



DEMOGRAPHIC TRENDS
IN
RAJASTHAN

BY
SOBHAG NARAIN MATHUR

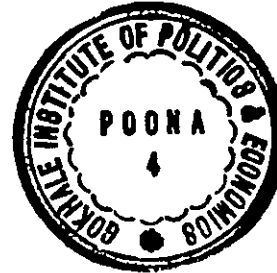
SUPERVISOR
PROF. N. V. SOVANI
JOINT DIRECTOR
GOKHALE INSTITUTE OF
POLITICS AND ECONOMICS
POONA (INDIA)

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DEMOGRAPHIC TRENDS IN RAJASTHAN

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IN
RAJASTHAN



(A thesis submitted to the University of Poona
for the degree of Doctor of Philosophy)

by

SOHNAG KARAIN MATHUR

M.A., B.Sc.

Under the guidance

of

Prof. N.V. SOVANI

Joint Director,

Gokhale Institute of Politics & Economics,

POONA (India)

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P R E F A C E

This thesis is the work of a Research that I undertook while I was a Ford Foundation Research Fellow at Gokhale Institute of Politics and Economics, Poona. Most of the writing and a bulk of the Statistical work were accomplished there. However, it was still unfinished when I joined the Staff of National Defence Academy, Kharakvasla, and the rest of the work was completed during my stay at Kharakvasla.

The main objective of the thesis has been to consolidate the scattered data for the population of Rajasthan by studying the different censuses and to analyse them fully with a view to drawing useful conclusions by tracing the trend in respect to growth, birth, death, marriage, fertility and mortality of the population.

Attempts have also been made to construct Life Tables exclusively for Rajasthan for two decades from 1931 to 1951, and to make an estimate of the future population. The scope of the study has been further enlarged by studying the trends of population growth in the four natural regions of Rajasthan, and the effects of natural factors on the population.

It may be noted that none of the surveys conducted in India and none of the censuses present a detailed analysis of the regional trends for a particular section of India's population. An attempt has, therefore, been made throughout this thesis to view the State and its regions against the background of population developments and economic conditions

elsewhere, and to find out in what ways the State is unique and in what respects it has common patterns with other parts of India.

In the past the Census Superintendents were content with presenting the population data collected at each decennial census. Although general conclusions at the country level were made, no detailed analysis was made at the State level. But for regional planning it is very essential to know the peculiar population trends of the region in detail. If we want to raise the standard of living and to alleviate pain, prolong life and postpone death, we must know the men for whom the plans are drawn. Our knowledge of even the basic population and other vital data for Rajasthan in the past was neither completely correct nor comprehensive. The statistics are also devoid of regularity and uniformity. With the merger of twenty-one States of Rajputana and the emergence of greater Rajasthan, the need has been increasingly felt to draw plans for the economic development of this part of the country which is still backward in several respects.

We have, therefore, fully analysed the data from the census volumes, despite great limitations. The Statistical techniques used in America and European countries, have been used in these analyses as far as possible. New methods have been evolved, wherever necessary, in order to suit the data available. Advantage has been taken of the published works of several authors which have been acknowledged at their proper places. We were confronted with some

difficulties and bottlenecks also which have been mentioned at their appropriate places.

India's population is increasing by more than two percent every year, and this is one of our greatest problems. A great majority of our population is denied even the bare requisites of life, and the fabulous growth of population is further lowering the standard of living. In spite of great efforts in the Plans and the advances in modern science and technology, our food problem is still a nightmare. It is obvious, therefore, that a restrictive population policy based on family planning is envisaged.

It is hoped that this independent study may do something to fill the gap in the basis of planning for Rajasthan, and to stimulate a better understanding and discussion of the most basic of the numerous population problems of Rajasthan.

I most sincerely express my debt of gratitude to Prof. N.V. Sovani for his kind and sympathetic guidance and for going through the whole of the dissertation. The discussions I had with him and the comments offered by him have been of immense help to me in writing this thesis.

I am also grateful to Prof. P.N. Mathur, Professor of Statistics, Gokhale Institute for his valuable suggestions, specially in connection with the Statistical treatment of the data. Prof. Mathur was also kind enough to read through the entire draft of the thesis and to guide me.

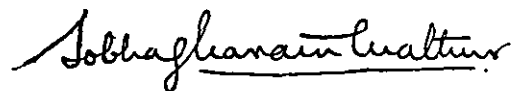
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kindly reading the thesis very thoroughly and critically. Without her invaluable suggestions, this work would not have taken the present form.

I had the benefit of discussions on specific problems with Prof.D.R. Gadgil and I sincerely thank him for this. I must also record my deep sense of appreciation for the authorities and staff of the Gokhale Institute for their kind co-operation and encouragement throughout my stay in Poona.

Gokhale Institute of
Politics & Economics,
POONA (India).


(Sobhag Narain Mathur)

December 31, 1959.

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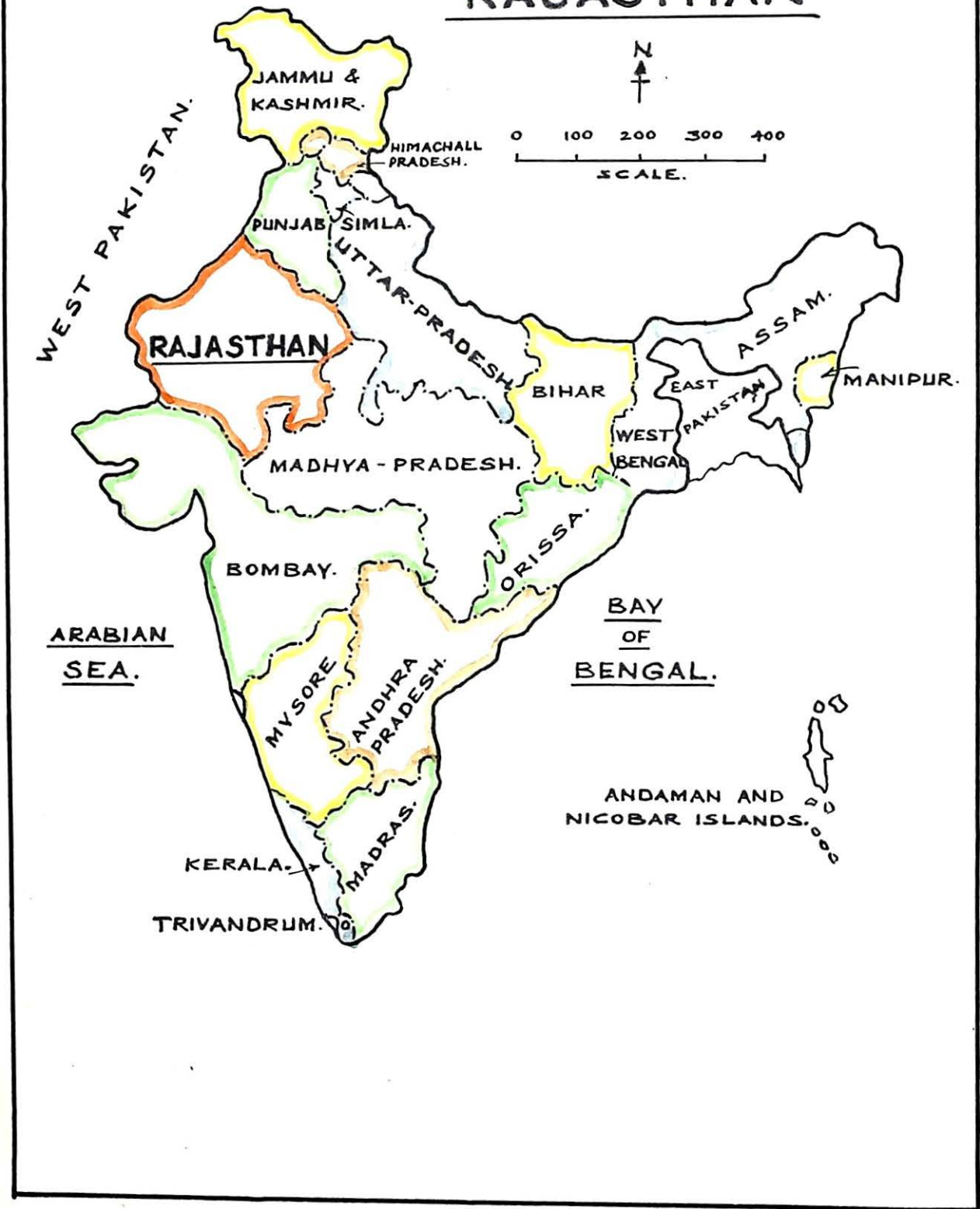
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THE TASK AND THE TOOLS

LOCATION OF RAJASTHAN



CHAPTER I

THE TASK AND THE TOOLS

1. Rajasthan is the third largest in area among the States of India, and is looked upon as a potentially rich unit from the point of view of future development. Yet not much, apart from purple patches and highlights of its fascinating history, is known about Rajasthan beyond its frontiers. One major difficulty in obtaining sufficient knowledge lies in the diversity of its systems of government before integration when political fragmentation precluded any possibility of obtaining information on a unified basis. With the cementing together of the historic feudal States, the need for consolidated information on various aspects of life in the integrated State is felt by all. The data available are as yet neither complete nor upto-date as systematic effort in this direction has only lately begun. An attempt has been made in the present thesis, despite severe limitations, to study the demographic trends in Rajasthan for the last half century, and to draw conclusions regarding future trend in the light of these.

Rajasthan in its present form was born on the 30th March, 1949. A curtain was drawn over a long act in the various princely States of Rajputana (as it was formerly known) and a new integrated State called Rajasthan, pulsating with renovated vigour came into existence.

¹Demography is a term used now-a-days to denote the

1. 'Demography' by P. R. Cox p. 1.

study of human populations by statistical methods, and deals with such questions as the number of people living, dying or being born in a country or region, and the measurement of fertility, mortality, migration and marriage rates".

Regional study of population problems has become very important these days as the regions differ in fertility, mortality, geographical and physical features. As Dr. Radha Kamal Mukerjee observes, "Man and the region are not two separate factors. They mutually influence each other, and form a natural balance, each part of which can be understood only in terms of the other"². An attempt has been made in this thesis to study the demographic characteristics—such as the growth-rate, mortality, fertility rates, marriage rate, birth and death rates, and expectation of life at birth in a life table - of Rajasthan and its natural regions by analysing all the available data.

2. THE TASK:

The study of population as contemplated here covers not only the number of people but also the characteristics of the population and their relations to society and economy of the regions.

Briefly, this task is sought to be accomplished in four different ways: first by describing the existing population of the State and its regions, and its past growth as accurately as possible; second, by studying causal relations between population and the factors governing it (such as climate, rainfall, physical features etc.) have been clearly

2. 'The Regional Balance of Man' by Dr. Radha Kamal Mukerjee p.47.

stated in the second chapter; thirdly, by estimating the general indicators of population changes - such as growth rate, birth and death rates etc. for Rajasthan and its regions and lastly by using these three types of investigation to estimate, on the basis of certain assumptions, future population trends and their possible consequences. There can be no doubt that all the four tasks are complex and incapable of perfect execution.

An exact description of population involves the treatment of its size, density and regional distribution, and measurement of its current and past rates of growth. The density and rate of increase, however, do not tell us much, especially about future development, unless their causes are traced. Consequently, our description must include an accurate assessment of the three demographic variables, through which alone the number of people can be determined, namely, fertility, mortality and marriage habits. Here, for various reasons, the difficulties begin to multiply, because of the facts that vital statistics for Rajasthan are absent and the migration statistics are not available for the whole of Rajasthan. Moreover, the facts regarding the changes in social structure that explain the changes, if any, in births, deaths and migration are scant. A chapter each has, therefore, been devoted to an analysis of these demographic characteristics and variables of Rajasthan.

Chapter III deals with the measurement of variation and growth rate for the population of Rajasthan and its

natural regions for the censuses from 1901 to 1951. The population with respect to the area has also been studied.

Chapter IV deals with the age distribution data available for Rajasthan and its natural regions. The age data have been adjusted for the changes in the boundaries of the State from time to time, and the new age distribution compiled for Rajasthan and its regions adjusted for the changes in the boundaries upto November 1, 1956, have been given in the Appendix to this chapter. The chapter also contains a discussion regarding proportions of females and males in the State.

In Chapter V the civil conditions of the population of Rajasthan have been discussed and the marriage rate by age groups have been estimated for the five censuses from 1901 to 1951. The mean age at marriage for males and females have also been estimated for these censuses.

In Chapter VI the trends of birth rate in Rajasthan have been discussed and estimated by an indirect method.

The census of Rajasthan and Ajmer Merwara, 1941 contains two fertility tables containing the number of children born and the number of married women in three castes for the year 1941 by age groups. From these tables the fertility rate for married women and all women in Rajasthan have been estimated for the year 1941 in Chapter VII. The Gross and Net Reproduction rates have also been estimated with the help of a life table for Rajasthan prepared in Chapter IX. From these rates the mean age of

the generation and the true rate of natural growth have also been estimated.

Chapter VIII deals with the death rate for five decades in Rajasthan and its regions, estimated indirectly from the age distribution of the population, in the absence of vital statistics.

