 286.54 | 56,981 | 163.27 | 125.34 |
| 30 | 258.72 | 55,591 | 143.33 | 110.41 |
| 31 | 230.78 | 54,193 | 125.07 | 96.01 |
| 32 | 203.79 | 52,789 | 107.58 | 82.58 |
| 33 | 178.42 | 51,380 | 91.67 | 70.37 |
| 34 | 155.11 | 49,965 | 77.50 | 59.49 |
| 35 | 134.04 | 48,545 | 65.07 | 49.95 |
| 36 | 115.25 | 47,121 | 54.31 | 41.69 |
| 37 | 98.68 | 45,693 | 45.09 | 34.61 |
| 38 | 84.20 | 44,263 | 37.27 | 28.61 |
| 39 | 71.63 | 42,829 | 30.08 | 23.55 |
| 40 | 60.78 | 41,391 | 25.16 | 19.31 |
| 41 | 51.48 | 39,948 | 20.58 | 15.80 |
| 42 | 43.52 | 38,552 | 16.78 | 12.88 |
| 43 | 36.73 | 37,151 | 13.41 | 10.48 |
| 44 | 30.97 | 35,766 | 11.08 | 8.50 |
| 45 | 26.09 | 34,402 | 8.98 | 6.89 |
| 46 | 21.96 | 33,062 | 7.26 | 5.57 |
| 47 | 18.46 | 31,746 | 5.86 | 4.59 |
| 48 | 15.52 | 30,456 | 4.73 | 3.64 |
| 49 | 13.04 | 29,194 | 3.81 | 2.92 |
| 50 | 10.94 | 27,960 | 3.06 | 2.31 |



TABLE
CHILDREN BORN EACH YEAR DURING THE REPRODUCTIVE LIFE OF

| Year in which the infants survived: | Number of female infants surviving their 1st year of life | Year of | | | | | | | | | | | | | |
|-------------------------------------|---|---------|------|------|------|------|-------|-------|--------|-------|--------|--------|--------|--------|--------|
| | | 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 | 5,678 | .. | 14 | 41 | 97 | 194 | 335 | 514 | 713 | 909 | 1,079 | 1,206 | 1,281 | 1,305 | 1,283 |
| 1922 | 11,294 | .. | .. | 28 | 82 | 193 | 385 | 667 | 1,023 | 1,419 | 1,808 | 2,146 | 2,398 | 2,549 | 2,596 |
| 1923 | 18,558 | .. | .. | .. | 46 | 134 | 317 | 633 | 1,095 | 1,681 | 2,332 | 2,972 | 3,526 | 3,941 | 4,188 |
| 1924 | 24,582 | .. | .. | .. | .. | 61 | 178 | 420 | 838 | 1,451 | 2,226 | 3,088 | 3,936 | 4,671 | 5,220 |
| 1925 | 30,756 | .. | .. | .. | .. | .. | 77 | 223 | 526 | 1,049 | 1,815 | 2,786 | 3,864 | 4,925 | 5,844 |
| 1926 | 37,365 | .. | .. | .. | .. | .. | .. | 93 | 271 | 639 | 1,275 | 2,205 | 3,384 | 4,695 | 5,993 |
| 1927 | 44,938 | .. | .. | .. | .. | .. | .. | .. | 112 | 325 | 768 | 1,533 | 2,652 | 4,070 | 5,646 |
| 1928 | 53,208 | .. | .. | .. | .. | .. | .. | .. | .. | 133 | 385 | 909 | 1,815 | 3,140 | 4,819 |
| 1929 | 57,381 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 143 | 415 | 981 | 1,957 | 3,387 |
| 1930 | 65,542 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 164 | 475 | 1,120 | 2,236 |
| 1931 | 74,919 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 187 | 542 | 1,280 |
| 1932 | 1,284 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 203 | 588 |
| 1933 | 3,692 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 234 |
| 1934 | 9,519 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1935 | 10,115 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1936 | 11,575 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1937 | 119,428 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1938 | 128,771 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1939 | 133,876 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1940 | 138,544 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1941 | 149,647 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1942 | 145,110 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1943 | 137,153 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1944 | 142,670 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1945 | 159,152 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1946 | 166,884 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1947 | 178,643 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1948 | 185,218 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1949 | 191,793 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1950 | 198,368 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1951 | 204,944 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1952 | 211,519 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1953 | 218,094 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1954 | 224,670 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1955 | 231,244 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1956 | 237,820 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1957 | 244,395 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1958 | 250,971 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1959 | 257,546 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1960 | 264,121 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1961 | 270,696 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Total | | | 14 | 69 | 226 | 582 | 1,292 | 2,650 | 44,578 | 7,006 | 11,831 | 17,424 | 24,499 | 32,118 | 43,304 |