Special pains have been taken to prepare "Life Tables" for the State for the two decades from 1931 to 1950 both for males and females and these have been given in Chapter IX. However, it should not be forgotten that it is an exercise in the methods of preparing Life Tables. As migration is a rather uncertain feature of a region, it may upset the estimation of a life table.

The final task, that of projecting future population on the basis of certain assumptions, is really an end product of the others. It is a hazardous task for a region like Rajasthan due to uncertain characteristics of migration. Nonetheless, it is absolutely necessary for planning and framing population policy. It involves the coordination of fact and theory, not only with reference to conditions in the State but with reference to developments in the country as well. This has been given in the last chapter along with suggestions for future population policy to be adopted in the State.

As stated by Kingsley Davis, "In trying to attain an exact picture of population, one is forced to undertake a certain amount of statistical analysis". The Statistical

analysis for this work has also been made which involved estimation, correction, fitting of curves etc., and the results are presented in charts. It is hoped that new facts and relationship arrived at for Rajasthan in this thesis will help foster a better understanding of the population of Rajasthan, and give an insight into the future, than has been possible hitherto.

The first half of this century has been chosen as the period of study for various reasons. Firstly, it is a long and yet not too long a period wherein trends can be observed better than in short intervals of time. Secondly, long trends are important because of the defects of the available statistical material. Thirdly, fifty years constitute a convenient stretch of time for establishing trends. Finally, the census of Rajasthan can be considered reliable and complete only from 1901.

3. THE TOOLS AVAILABLE:

One can classify the data as registration data, census data and those available from other sources. Registration data which means the vital statistics, are not available for Rajasthan for any of the decades, except for the former Ajmer State, which forms only 4% of the population of Rajasthan. Data from other sources such as Government records or a survey of some part are also not available for Rajasthan. Thus the only available data are obtained from the census reports for different decades. Data on registered births and deaths for Ajmer State have been obtained from the "Statistical Abstract for India" and the reports of Health

Commissioner for India. Most of the data used are published material available in the country. For the information bearing on other countries, our principal source has been the "Demographic Year Book" of the United Nations.

The nature, worth and value of the source material for the study have been examined in some detail below, largely in the light of official reports and evaluation. While this examination may appear to be too detailed, it has been found necessary to indicate what kind of tools are available for the task undertaken. In a sense, this examination is very important, since the weaknesses and strength of the sources are reflected in the study. The cleanliness and purity of the stream are largely conditioned by circumstances at the source.

It may be noted that the Statistics of Rajasthan do not cover all types of data, like the vital statistics and the statistics regarding migration. Even the statistics regarding age return are neither reliable nor complete.

The best demographic material on Rajasthan is obtained from the censuses. The first systematic attempt to ascertain the whole population of the State by actually counting heads was made in 1881 along with the census for the whole country.

Regarding the conducting of censuses in India, Dr. C. Chandrashekhar points out, "The census, at least in its earlier stages, was conceived essentially as an administrative undertaking and the persons appointed as census

Commissioners or Census Superintendents of the States were often foreign administrators posted temporarily to their offices. Probably because of the individual inclination of these persons or because of a different concept of the purpose of the census, the reports of the earlier census authorities paid great attention to discussions of the anthropology of the people and to such subjects as religion, caste or tribe than to a detailed study of the census data and of their social and economic implications³. There have not been many changes in the machinery of enumeration in India, except for the enlargement of the data collected to meet the changing social and economic conditions.

4. CENSUSES IN RAJASTHAN:

A number of difficulties came in the way of reliable census for Rajasthan from decade to decade. The difficulties and changes in the area for each census from decade to decade have been reviewed for Rajasthan and Ajmer separately. Ajmer State was under the administration of the Central Government and its enumerations from the 1871 census were made separately and presented in separate volumes till 1901. But the results of enumeration of 1911 and 1921 censuses of Ajmer were incorporated in the census volumes of Rajasthan. They were again separated in 1931, and again incorporated in the census volumes of Rajasthan in 1941 and 1951.

As regards the twentyone native States of Rajputana (as it was known till 1948), when the Government of India

³ "The Study of Population: An Inventory and Appraisal"
edited by Philip M. Hanser & Otis Dudley Duncan; p.249.

wanted to have an all India Census in 1881, it requested these States also to carry out a simultaneous census in their respective States. All the native states acceded to this request, and the results were presented in a single volume "The census for Rajputana" by the Agent to the Governor General for Rajputana. They also expressed the desire to have the same enumeration Form for all Native States. This practice continued till 1941. The census of 1951 was taken after the integration of these States, and the results were therefore presented district-wise. Hence the 1951 Census is not fully comparable with the previous censuses.

1) Census of 1881:

The Census of 1881 is the first general enumeration of population to have ever taken place in Rajasthan. No authentic record of any enumeration previous to that year is available, though Bharatpur and Jaipur States are said to have taken a count of their respective subjects sometime prior to 1881. A count of some sort, for which figures are not available, is also said to have been taken in Ajmer - Merwara⁴ in 1865, but the first regular census was conducted in 1872, which too was disregarded owing to the unreliability of its figures and a fresh enumeration had to be held in 1876, the data for which were incorporated in 1881 census⁵.

The information sought in the 1881 census was rather meagre. It concentrated only on sex, age, religion, caste, occupation and birth-place. As regards other information the census superintendent wrote, "I would leave out ' civil

4. Ajmer State was known as Ajmer-Merwara till 1948.

5. Census of India 1921: Vol. XXIV Rajputana & Ajmer-Merwara Part I p. 12.

-condition', 'mother tongue', 'education' and 'infirmities', none of which columns convey information at all equal in importance to that conveyed by the eight columns I would return"⁶. Regarding returns in Age column he wrote, "Under 'Age', the enumerator might either enter the number of years or might state the class to which the person belongs, as Infant (Bachsha) upto 3 years; Boy or Girl (Larka, Larki) upto 15; youngman or woman (Jawan) upto 30; Middle aged (Adher) upto 45; old man or woman (Buddha, Buddhi) above 45"⁷. This plan was also approved by Sir Henry Daly, the Census Superintendent for 1881 census for Central India. For Ajmer- Merwara the full form containing all the information was used and the age was also returned in actual years and presented in quinquennial age groups. In the States of Jodhpur, Jaisalmer, Bikaner and Sirohi, the final enumeration was not synchronous, and was effected chiefly by day, due to shortage of enumerators.

The census was not taken in the true light by the people and a "rumour gained currency that Government were trying to ascertain how many able bodied men were available for despatch to Afghanistan"⁸.

The enumeration in the Bhil and Grassias tracts of Southern Rajasthan was not possible in 1881 due to great opposition of the tribes to counting the numbers. The census superintendent wrote: "owing to a very pronounced repugnance to being enumerated, a repugnance which in some instances led to a disturbance of peace, no accurate census could

6. Census of Native States of Rajputana, 1881: by F.T. Hewson -p.2.

7. Ibid. p.2;

8. Ibid. p.21.

be taken of the Ehil population in the States of Udaipur, Partabgarh, Dungarpur and Banswara, and the authorities had to be contented with counting houses and allowing an average of four persons to each house⁹. The subjoined table gives the supposed numbers in the four States mentioned above:-

1. Udaipur	....	51,076
2. Paratabgarh	....	270
3. Dungarpur	....	66,952
4. Banswara	....	48,045
Total	....	<u>1,66,343</u>

This formed about 1.6 percent of the total population of Rajasthan in the year 1881.

ii) Census of 1891:

The census of 1891 was second in the series of the decennial censuses. The reliability of the counts increased this time which was evidenced by the high proportion of females. It was decided to adopt two forms of enumeration schedules for Rajasthan, one of 10 columns for Native States omitting the headings regarding (1) civil condition, (2) Parent-tongue, (3) Education, (4) Language and the other form of 14 columns for Europeans living in the Native States. For Ajmer State the second form was used for all.

In 1891 also, as in 1881, many wild stories of the object of the census were circulated in the Ehil country and such excitement and unrest were caused that the Maharana of Udaipur thought it necessary to give the Bhils in his

9. Census of Native States of Rajputana, 1881: by F.T. Hewson -p.6

territory an undertaking that they should never suffer by the counting of men and houses. In 1891 it was also deemed advisable not to enumerate the Bhils and Grassias in the States of Mewar, Dungarpur, Kushalgarh and Sirohi but an approximate estimate was formed by taking approximately four persons per hut, two males and two females.

In Mewar, the census staff were so afraid of Bhils that they quietly counted the huts in each village, whereas in Dungarpur, they could not even count the huts, and the population of Bhil tracts for 1891 was taken as it was estimated in 1881.

In some cases even the houses in the villages were not actually counted. The census Superintendent writes,¹⁰ "From information given by the State officials it appears, however, that the houses were never properly counted. The enumerating staff did not venture to enter many of the more inaccessible villages but were content to record any number told them by the first inhabitant of the village whom they were able to question!" The total estimated Bhils and Grassias numbered 2,29,839 in the whole of the State.

At that time it was also not thought advisable to attempt the collection of details from the people of the Native States as to their conjugal relations. The age too was recorded in four broad classes as was done in 1881.

As regards the areas of Rajasthan lying in Central

10. Census of India 1901 Vol. XXV Rajputana Part I Report p. VI.

India territory, districts of Tonk State lying within the limits of the Central India Agency, namely Chabra, Pirawa and Sironj were enumerated as part of Central India. The figures for the detached tracts of Central India within Rajputana, namely Gangapur of Gwalior and Nandwas of Indore were included in Rajputana totals. Chowmebla of Jhalawar was taken in Rajputana in Jhalawar State from Central India. Difficulties were also encountered in recording age of females as some Rajputs declined to give the age of their womenfolk. There was some difficulty in recording birth places correctly owing to the ignorance of geography on the part of the people and the enumerators.

(iii) Census of 1901:

The Census of Rajputana and Ajmer-Merwara for 1901 was the sixth for Ajmer and third for Rajasthan. This time the two districts of Ajmer State - Ajmer and Merwara - were also separately enumerated. The operations embraced for the first time the Ehils of Mewar, Banswara, Kshahgarh, Dungarpur and Partabgarh, and the Grassias of Sirohi. This, therefore, was the first complete census of Rajputana.

In this census a new method was adopted to enumerate the Ehils. Since they were given food, clothes, seed and cattle by the Committee of the Indian Famine Charitable Relief Fund during the famine of 1899-1900, it was thought advisable to tell them that one object of the counting was to find out how many people might require food in the next famine. This argument proved effective.

The Ehils were enumerated in the day. The other

racers were enumerated between 7 p.m. and midnight on the 1st March.

The general schedule prescribed for all India was adopted in full for Rajasthan and this has resulted in the collection for the first time of the Statistics regarding civil condition, literacy and languages of the people. For the first time, the number of males and females at each of the first five years of life and after that at each quinquennial age group upto 60 is given.

Allowance has been made in the census for the population of the districts of Tonk situated in Central India which is included in the Imperial Tables of Central India and for the population of the detached districts of Gwalior and Indore situated in Mewar which have been included in the Rajasthan totals. Separate statistics have been given for the estate of Kushalgarh, a fief of Banwara.

Even though the 1901 census was third in series for Rajasthan it failed to get right support of the masses due to their illiteracy and superstition. But the educated people took an intelligent interest in the taking of the census.

(iv) Census of 1911:

In 1911, houses were actually numbered in the tracts of Banwara, Dungarpur, Kushalgarh and Partabgarh and the enumeration done the ordinary way. Only the final checking was done on the morning of the 10th March, 1911. As a result of boundary settlement the villages of Ratakhera and

Babalwas of the Punjab were transferred to Bikaner State and a tract of about 3 square miles from Idar State was transferred to Mewar. The parganas of Chhabra, Pirawa and Sironj belonging to Tonk State were also enumerated with it.

This time the census authorities had to face two major difficulties. One was the wide-spread plague in Alwar and Tonk States at the time of census.¹¹ Secondly, the lower tribes of the Southern region declared themselves as Bhils, since Bhils were given good facilities by the Darbars (rulers) during famines, and all of them now wanted to take advantage of the State charity.

The census of 1911 is, nevertheless, a landmark in that the proportion of the number omitted to the number counted had been substantially reduced and a high standard of completeness of enumeration attained as the technique of enumeration had been almost perfected.

(v) Census of 1921:

This census was taken immediately after the influenza epidemic of 1918, which shook the entire State and wrought unprecedented havoc. There was, in fact, no year in the decade 1911-20 which did not see one or the other State involved in plague or scarcity, either of food-grains or of fodder, due to scant or excessive rains.

As in 1911, the census in Ajmer-Merwara was complete in every respect. In Rajasthan the only tract left for non-synchronous enumeration was the Bhil tract in the Kherwara Bhumat in Mewar, Banswara, Dungarpur, Kushalgarh, Par-

11. Vide "Census of Rajputana & Ajmer Merwara 1911" p.(1).

tabgarh, Sirohi and Kotra Bhumat in Mewar.

Ajmer and Merwara became one in 1914 and their figures are shown for the combined State. Ajmer city showed an astounding rise in population by 14%, owing to the influx of pilgrims (approximately 15,000) into the city of Ajmer because of the Urs Fair, which happened to fall on the census day and which attracted Muslims from all parts of India. Special arrangements had to be made for the census of the pilgrim population. A separate Census staff was appointed for this purpose.

(vi) Census of 1931:

The decade 1921-30 was uniformly healthy and agricultural conditions were on the whole good. But in Bharatpur there were severe floods in 1924 and as a consequence the economic conditions deteriorated. This was responsible for the only minus variation observed in Bharatpur. The abnormal increase in Bikaner State was due to an influx of colonists to the newly irrigated lands of Ganga canal in the north of the State.

Since the last census in 1921, the only change was that the population of the two isolated parganas of Nandwas and Gangapur situated within the boundaries of Mewar were included in those of Indore and Gwalior to which States they respectively belonged. Nimrol village of United Provinces was included in Dholpur State and was enumerated with it only in 1931. A small area of 6.4 square miles known as the Abu District was leased by the British Government in India from the Sirohi Darbar and

its population was shown separately in the report. The Government of India sanctioned the preparation of a separate report for Ajmer-Merwara, thereby reviving the practice that had existed upto 1901. There was no change in area of Ajmer-Merwara since 1921.

The 1931 census was confronted with the Non-cooperation Movement. It had no effect in the States of Rajasthan but some demonstration was made in Ajmer city.

The 1931 census age distribution data were smoothed before publication. This method of adjustment precludes a close comparison being made with figures for ages recorded at previous censuses. The data cannot be compared in quinquennial age groups, though it produces no difficulty when used in groups of ten. The preference for digits ending with 0 over those ending in 5 and for either over any others, led to an attempt being made at this census to adjust the recorded figures so as to bring about a representation of ages that would show a great semblance of probability. The procedure adopted for smoothing is explained by the Census Commissioner: "The actual returns were first grouped, from age 4 upwards, into alternate groups of three and seven. Thus the years 4, 5, and 6 formed the first group, and the years 7-13 the next group. This placed the year ending in 5 in the centre of a group of three ages and the year ending in 0 in the centre of a group of seven ages. These groups were then re-distributed into 5-year groups by a process of combining their halves. Thus the group 10-14 was formed by combining half the group 7-13 with half the group 14-16.

The ages below 5, however, were treated differently. They were formed by splitting up group 4-6 into six parts, two of which sent to compose the group 5-10, and one of which sent to supplement half the number of those whose age to the nearest birthday was returned as three years to make the group 3-4. The group 0-1 was composed of those whose age was returned as nil plus half those whose nearest birthday was given as one year."¹²

Criticising the procedure adopted for giving the smoothed figures for age groups in 1931 census for each State of India, Kingsley Davis writes, " while this procedure may have given a five-year age distribution that was closer to reality than would otherwise have been the case, it nevertheless made the 1931 distribution strictly non-comparable with the 1921 or the 1941 age distribution. No way was left open by which the statistical analysis could get back to the original returns either in 5 year groups or in single ages."¹³ He further writes in the foot-note that " this situation illustrates the wrong role for a census bureau to take. The function of such a bureau is to present the data as completely as possible. No bureau can foresee all the purposes for which analysis may be used. If subsequent investigators lack full data they cannot get the ultimate and necessary meaning out of them.....To publish only a 5-year grouping or the smoothed figures is to put the data in a strait-jacket from

12. Census of India 1931, Vol. I Report: p.83.

13. "The Population of India and Pakistan" by Kingsley Davis, p.249.

which is is hard to rescue them."¹⁴

(vii) Census of 1941:

The counting method known as "de-facto", followed in the 1941 census, represented an important change from that adopted in the 1931 and earlier censuses. The method adopted and followed till the 1931 census was based on a synchronous overnight enumeration all over the country. This was considered unsuitable and even unscientific in a country with considerable climatic, social and regional variations and a considerably heavy casual migration of population within the States. Instead of the one night enumeration, the 1941 census count (with the aid of the house numbering system) became a count spread over a few days and counting the population at their usual place of residence and not at the place where they were found on the census night. Persons who had a 'usual place of residence' were recorded there whether physically present or not, unless they had moved out of the State.

The 1941 census was the first complete census for Rajasthan in all respects. For the first time the houses were numbered correctly and properly, even in the Bhil tracts, and the population was enumerated with respect to their usual place of residence. It had also widened the field by asking some twenty-two questions. The additional questions were regarding means of livelihood, information on fertility such as the age of the girl or boy at marriage, age of the mother at the birth of the first child, the number of children born and the number surviving. This information regarding ferti-

14. Ibid p.240 foot-note No.7.

-lity in Rajasthan was confined only to three communities the Brahmans, the Jats and the Chamars. The information for some of the States was unreliable and hence was excluded from the final tables. Due to the war economy, the census volume for 1941 was devoid of explanatory notes and only the tables were presented. Rajasthan census of 1941 had an additional advantage that the age data were also presented in the quinquennial age groups for total population as well as for civil condition which was not tabulated for other States in India.

The Rajasthan census of 1941 contains the census of Ajmer-Merwara combined with it again. It also includes the two States of Palanpur and Danta, which were in previous census included in Bombay State. The area of Ajmer-Merwara falls short by 343 sq. miles, because of the partition of Merwara in 1937, when 115 villages were transferred from it: 22 to Marwar and 93 to Mewar States. The figures of "Sambhar" "Shamlat Area" are shown half each against Jaipur and Marwar States, since it was jointly owned by the two States. It appears that the considerable increase in population in 1941 in Rajasthan over the last ten years, as disclosed by the 1941 census, was due to a definite move among quite considerable numbers of Hindus as well as Muslims to make false returns in order to inflate the real numbers.

Two interesting stories are given for Rajasthan census, by the Census Superintendent in "These Ten Years", a short account of the 1941 census operations written specially for the general public. The first one is regarding the census in Lawa estate which is a small estate of 20 square miles. He says, "It certain is the subject of another and recent

story, to the effect that the Census Superintendent enumerated the people of the estate from the luxury of a long chair set on the roof of his house".¹⁵ The other, "The Revenue Minister of one State told the writer the story of how, on assuming charge, he had taken stock of the State's villages, 'Some eighty were missing.' The explanation he received was that they had been represented by a few grass huts specially erected for the 1931 census, to bring the number of villages upto an auspicious one, but had long since disappeared."¹⁶

(viii) Census of 1951:

The 1951 census is the modified 'defacto' census in which the schedule was standardized which carried fourteen questions in all. Also National register for each village was prepared in which the demographic history was recorded.

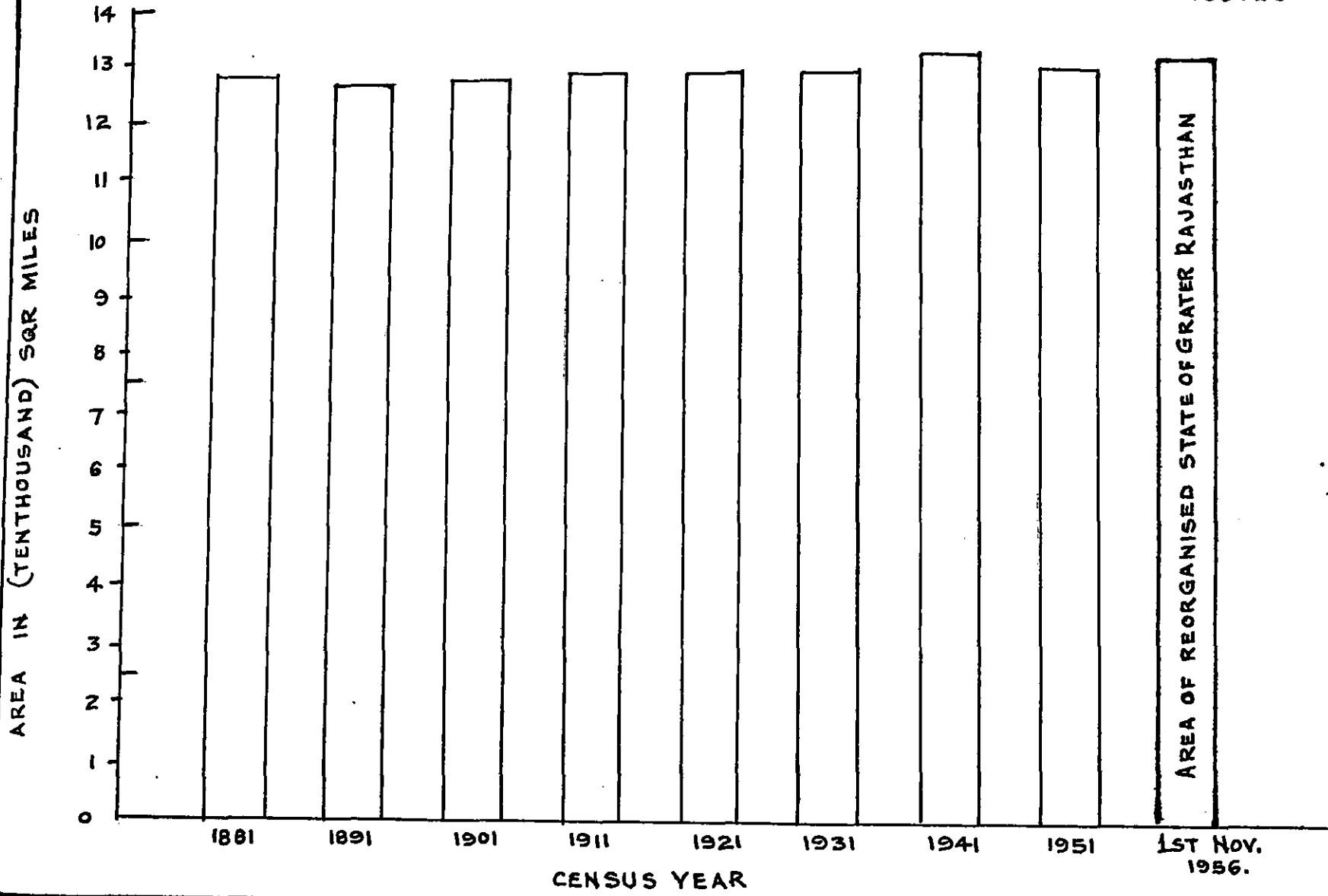
The decade 1941-50 saw a number of changes, the prominent of these were (1) The independence of India, (2) the partition of the country and the consequent migration of population, (3) the merger of former States of Rajputana to form a consolidated Rajasthan State, (4) the formation of new districts in Rajasthan irrespective of the boundaries of former States.

The census report of 1951 includes the census of newly born Rajasthan with the census of Ajmer State, which was a part C State at this time, given separately. The census excluded the States of Danta and Palanpur which were merged in Bombay State. Abu district also formed part of Bombay State

15. "These Ten Years", by A.W.T. Webb p.65.

16. Ibid p.71.

AREA OF RAJASTHAN AT DIFFERENT CENSUSES



and hence was excluded from the census. Due to the formation of the new districts their figures for 1951 are not comparable with the figures of any of the previous censuses which were Statewise.

As the Census Superintendent wrote : ... " the unit of abstraction is the district instead of the State. Therefore a comparison is possible only in cases of such of the present districts which consist of a complete State or States of the past census e.g. Dungarpur, Banswara and Jaisalmer, or such of the Natural Divisions as are composed of one or more complete former States. Districts which include part of several former States do not permit such comparability".¹⁷

There is one landmark of the census that the age data for the total States are given in single year distribution in a sample population of ten percent. The occupational data are also classified in eight well-defined classes.

5. CHANGES IN BOUNDARY AT VARIOUS CENSUSES:

(i) In Table I.1, is given the area of Rajasthan and Ajmer-Merwara as it stood at each census.

TABLE I.1.
Area of Rajasthan and Ajmer-Merwara at different years¹⁸
(in square miles).

S.No.	Year	AREA	
		Rajasthan	Ajmer-Merwara
1	1881	129,750 (127,416)	2,711
2	1891	129,065	2,711
3	1901	127,541	2,711
4	1911	128,987	2,711
5	1921	128,987	2,711
6	1931	129,059	2,711
7	1941	132,559	2,400
8	1951	130,207	2,417
9	1956	132,227	-

¹⁷. Census of India 1951 Vol. X Pt. I p. (111). ¹⁸. Ibid T.No. I. p3.

The area of Ajmer-Merwarahad not undergone any change from 1881 to 1931. In 1941, the area was reduced by 311 square miles by the partition of Merwara and about 115 villages of Ajmer Merwara were transferred to Rajasthan. In 1951 there was an increase of 17 square miles due to the boundary settlement with Rajasthan and a few villages were received by Ajmer State. In November, 1956 Ajmer State was finally merged with Rajasthan as recommended by the States Reorganization Commission.