TABLE IV (SECOND)
CHILDREN BORN EACH YEAR TO THE FEMALE BIRTHS OF THE FIRST

| Year in which children of the first generation were born. | Total children born (1st generation) | Female births of the first generation | Year of birth of the | | | | | |
|--|--|---|----------------------|----------|----------|----------|----------|----------|
| | | | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
| <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> |
| 1933 | 14 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1934 | 69 | 33 | .. | 0 | 0 | 0 | 1 | 1 |
| 1935 | 225 | 108 | .. | .. | 0 | 1 | 1 | 3 |
| 1936 | 582 | 280 | .. | .. | .. | 1 | 2 | 4 |
| 1937 | 1,292 | 621 | .. | .. | .. | .. | 1 | 3 |
| 1938 | 2,550 | 1,226 | .. | .. | .. | .. | .. | 2 |
| 1939 | 4,578 | 2,201 | .. | .. | .. | .. | .. | .. |
| 1940 | 7,606 | 3,657 | .. | .. | .. | .. | .. | .. |
| 1941 | 11,831 | 5,688 | .. | .. | .. | .. | .. | .. |
| 1942 | 17,424 | 8,378 | .. | .. | .. | .. | .. | .. |
| 1943 | 24,409 | 11,779 | .. | .. | .. | .. | .. | .. |
| 1944 | 33,118 | 15,924 | .. | .. | .. | .. | .. | .. |
| 1945 | 43,304 | 20,821 | .. | .. | .. | .. | .. | .. |
| 1946 | 55,027 | 26,458 | .. | .. | .. | .. | .. | .. |
| 1947 | 68,252 | 32,816 | .. | .. | .. | .. | .. | .. |
| 1948 | 82,917 | 39,868 | .. | .. | .. | .. | .. | .. |
| Total | | | 0 | 0 | 0 | 2 | 5 | 1 |

GENERATION)

GENERATION WHEN THEY REACH REPRODUCTIVE LIFE

second generation

| 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <i>10</i> | <i>11</i> | <i>12</i> | <i>13</i> | <i>14</i> | <i>15</i> | <i>16</i> | <i>17</i> | <i>18</i> | <i>19</i> |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 5 | 5 |
| 5 | 8 | 10 | 13 | 16 | 18 | 19 | 19 | 19 | 18 |
| 7 | 13 | 19 | 27 | 34 | 41 | 46 | 49 | 49 | 49 |
| 8 | 16 | 28 | 43 | 60 | 76 | 91 | 101 | 108 | 110 |
| 7 | 16 | 32 | 56 | 85 | 118 | 151 | 179 | 200 | 212 |
| 4 | 12 | 20 | 58 | 100 | 153 | 212 | 271 | 321 | 559 |
| .. | 7 | 20 | 48 | 96 | 166 | 254 | 353 | 450 | 533 |
| .. | .. | 11 | 32 | 75 | 149 | 258 | 395 | 549 | 699 |
| .. | .. | .. | 16 | 47 | 110 | 219 | 380 | 582 | 808 |
| .. | .. | - | .. | 23 | 65 | 155 | 308 | 534 | 819 |
| .. | .. | .. | .. | - | 31 | 89 | 209 | 417 | 721 |
| .. | .. | .. | .. | - | .. | 40 | 116 | 273 | 545 |
| .. | .. | .. | .. | - | .. | .. | 51 | 147 | 347 |
| .. | .. | .. | .. | .. | .. | - | .. | 63 | 182 |
| .. | .. | - | .. | .. | .. | - | .. | - | 77 |
| 34 | 76 | 154 | 299 | 542 | 934 | 1,541 | 2,438 | 3,718 | 5,485 |