As given in the Census of Rajasthan 1951, the area for 1891 census fell short of the area for 1881 census by 685 square miles and for 1921 census by 2,334 square miles¹⁹ (figures for which have been given in brackets). But no satisfactory explanation for this decrease is forthcoming. There is, however, a hint in the Report of 1881 that survey operations were then in progress and only approximate figures of the area were given in the Census Report. The increase of 125 square miles in 1901, as per 1921 census and decrease of 1524 square miles in 1901, was due to the recalculation of areas in the office of the Surveyor General, owing to this discovery of large differences in the areas of the States of Bikaner, Alwar and Dholpur, as obtained from their revenue records. The detached Parganas of Sironj, Chhabra, and Pirawa of Tonk State situated in the Central India Agency comprising an area of 1439 square miles were excluded from Rajasthan and the detached tracts of Mandwas of Indore and Gangapur of Gwalior situated in Rajasthan were included. The addition of

19 Ibid p. 4.

1446 square miles to the area of Rajasthan in 1911, was due to the transfer to Rajasthan (1) of the villages of Ratakhera and Eabalwas (4 square miles) from the Punjab to the Bikaner State, , (2) of 3 square miles from Idar State to Mewar as a result of boundary settlement and (3) of the Parganas of Chhabra, Pirawa and Sironj belonging to Tonk with an area of 1,439 square miles, from the Central India Agency. There was no change in the decade 1911-1920. In the decade 1921-30 the apparent increase in the area of 72 square miles from 1921 figures was due to a portion of the State having been re-surveyed, and former figures adjusted, and to the addition of 2 uninhabited square miles to Bikaner from the Punjab. The village of Nimrol was also included in Dholpur State in this decade, but was later on retransferred to United Provinces. In 1941 the increase in area of 3500 square miles was due to (i) the extension of modern surveys with consequent adjustments, (ii) the addition of the States of Palanpur and Danta in Rajasthan and (iii) the transfer of 343 square miles of Ajmer State to Rajasthan. In 1951, the two States of Palanpur and Danta (with an area of 1794 and 347 square miles respectively) were excluded from Rajasthan. The two tehsils from Sirohi State namely Abu Road and a part of Delwara with an approximate area of 317 square miles was also transferred to Bombay State. Under the Removal of Enclaves Order, 67 villages were transferred from Rajasthan to various States while 111 villages from other States were transferred to Rajasthan. The net gain of area to Rajasthan on this account was 111.7 square miles.

(ii) Reorganisation of States:

Under the States Reorganisation Act, Ajmer State with an area of 2,417 square miles was merged with Rajasthan on the 1st November, 1956. Also the Abu Road Taluka of Banaskantha district of Bombay State with an area of 304 square miles and Sunel-Tappa of Bhandrapura Tehsil of Mandsaur district of Madhya Pradesh with an area of 150 square miles was added to Rajasthan territory. The Sironj sub-division of Kotah district with an area of 850 square miles was transferred from Rajasthan to Madhya Pradesh. This gave Rajasthan an additional area of 2,021 square miles.

In this thesis we have tried to adjust the population of Rajasthan and its natural regions as given in the census from 1901 to 1951 to the area as it stands on the 1st of November, 1956 as far as possible. The methods adopted for adjustments have been clearly explained at their respective places. It may not be out of place to mention here that the adjustments are made only where they are very essential.

The census volumes contain huge amount of information and data on subjects which are unimportant from our point of view. Hence we have excluded the subjects of Language, Infirmities, Literacy, Caste, Race, Religion from our study. Minor details regarding occupations are given which may give some idea of economic status of the population affecting its demography.

6. RELIABILITY OF THE DATA:

The question how far the census data used in the study are reliable is always on the tip of the tongue of general

public as well as people interested in demographical studies. The reliability of the censuses of Rajasthan is almost impossible to assess. The simple truth is that it involves a study of human beings which is not an easy task. No attempt has been made on our part to calculate by statistical methods the reliability of censuses because it will be just - to use a Rajasthani expression, to go 'chasing a horned donkey'.

Despite obvious limitations, much reliance has been placed on the census data, supplemented whenever possible by unofficial data, where such data have been found to be reliable. And where there is any inconsistency in the data, statistical methods have been made use of to estimate the possible correct data. We hope our work will be successful in explaining the demographic trends of the State as near to the reality as possible and in pointing out its difficulties as also in arousing an interest in the demographic study.

RAJASTHAN : GEOGRAPHICAL SETTING

CHAPTER II

RAJASTHAN: GEOGRAPHICAL SETTING

1. INTRODUCTION:

The demographic situation of any region is largely the product of its peculiar social and geographical characteristics, affecting in their turn births and deaths, marriages and migrations. Therefore the population of the region cannot be described until and unless something is known of the physical characteristics of the region. In this chapter an attempt has been made to study these aspects of Rajasthan before dwelling upon the fuller demographic survey of the region.

"Rajasthan", says Todd¹, " is the collective and classical denomination of that portion of India which is the abode of (Rajput) princes. In the familiar dialect of these countries it is termed Rajwara, but by the more refined, 'Raethana', corrupted to Rajputana, the common designation among the British to denote the Rajput principalities".

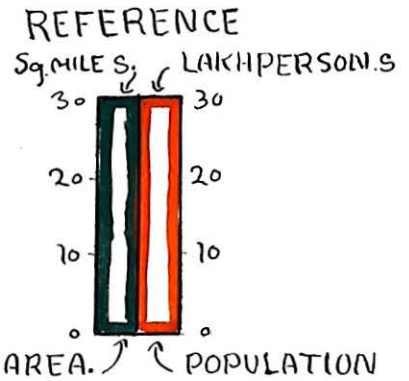
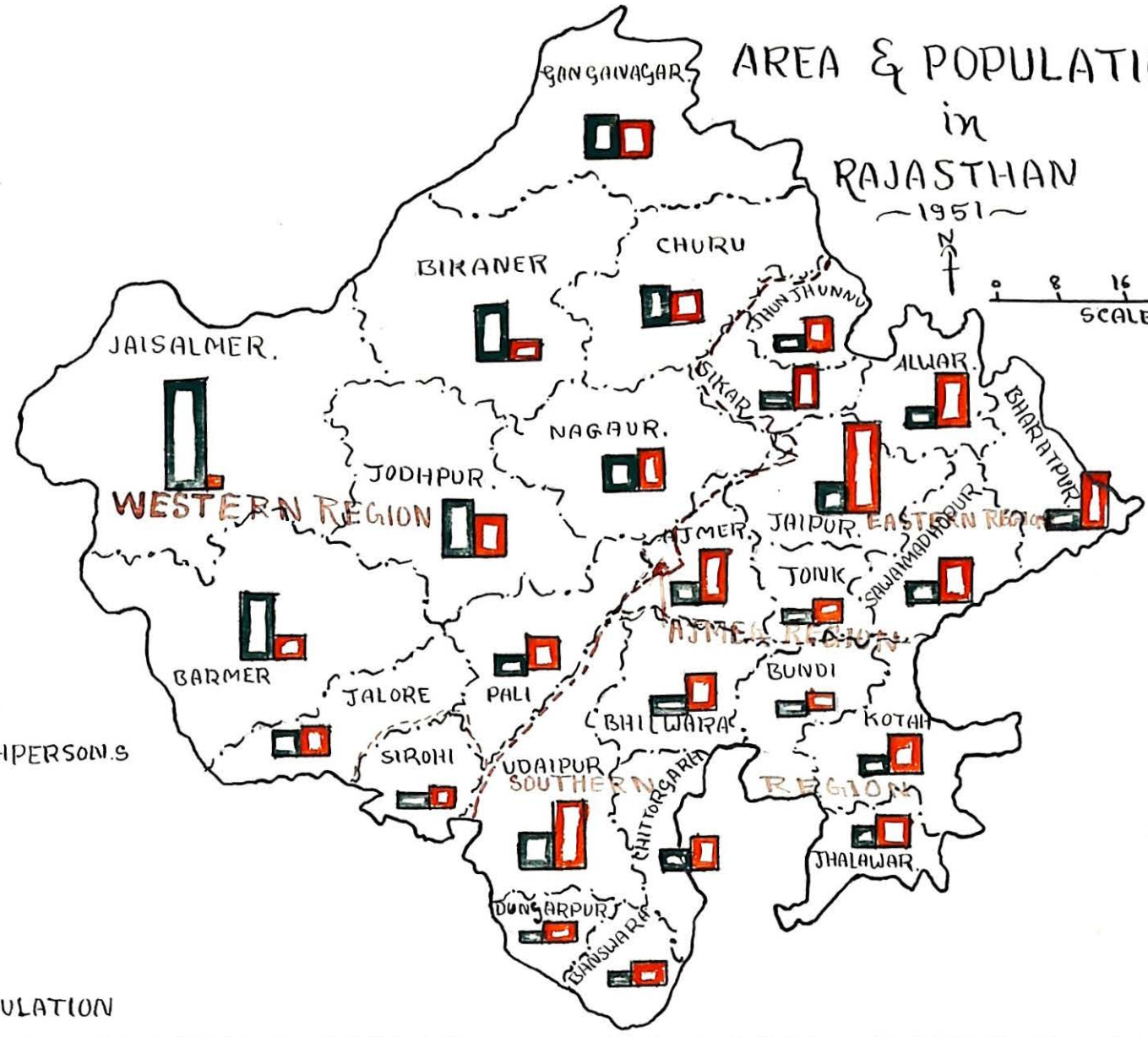
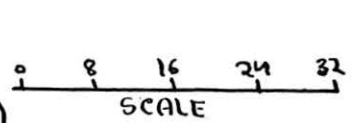
This land of hills and desert is also the classical, colourful land of legends - legends which still inspire poetical and dramatic literature throughout the country.

2. POSITION:

Rajasthan is the large territorial circle which lies between $23^{\circ} 3'$ and $30^{\circ} 12'$ north latitudes and $69^{\circ} 30'$ and $78^{\circ} 17'$ east longitude². It is roughly rhombic in shape.

1. "Annals and Antiquities of Rajasthan"-by Col. James Todd, p 1.
2. "Census of India 1951, Vol X. Rajasthan and Ajmer.
Part I -C-Appendices p 1.

AREA & POPULATION in RAJASTHAN 1951



The east-west diagonal is about 540 miles long, or nearly one-fourth of the breadth of undivided India. The north-south diagonal is about 510 miles long or nearly one-fourth of the length of Indian Union from Cape-Comorin to Kashmir. The entire perimeter of Rajasthan which forms the whole boundary from all sides is nearly 3,700 miles.

3. BOUNDARY:

It is flanked on the west and north-west by Pakistan. Thence its northern and north-eastern frontier marches with the Punjab and the Uttar Pradesh until it touches the river Chambal where it turns south-eastward. The eastern boundary is formed by the Chambal for about two hundred miles dividing Jaipur and Kotah divisions of Rajasthan from Gwalior division of Madhya Pradesh. The southern boundary runs in an irregular zigzag line across the central region of India, dividing Rajasthan from Madhya Pradesh and Greater Bombay. Ajmer State, situated in the heart of Rajasthan, was a British territory upto the time of Independence, was later a part C State, and was then merged in Rajasthan on the 1st November, 1956 under the States' Reorganisation Act. Throughout this thesis this territory has been treated as a part of Rajasthan and all the previous data have been adjusted for the changes in the boundaries.

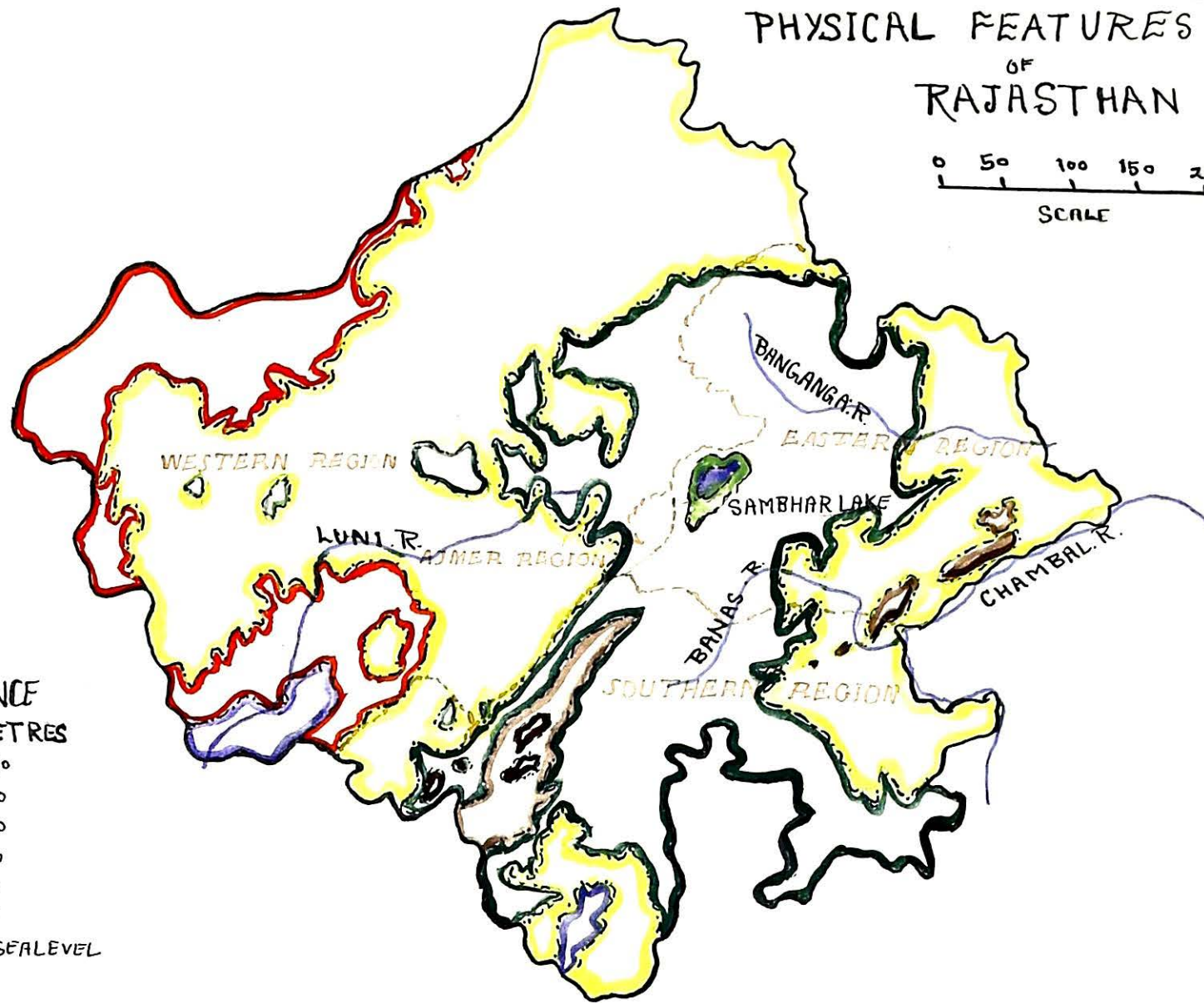
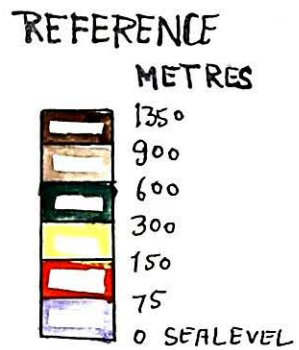
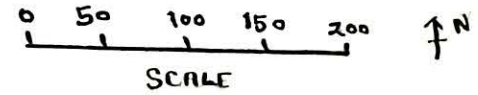
4. AREA:

The total area of Rajasthan as given for the reorganised State, in the "Census of India Paper No. I, 1957," is 1,32,098 square miles³. Rajasthan is the third largest State of India

3. Census of India Paper No. I, 1957 "General Population Tables and Summary Figures by Districts of Reorganised States-4.1951 Census. p. 3.

(The Surveyer General, however, has pointed out that these figures are still provisional ...)

PHYSICAL FEATURES OF RAJASTHAN



in area. Before the integration of States in India and before the formation of Greater Bombay, Rajasthan had the largest area amongst the States of India. It occupies about 11.21 percent of the total area of the Indian Union. It is more than double in area to that of Orissa, two and a half times that of Punjab and more than four times that of west Bengal. Compared to some of the foreign countries, Rajasthan is bigger in size than the United Kingdom, Hungary, Norway, Austria and Italy.

5. PHYSICAL FEATURES:

The most striking physical feature is the Aravali range of mountains which intersects the country almost from end to end in a line running from south-west to north-east. About three-fifths of the area lies north-west of this line, leaving two-fifths to the south-east. The Aravalis form a water shed for Rajasthan. The tract lying to the north-west of it, referred to in this thesis as the western division, is sandy, ill-watered, and unproductive, improving gradually from a desert in the north-west and west to comparatively fertile land in the east. The region to the east and south-east of the Aravalis affords a striking contrast to the sandy plains on the north-west of the range, and is blessed with fertile lands, hill-ranges and long stretches of forest where fuel and fodder are abundant. It contains two large tracts, sufficiently distinct in their physical features to warrant sub-divisions, which are designated here as the eastern (or the plain) and southern(or the hill) divisions. The eastern division, where the country inclines upwards from the plains to the Central India plateau, forms the plains generally called trans-Gangetic-plain. It

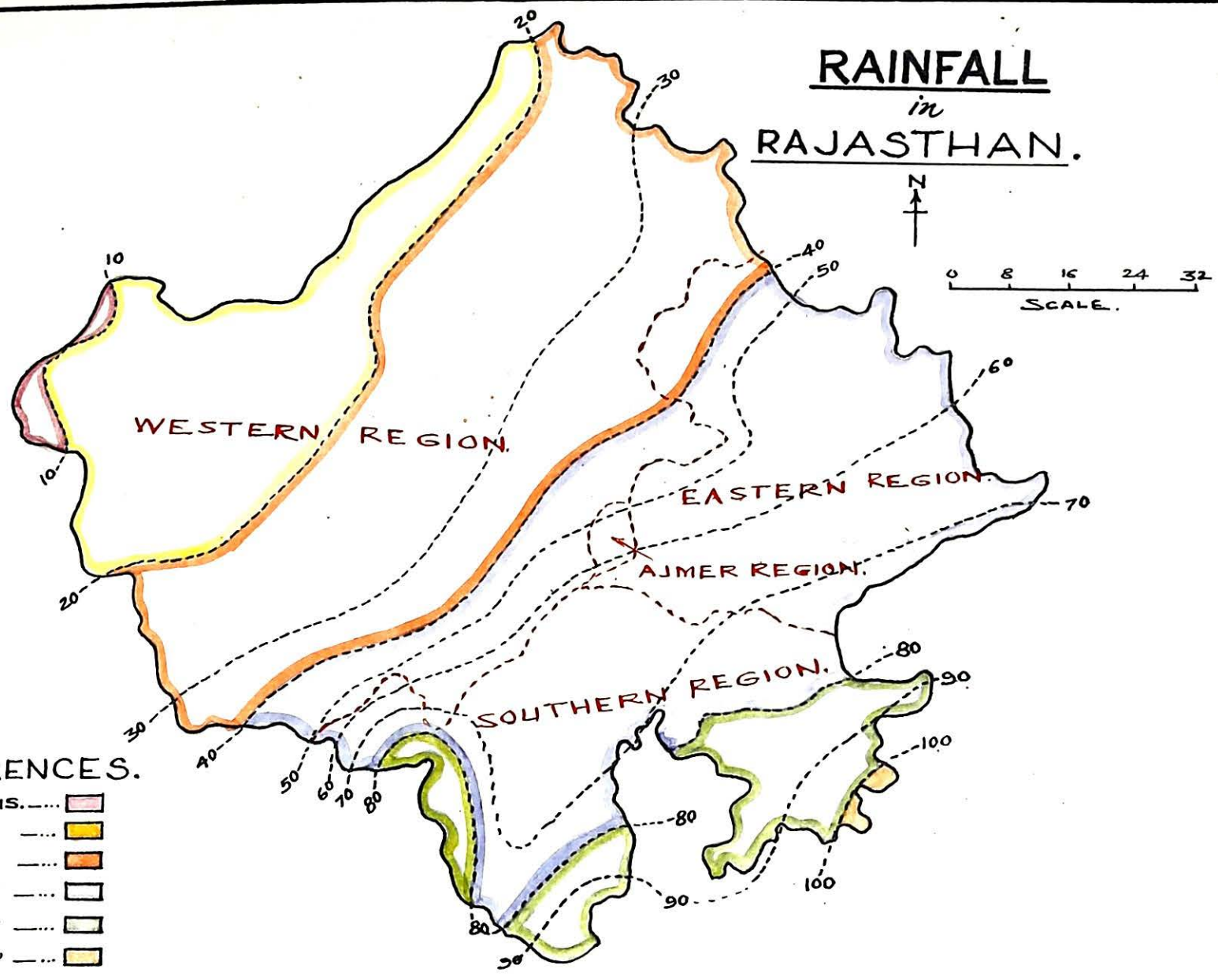
enjoys , as a rule, a good rainfall, is traversed by several important rivers and passes extensive table-land and breadths of excellent soil. The southern division is made up of hilly and mountainous tracts. Except for some tracts of open country towards the centre of Mewar and along the north-west border of Sirohi district, it consists of a network of hills covered with forest enclosing in many parts wide, and well-watered valleys.

6. CLIMATIC CONDITIONS:

The climate varies with the rainfall. Throughout Rajasthan in summer the heat, except in the higher hills, is severe everywhere and in the western region very intense. The mean daily maximum temperature in summer in practically all parts of the State ranges from 104° F. Hot winds and dusty storms are experienced throughout the season. In the sandy tracts, they are violent but in the southern region they are tempered by the hills, forests and water. In the desert the glaze of the sun and the wafts of suffocating heat reflected from the hard-back ground compel all out-door life to cease, while the sun is always above the horizon. Nights are generally cool in this region and are pleasant.

In the winter the climate of the northern parts of Rajasthan is much colder than in the southern region. The change of temperature in this season between day and night is sudden and very trying specially in the western region. Another characteristic feature of Rajasthan is its great variability with regard to humidity, which varies from 20 in April and May to nearly 97 in the wet seasons of July and August. In short Rajasthan is, therefore, a region of extreme climate,

RAINFALL *in* RAJASTHAN.



very hot and very cold.

Talking about the types of influences that climate has on man, Webb says, "Climate exerts three distinct types of influences. In the first place it has a direct effect upon man's health and activity. Second, it has a strong indirect, but immediate effect through food and other resources, through parasites and through modes of life. Third, by its combined direct and indirect effects in the past, it has been a strong factor in causing racial mixture and natural selection. Thus it has a powerful effect upon inheritance".⁴

Rainfall in Rajasthan is unequally distributed. The western region comes very near the limits of that part of Asia which is called the "rainless area" of the world. In the whole of western Rajasthan the rainfall scarcely averages more than 12 inches. In the southern Rajasthan, which lies directly in the line of the south-easterly winds, the rainfall is much more and varies from 30" to 60" annually. In the eastern Rajasthan, however, the periodical supply of rain is variable. If the eastern winds are strong, they bring good rains from the Bay of Bengal, whereas if the south-west monsoon prevails, the rain is comparatively late and scant. The annual variation is very great from 5" -55" and also the variability is high from year to year. In brief, it may be said that starting from Bikaner and Jaisalmer in the north-west to Banswara in the south and Kotah and Jhalawar in the south-east and also from Jaisalmer in the west to Bharatpur in the east, there is a very gradual increase in rainfall from 5" to 40 inches and from 0" to 30 inches respectively .

4. " These Ten Years" by A.W.T.Webb p 35.

The increase is rapid after Aravalis have been crossed. The distribution of population and the density of population and even the prosperity of the people of the State varies with the variations in the rainfall.

7. WATER RESOURCES:

Rivers play a very subordinate part in moulding the economy of Rajasthan, because either they are very few or they are dry for the greater part of the year.

In the western region the only river of any importance is the "Luni" which flows south-west through Jodhpur and Barmer districts for about 200 miles to its embouchure the Rann of Kutch. There are as many as seven other streams, all of them drying up in summer. In the north of western region there are two other rivers the Ghaggar and the Kantli. A dam has been constructed on river Ghaggar and a canal, 84 miles long, known as Ganga canal was drawn from it in 1928.

In the eastern and the southern regions, the river system is important. The principal river is the Chambal which flows for about 560 miles in Rajasthan. The chief tributaries of the Chambal are the Banas and Mej, which after flowing through Ajmer region and Mewar and covering nearly 300 miles join Chambal near Kotah. The Parbati and Kali Sindh rivers flowing through Tonk and Jhalawar regions also join Chambal. The Mahi river flowing through Banswara and Dungarpur districts flows into the Gulf of Cambay.

Besides the few rivers, there are no natural fresh water lakes in Rajasthan. The only basins worth mentioning being the well-known salt lake of Sambhar, and the three unimportant ones of Diwana, Pachbhadra and Bharkini.

There are, however, many artificial lakes, which have been constructed with a view to providing water for drinking purposes and for agricultural purposes. Mewar has the finest lakes at Debar, Kankroli, and the Pichola and Fathch Sagar at Udaipur. Other places in Rajasthan also have artificial lakes like the Jaswant Samand in Marwar, the Rangarh at Jaipur, and the Anna Sagar and Foy Sagar in Ajmer. Water and irrigation facilities in Rajasthan have to be developed, till every acre of the cultivable land in the State gets the necessary amount of water if the State is to become economically sound and the country to be free from food shortage. With the formation of Greater Rajasthan the question of irrigation works was taken up. Among the major works there are four important projects namely: the Bhakra canal, which will irrigate nearly 5,70,000 acres, the Jawai dam, will irrigate about 30,000 acres, the Chambal Project, will irrigate about 5.5 lakh acre and the Rajasthan canal, will irrigate about 35 lakh acres.

8. NATURAL DIVISIONS:

In this thesis Rajasthan has been divided into three natural regions namely 1) the Eastern Rajasthan Plain region, 2) the Southern Rajasthan Hill region and 3) the Western Rajasthan Desert region. Former Ajmer State has been treated as a separate fourth region. This decision to treat Ajmer State as a separate region is purely for the sake of convenience of study, because this State has always been treated as a separate unit in all the Censuses right up to 1951. Besides some more detailed data for the State are available such as for births, deaths etc., which are not available for Rajasthan

Hence it was thought necessary to explore such available data and draw useful conclusions from them.