CHART I

TREND OF THE ANNUAL VITAL INDEX
(PERCENTAGE OF BIRTHS TO DEATHS)
IN INDIA FROM 1901 TO 1946

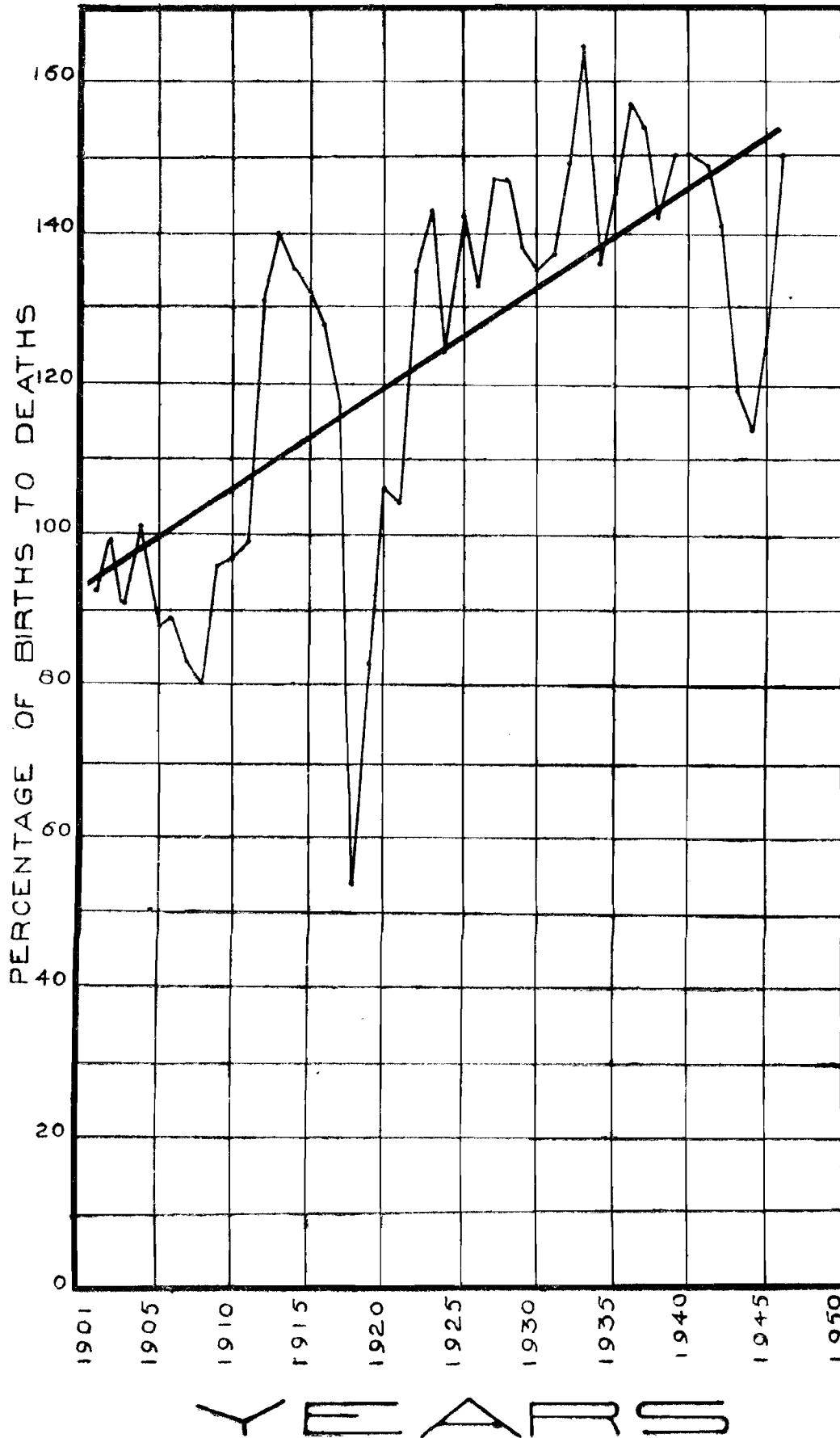


CHART II

TRENDS OF THE ANNUAL BIRTH AND DEATH RATES PER 