As was mentioned in Chapter I, the unit of collection of data in Rajasthan up to 1941 census was a Princely State. But in 1951 the unit of collection was a district which was very often a combination of two or more former States. This change in the unit of collection of data in 1951 has put a limitation on our part in forming the natural regions of Rajasthan for our regional study. We can now form regions only by combining such areas for which separate data for 1951 census are available and which also formed the part of the former native States, so as to make it uniformly comparable with the previous censuses. In doing so, some of the areas of one natural region have been included with other regions and some reliability has been sacrificed for the availability of data in that form. In the following are described the adjustments in Natural Regions of the censuses to facilitate comparisons with the previous censuses. The former Shahpura State, (area 405 square miles), which is more or less akin to the Eastern Plain region in configuration has to be included in the Southern hilly region because of its inclusion with Bhilwara district in the 1951 census. Bhilwara in all previous censuses was a part of Mewar State which falls in the Southern hilly region. Bhilwara could not have been treated in Plain region as no separate data for this part were available for the previous censuses. Hence it was thought necessary to transfer Shahpura State in the hill region for which separate data up to 1941 census was available. The former Tonk State had four scattered districts,

one district was in the Eastern region, two districts were in Southern region and the fourth was in the neighbouring State of Madhya Pradesh. Up to 1941, the census of Tonk included the population of all the four districts. In 1951 census of Rajasthan the four districts of Tonk were included in the different districts of Rajasthan where they were situated. Also in 1956, with the reorganisation of States, the fourth district of Tonk falling in Madhya Pradesh was transferred to that State from Rajasthan. In this thesis Tonk districts are treated as they are in 1951 census in the natural regions where they lay and all the previous data for the regions have been adjusted accordingly.

Sirohi State (area 1958 square miles) minus the Abu district (six square miles) could have been included in the western dry region because of its similarity with it, but because of its inclusion in 1951 census with the Southern region it is treated with the Southern region.

The natural regions of Rajasthan do not come under one single region of India⁵, but form parts of different regions. The East Rajasthan Plain region and the Ajmer region come under the Trans-Gangetic Plains sub-region of the Northern Plains region of India. The Rajasthan Western Dry region falls in the Desert sub-region of the Northern Plains region of India whereas the Rajasthan Southern Hill region lie in the North-west Hill sub-region of the Peninsular Hills and Plateau region of India.

5. "In 1951 Census of India, the country as a whole has been divided in five Natural Regions. These five natural regions are sub-divided into 15 "Sub-regions", which are further sub-divided into 52 divisions". The full description of the natural regions is given in the "Census of India Paper No. II 1951".

Since one of the objectives of this thesis is to study the variations in population in the four natural regions of Rajasthan, it would be necessary first to have a clear idea of the differences in the climatic conditions and the physical features of the various natural regions. Below are described the four natural regions:-

1) EASTERN PLAINS REGION:

The eastern plain region has been formed out of the former States of Alwar, Bharatpur, Dholpur, Karauli, Jaipur, Kishangarh, Tonk paragana and Lawa.

The whole area of the region is about 24,788 sq.miles i.e. 18.7 percent of Rajasthan and is about 600 - 1500 ft. above the sea level, except in the south-west where a part of the Aravali range enters.

The region is more fertile and is very diversified in character. It contains extensive hill ranges and long stretches of rocky terrain and woodland, considerable rivers, wide valleys and fertile table lands, and broad stretches of excellent soil.

During winter (November to February) the cold dry winds from the west blow over the area and sometimes it comes under the grip of the cold waves. It gets about 0.85" to 1.06" of rain during this season which is good for winter crops. May and June are generally the hottest months when the maximum temperature ranges from 105° to 116°F and frequent dust storms occur in the region. It gets most of its rainfall during the months of June to September, the average varies from 10" to 30".

In mineral resources, the region is noted for the

mica deposits⁶. Other important minerals are : staurolite, felspar, asbestos, barytes and calcite. There are large reserves of good building stones like " sand-stone, quartzites slates, limestones and marbles. The other less important minerals are copper and cobalt.

The soil in the west and north of the region is generally sandy . To the east, the soil is either black cotton or richly alluvial. Most of the big towns of Rajasthan are in this region and it is better served by road and rail. Some of the big industries of Rajasthan are also found in this region.

11) SOUTHERN HILL REGION:

The region consists of the former States of Udaipur (Mewar), Dungarpur, Banswara, Pratapgarh, Sirohi, Jhalawar, Kotah, Bundi, Kushalgarh, Shahpura and Abu District. It also includes the detached parganas of Tonk - Nibana, Chhabra and Pirawa and also Sunnel Tappa of Bhaupura tehsil of Mandasaur district of Madhya Pradesh which was merged in Rajasthan in 1956. The total area of the region is about 29,585 sq. miles about 22.4 percent of total Rajasthan.

Except for some open tracts in the west it consists of network of hills covered with forests and well-watered valleys. This region of Rajasthan is the chief home of "Bhils". The Aravali Hills running northeast-south west form the North-West boundary and the Vindhya and Satpura ranges running east-west form the southern boundary of the region. The climate is on the whole healthy, the elevated plateau being noted for its cool nights even in the hot season. Hot

6. "Census of India Paper" No.2 -1952
Geology and Mineral Resources p 60.

winds and dust storms are experienced in the western part during the hot weather, but they are much milder. The annual rainfall of the region is about 30"-40" while in the high hills it varies up to 60". December to February is the coldest season and is associated with cold waves.

The chief minerals of economic value in this region are mica in Mewar and lead-zinc in Zawar which are the only deposits in India. The mica mines of Rajasthan account for nearly one-fifth of the total production in India. There are small deposits of asbestos, magnesite and calcite. Other minerals of less importance are copper, nickel, and cobalt. The region is well known for a great variety of building stones like sand-stone, lime-stone, marbles and ornamental stones, steatite and china clay.

111) WESTERN DESERT REGION:

This region consists of the former three western States of Jodhpur (Marwar), Bikaner and Jaisalmer.

It is situated between $24^{\circ}37'$ and $27^{\circ}42'$ north latitudes and $69^{\circ}30'$ and $72^{\circ}42'$ east longitudes. Its area is about 75,309 square miles, about three fifths of the area of Rajasthan.

The most characteristic feature of the climate of the region is its dryness and the large extremes of temperature. The winter is very severe and frequently the temperature falls below the freezing point, and the mean minimum temperature ranges from 30°F to 50°F . The hot season prevails from April to October. Temperature of the order of 105° - 117°F prevails day after day in the months of May and June. The heat during the

summer months is intense and scorching winds prevail.

Dust storms, some of which are very violent, are of frequent occurrence. Most of the rain that falls occurs in July and August and varies from 5" to 15". Famine is very common in the region. The greater part of the region is covered by desert where there is no running water.

The region is well known for certain large deposits of gypsum which meet the demand of Sindri Fertilizers. The Tertiary strata of Bikaner and Jaisalmer carries good reserves of lignite and Fuller's earth. The Sambhar lake and the other inland basins in the desert region like Deedwana and Pachbhadra carry large concentrations of salt deposits. Jodhpur is noted for large reserves of white Marble of Mekrana, which has been used in the building of the Taj Mahal and other buildings in Agra and Delhi.

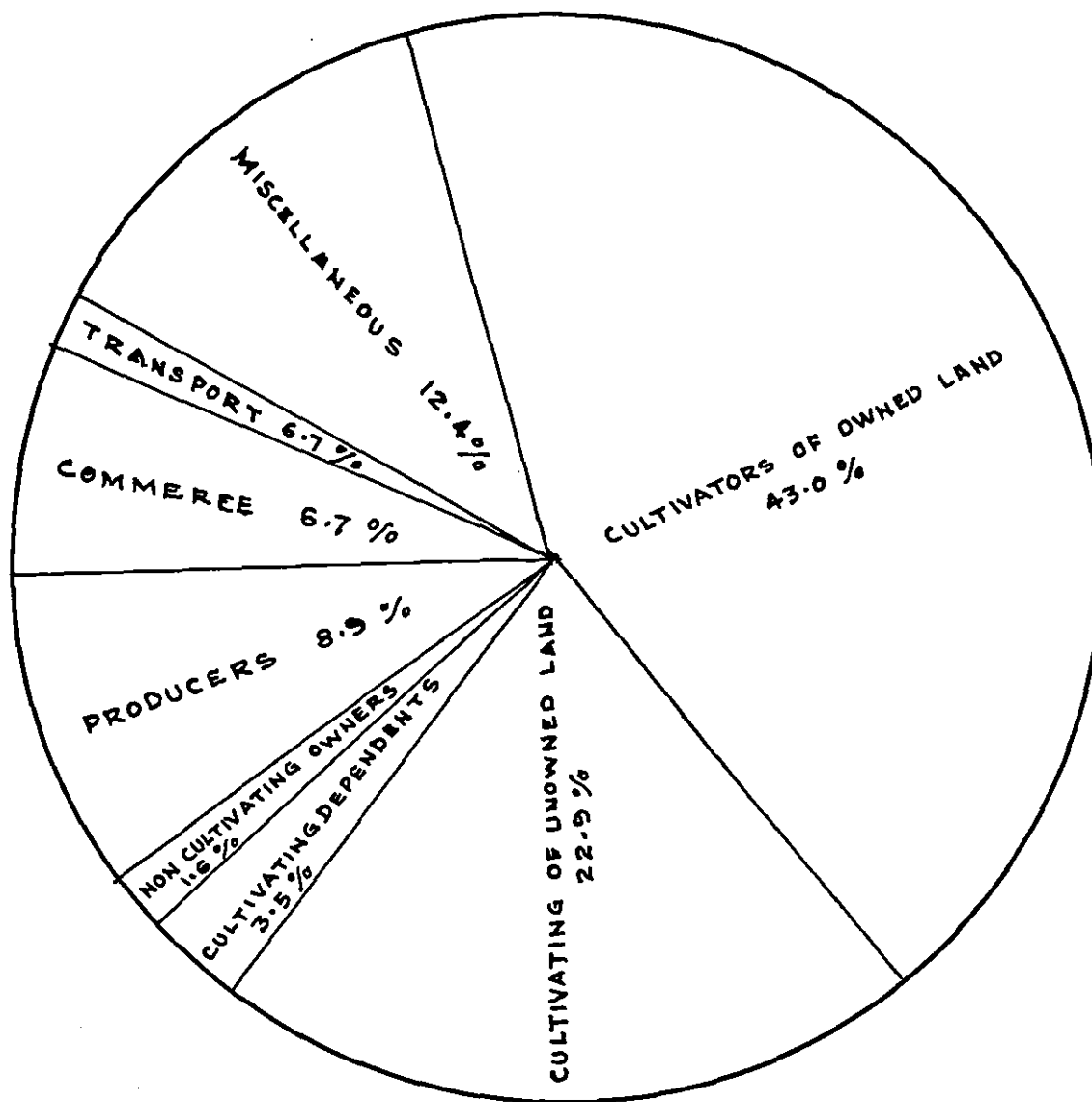
The western region though sandy and undulating as it is, is very fertile. The soil is capable of yielding fairly good produce, even better than some parts of India, if it is adequately watered. But water is most scarce in this region.

iii) AJMER REGION:

Ajmer is an isolated mono-district, situated in the heart of Rajasthan. It lies between $25^{\circ}24'$ and $26^{\circ}42'$ north latitudes and $73^{\circ}45'$ and $75^{\circ}24'$ east longitudes. It is triangular in shape. The maximum length from north-east to south-west is 90 miles, while from east to west it is 45 miles. It has an area of 2,416 square miles i.e. 1.8 percent of Rajasthan.

This region is generally a level plain. The Ara-

OCCUPATIONAL PATTERN
IN
RAJASTHAN (1951)



vali range, the strong barrier which divides the sandy plains of west from the high table land of south, runs north-west to south of the region. It marks the dividing watershed of India. The rain which falls on the southern side finds its way by the Chambal into the Bay of Bengal, whereas that which falls on the other side is discharged by the Luni river into the Gulf of Kutch. The average annual rainfall of the region is about 21 inches which is often uncertain.

The climate of the region is healthy. In summer it is dry and hot, in the winter cold and bracing. There is no river in the region. There are four natural lakes, the Pushkar, Old Pushkar, Sargaon and Karatia. Many of the tanks in the region are the products of famine labour. The region has large deposits of Mica and is industrially well developed.