1000 OF POPULATION IN THE UNION OF INDIA FROM 1901 TO 1946

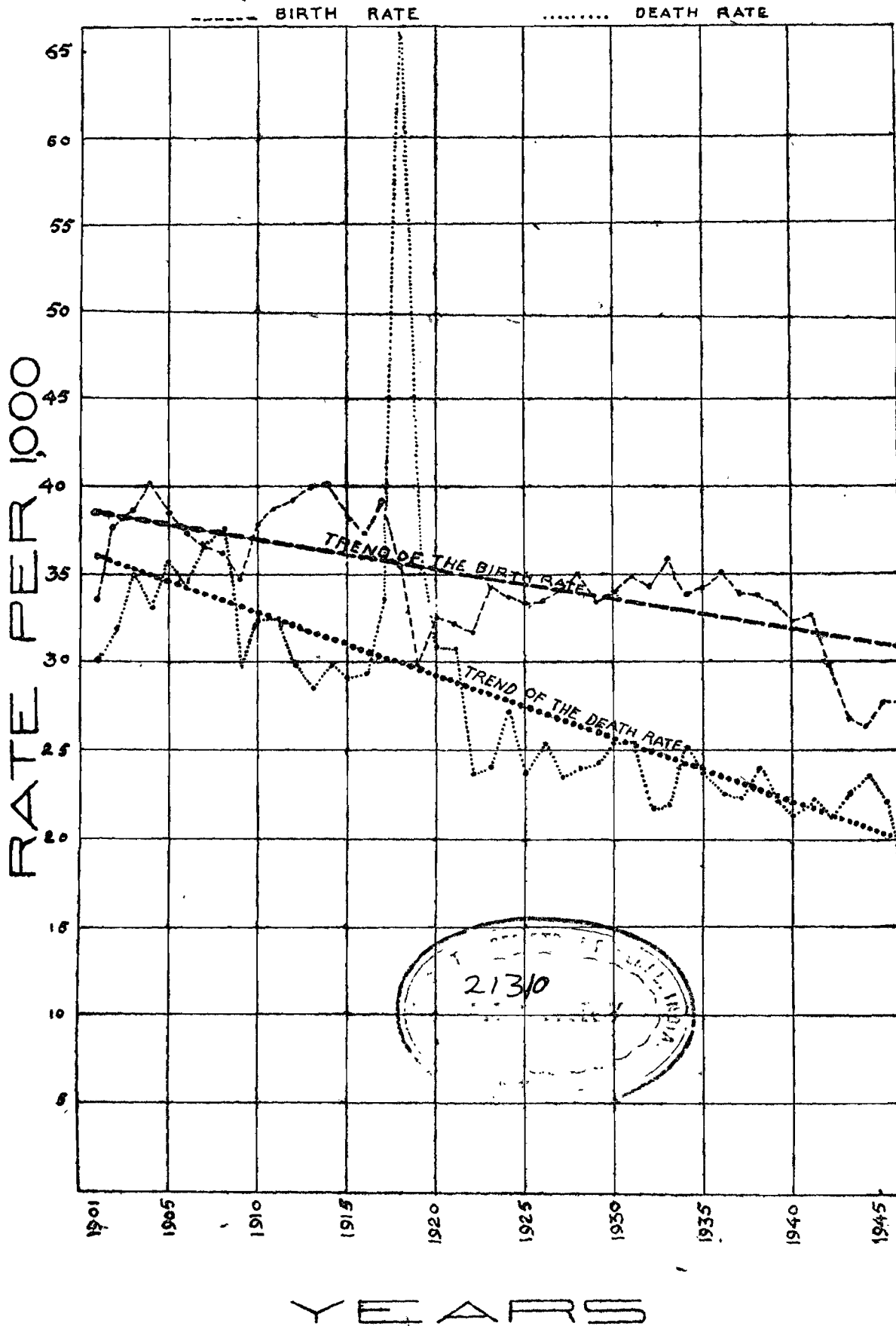


CHART III
 TREND OF THE INFANT MORTALITY RATE
 PER THOUSAND LIVE BIRTHS IN INDIA
 FROM 1920 ONWARDS