9. OCCUPATIONAL PATTERN:

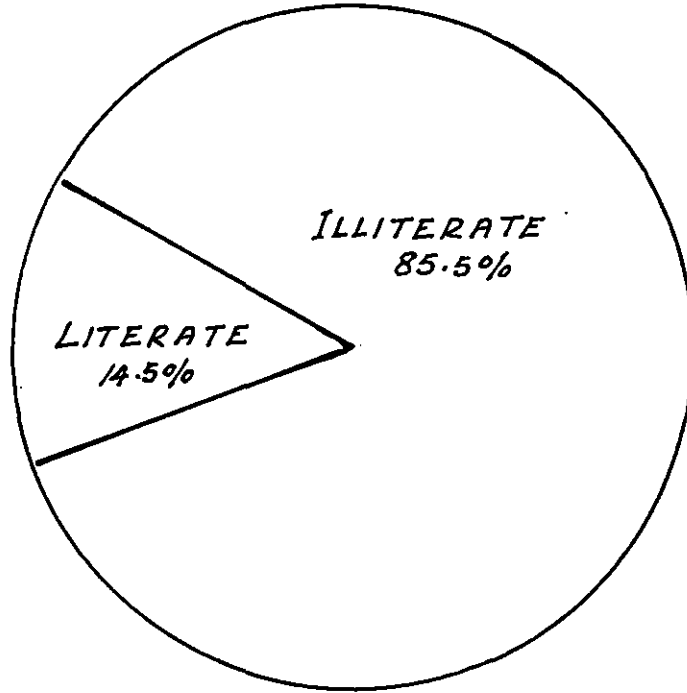
Occupation generally determines the economic status of a man which in turn may affect the demographic pattern.

A perusal of the Livelihood Table of 1951 census of Rajasthan shows that 71 percent of the people were in the agricultural class and 29 percent in the non-agricultural. There has been no change in the occupational pattern of Rajasthan throughout the previous censuses. Rajasthan as compared with the other States of India is an Agricultural State.

The occupational classification in the natural regions is shown below.

EDUCATIONAL STANDARDS
IN RAJASTHAN (1951)

MALES



FEMALES

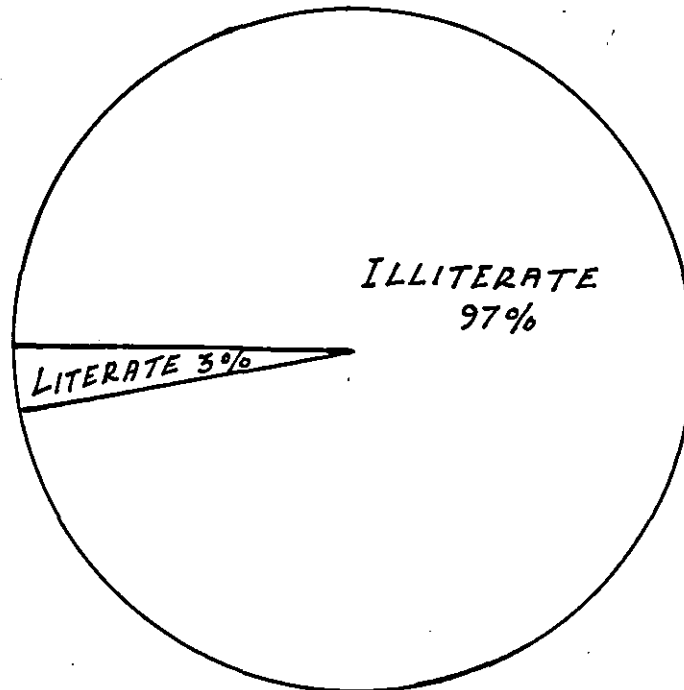


TABLE II. 1

Occupational Classification in the Natural Regions of Rajasthan

Region	Agricultural percent	Non-Agricultural percent.
1. Ajmer	45	55
2. Eastern	69.8	30.2
3. Western	68.7	31.3
4. Southern		
(a) Hills	77.4	22.6
(b) Plateau	72.5	27.5

Ajmer region is industrially more advanced than other regions which are primarily agricultural. The people in the western region generally foster camels, sheep and cattle.

10. EDUCATIONAL STANDARD:

Only 8.4 percent of the population of Rajasthan is literate i.e. they can read and write. The percentage of literacy among males is 13.7 and that among females is 2.6. Compared with the literacy in other States of India, which varies from 45.8 percent in Travancore to 8.4 percent in Rajasthan, it will be seen that literacy here is among the lowest.

Low level of literacy in Rajasthan is bound to have an effect on the attitude of people towards child bearing and family building habits. It also provides a measure of the progress and modernization of the State.

Literacy in the natural regions is shown below:

TABLE II.2.

Percentage of Literacy in the Natural Regions of
Rajasthan in 1951⁸

Region	Literate percent		
	Persons	Males	Females
1. Ajmer	20.3	29.6	10.2
2. Eastern	9.0	14.7	2.6
3. Western	8.1	13.0	2.7
4. Southern:			
(a) Hill	7.0	11.6	2.3
(b) Plateau	3.6	14.1	2.8

Literacy in Ajmer region is higher than in other regions, the lowest being in the Hill region which is the home of Bhil tribes.

8. Compiled from "Census of India 1951 Vol. E Part I-C Table No.A.2 p.125.

POPULATION CHARGES

CHAPTER III

POPULATION CHANGES :

1. There is no definite knowledge of the size of the population of Rajasthan during the long centuries of its glorious history. The first general census in the States of Rajasthan was taken in 1881. No authentic record of any enumeration previous to that year is available, though Eharatpur and Jaipur States are said to have taken a count sometime prior to 1831. A count of some sort, for which figures are not available, is also said to have been taken in Ajmer State in 1865, but the first regular census was conducted in 1872. Since 1881 regular census has been taken every ten year. From that period our knowledge of growth of population in this region rests on a surer ground. Yet the actual census figures cannot be relied upon for comparison, because of two reasons: firstly change in areas took place in each decade; and secondly the enumeration itself steadily improved in accuracy. In all the tables prepared in this chapter, therefore, figures of the past censuses, as published in those reports have been adjusted,¹ to represent the population of the reorganised State of Rajasthan as it was constituted on the 1st November, 1956. But we have no means to measure the extent of variation due to the improved methods of enumeration.

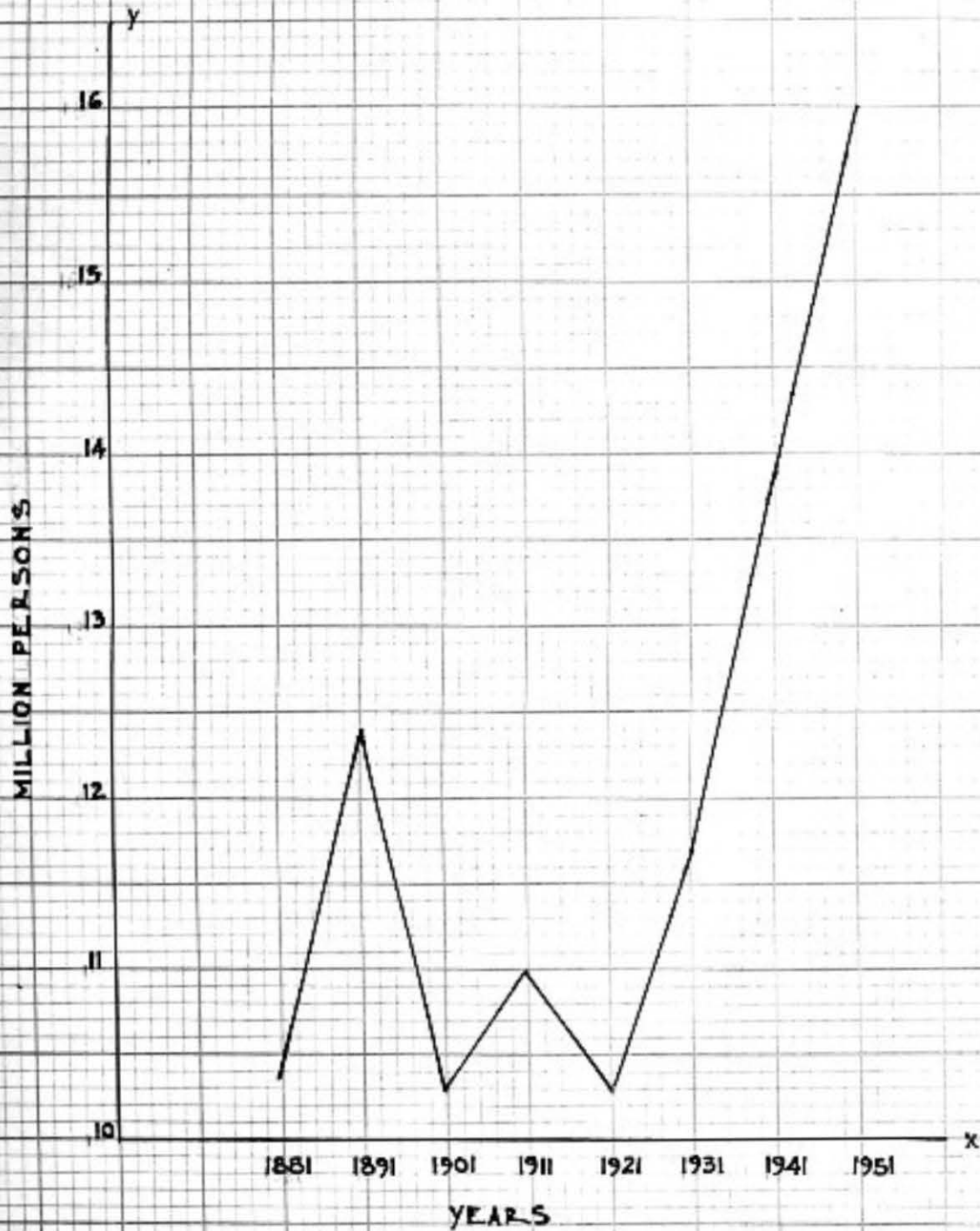
The population of the reorganised State of Rajasthan, according to the census of 1951, was 15,970,776 with 8,313,893 males and 7,656,893 females. This is the highest figure ever

1. The methods of adjustment in the population figures have been explained in Chapter II.

GROWTH OF POPULATION IN RAJASTHAN
(1881-1951)

SCALE ALONG OX¹ = 20 YEARS

oy¹ = 1 MILLION PERSONS



recorded for the State. Rajasthan's population is nearly 4.2 percent of the population of Indian Union, nearly twice that of Ceylone (8.15 millions)² and equal to the population of Egypt (14 millions)².

2. VARIATION IN POPULATION:

In Table III.1 is shown, in a succinct form, the population at each census since 1881 in Rajasthan with its variation from the preceding one and also the percentage variation in the population.

TABLE III.1

Population and its variations, in Rajasthan for censuses from 1881 to 1951 .

S.No.	Census Year	Population	Variation	Variation percent
1	1881 ³	10,402,300	- -	- -
2	1891 ³	12,449,817	+2,047,517	+19.7
3	1901	10,233,896	-2,155,921	-17.3
4	1911	10,983,508	+689,612	+ 6.7
5	1921	10,292,649	-690,859	- 6.3
6	1931	11,747,974	+1,455,325	+14.1
7	1941	13,863,855	+2,115,881	+18.0
8	1951	15,970,776	+2,106,921	+15.2

Note -1: The figures for the population of 1881 and 1891 are not very reliable as the Bhil population in the Southern region of Rajasthan were not enumerated but estimated as four persons per house, two males and two females. Also these figures are not fully corrected for the reorganised State, but estimated because of

2. Demographic Year book 1957.

3. Figures for 1881 & 1891 have been taken from Census of Rajasthan 1951: Table 24, p.25.

the non-availability of the fuller data for these censuses.

Note-2 : In this and all the following tables, the figures have been adjusted for the changes in the boundary for the reorganised State. We have calculated the figures for the population of the reorganised State of Rajasthan for all the previous censuses, taking into consideration the changes in the boundaries in November, 1956. After I had finished my calculations, I found that the same figures have been published recently in the census of India Paper No. 1, 1957. "General Population Tables for Reorganised States 1951 Census". Fortunately, there is no significant difference in the two figures. As the differences are negligible, the figures calculated by me have been taken for further work.

As seen from Table III.1, there has been an increase of 19.68 percent in the population in the decade 1881-1891. This was due more to improved methods of enumeration than to natural causes. During the decade there was practically no epidemic,⁴ excepting cholera in 1887 and small pox in 1886, in some parts of the Province but it did not bring about any unusual thinning of the population and famine too was absent from the land. The decade before 1881 was also not free from epidemics and famines. There was one great famine in Rajasthan in 1868. The figure for 1881 is, therefore, lower. Moreover,

⁴ Census of India 1921 Vol. XXIV, Rajputana and Ajmer Part I Report p.13.

the under enumeration was very great as it was the first census for Rajasthan and the people (specially women) were shy to be enumerated.

The decrease in the succeeding decade 1891-1900 was largely due to a succession of unfavourable seasons caused by the deficiency of rainfall. The climax was reached in 1899 with the complete stoppage of the rains bringing the Province face to face with a famine unparalleled in severity in the history of Rajasthan. The decade was also unhappily marked by outbreaks of pestilential diseases of no ordinary virulence and the mass migration of population from the State. Rajasthan lost nearly 17.3 percent of its people in this decade.

The decade ending in 1911 was not so bad as the one preceding it. It would have been more conducive to the increase of population, had it not been infested by plague of a more or less severe type - almost throughout the State and small-pox among children during 1905 and 1906. The State was not totally free from famine and unfavourable agricultural conditions during the rest of the decade. The State recorded an increase of only 6.7 percent during the decade.

The decade ending in 1921 saw the population at its lowest recorded limit as a result of a very severe outbreak of influenza in 1918. The State was also not free from plague and famines in the decade. "The loss of life by plague and famine was not very serious but the most critical, trying and terrifying was the appearance of the world-wide voracious disease Influenza in 1918, which shook the entire Province and wrought havoc surpassing all previous records."⁵

5. Ibid p.16.

The decrease in the population in 1921 was 6.3 percent of the population of 1911.

The decade 1921 to 1931 saw a considerable increase in the population in the State. It increased by 14.14 percent due to " freedom from epidemics, absence of famine conditions, and increased immigration into Bikaner State, due to the opening of Ganga Canal in 1928"⁶.

During the ten years between 1931 and 1941 the increase has been larger than during the previous decades, and only in this decade Rajasthan could surpass all previous figures. The increase of 18.01 percent was due considerably to the absence of any type of epidemic or famine in the State. Same was the reason for the increase of 15.2 percent in the population of the State in the next decade from 1941 to 1951.

It is observed from the above table that the total number of people in Rajasthan between the 40 years from 1881 to 1921 remained more or less constant, showing an alternate decade of increase and a decade of decrease. But in the next 30 years from 1921 to 1951, the population showed an increase of nearly 5.8 millions.

In Table III.2 , is given the variation in male and female population of Rajasthan from 1881 to 1951.

6. Census of India, 1931, Vol. XXVII p.3.

VARIATION IN POPULATION *in* RAJASTHAN.

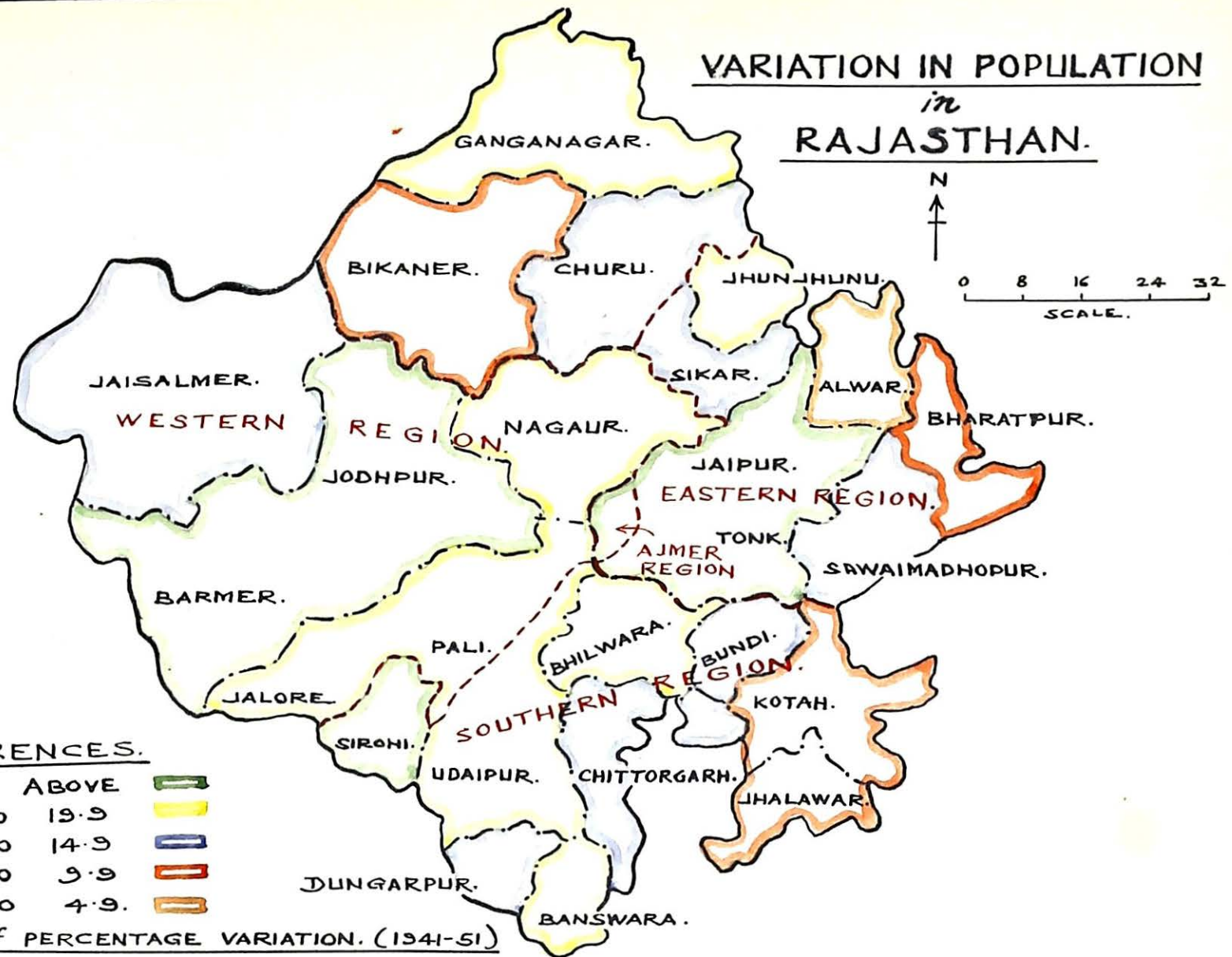


TABLE III.2

Variation in male and female population of Rajasthan at different Censuses

Sb.	Census Year	M A L E S			F E M A L E S		
		Number	Variation	Variation percent age.	Number	Variation	Variation percent age
1	1881	5,623,821	---	---	4,778,479	---	---
2	1891	6,730,874	+1,107,053	+19.7	5,718,943	+940,464	+19.7
3	1901	5,403,871	-1,327,003	-19.7	4,890,025	-823,918	-14.5
4	1911	5,756,206	+352,335	+ 6.5	5,227,302	+337,277	+ 6.9
5	1921	5,429,373	-326,833	- 5.7	4,863,276	-364,026	- 7.0
6	1931	6,160,610	+731,237	+13.5	5,587,364	+724,085	+14.9
7	1941	7,274,679	+1,114,069	+18.1	6,589,176	+1,001,812	+17.3
8	1951	8,313,883	+1,039,204	+14.3	7,656,893	+1,067,717	+16.2

Note:

The figures for 1881 and 1891 are not adjusted for the changes in the boundaries of the reorganised State of Rajasthan because the necessary data were not available.

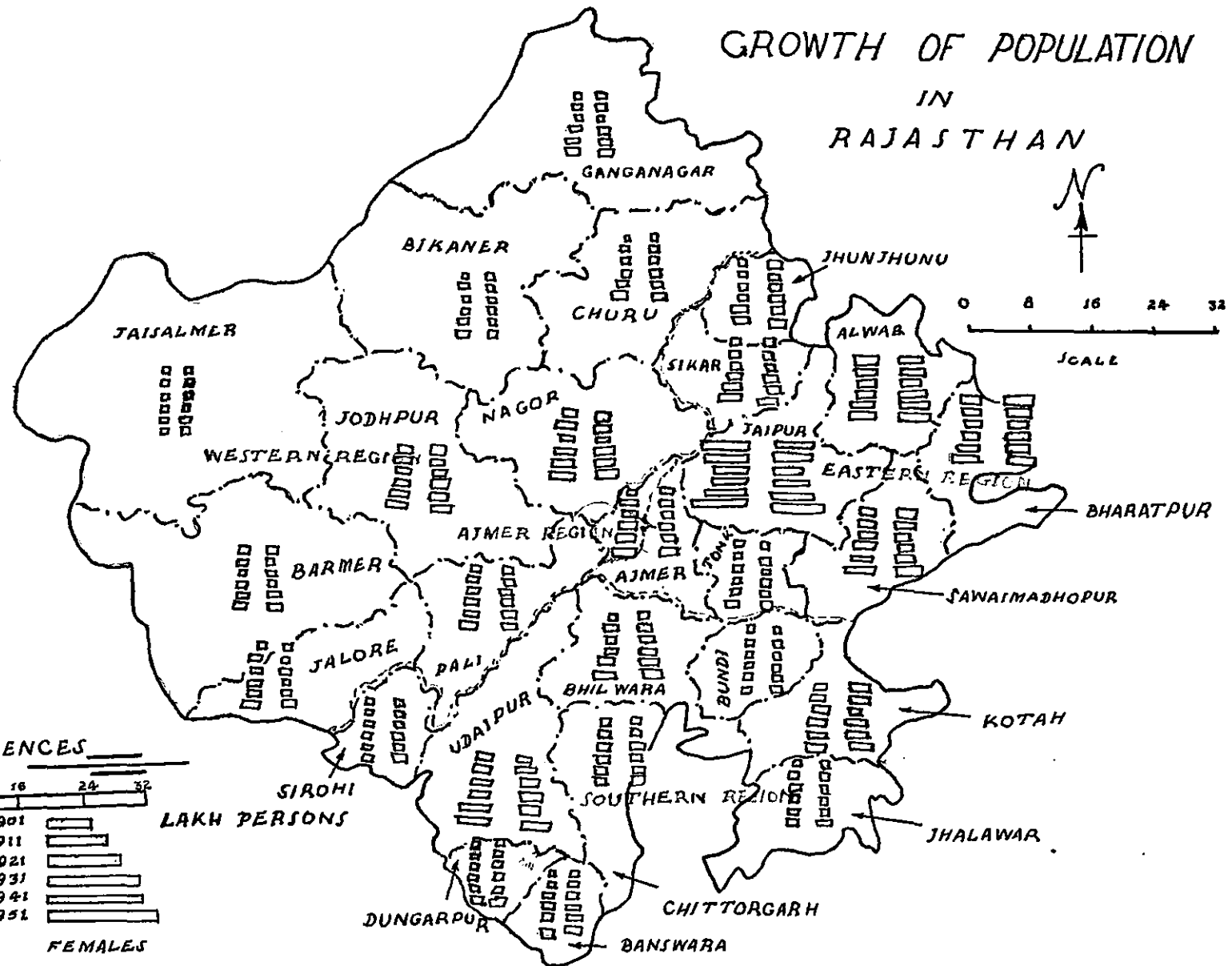
Judged from the Table III.2, the percentage fall in the population in the census of 1901 was (-19.7) percent for males and (-14.6) percent for females, i.e. more in males than in females. The decade was not so adversely affected by epidemics as by the great famine of 1899-1900. On the other hand, during the decade 1911-20, when the pestilence of famine was not so virulent as the epidemics of plague, small-pox, malaria and influenza were, the fall in female population was more than the fall in the male population :- 6.96% for females and -5.68 % for males. It has been observed that if a decade is free from all epidemics and famine the female population generally rises

at a faster rate than the male population. This is illustrated by the figures for the decades 1881-90, 1901-1910, 1921-31 and 1941-51 where the percent increase in female population is more than that in male population.

3. GROWTH RATE:

Hitherto the growth of population has been measured in the censuses by 'percentage' variation'-which expressed the difference between the numbers at the beginning and end of a period as a percentage of the population at the beginning of the period . In this thesis, the rate of growth is measured by the "Growth Rate" which differs from the "percentage variation" in that, " the difference between the numbers at the beginning and end of a period is expressed as a percentage of the arithmetical mean of the population at the beginning and the end of the period."⁸ The difference is small; nevertheless, it is worth calculating. It helps us to institute comparison between the periods of unequal duration and records the real growth of the decade. In Table III.3 , is given the growth rate for Rajasthan from 1901 to 1951. Growth rate for males , females and for both the sexes combined have been calculated so as to differentiate the growth in each sex separately.

GROWTH OF POPULATION IN RAJASTHAN



REFERENCES

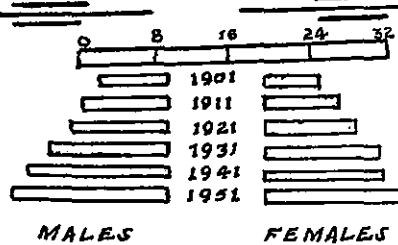


TABLE III.3

Mean Decennial Growth Rate for Rajasthan from 1901 to 1951.
(expressed as percent of mean population):

S.No.	Census year	Both sexes	Males	Females
1	1901	—	—	—
2	1911	+6.48	+6.31	+ 6.67
3	1921	-6.49	-5.84	- 7.22
4	1931	+13.21	+12.62	+13.86
5	1941	+16.52	+16.58	+16.45
6	1951	+14.12	+13.33	+14.99

Note: Growth rate has been calculated for the decades from 1901 to 1951, as the data for the previous decades were unreliable.

The Table above shows a greater percentage (-7.22) of fall in the female population in the decade 1911-21 than was shown by the percentage variation (-6.96) as is given in Table III 2, which indicates that the female population was worst affected by influenza. The 1921 census report for Rajasthan points out that female population is more affected by influenza, plague or any epidemics, whereas famine affects male population more. This has not been tested here.

The growth rate for female in 1941-51 is 14.99 per cent whereas the percentage variation has shown a higher figure of 16.20 percent. One thing seems probable from the growth rates given in the table that the increase in female population in the decades 1901-1911 and 1941-51, which were

comparatively free from epidemics, are more than in male population.

In the Table III.4 is shown the mean decennial growth rate for Rajasthan and some of the States in India.

TABLE III.4

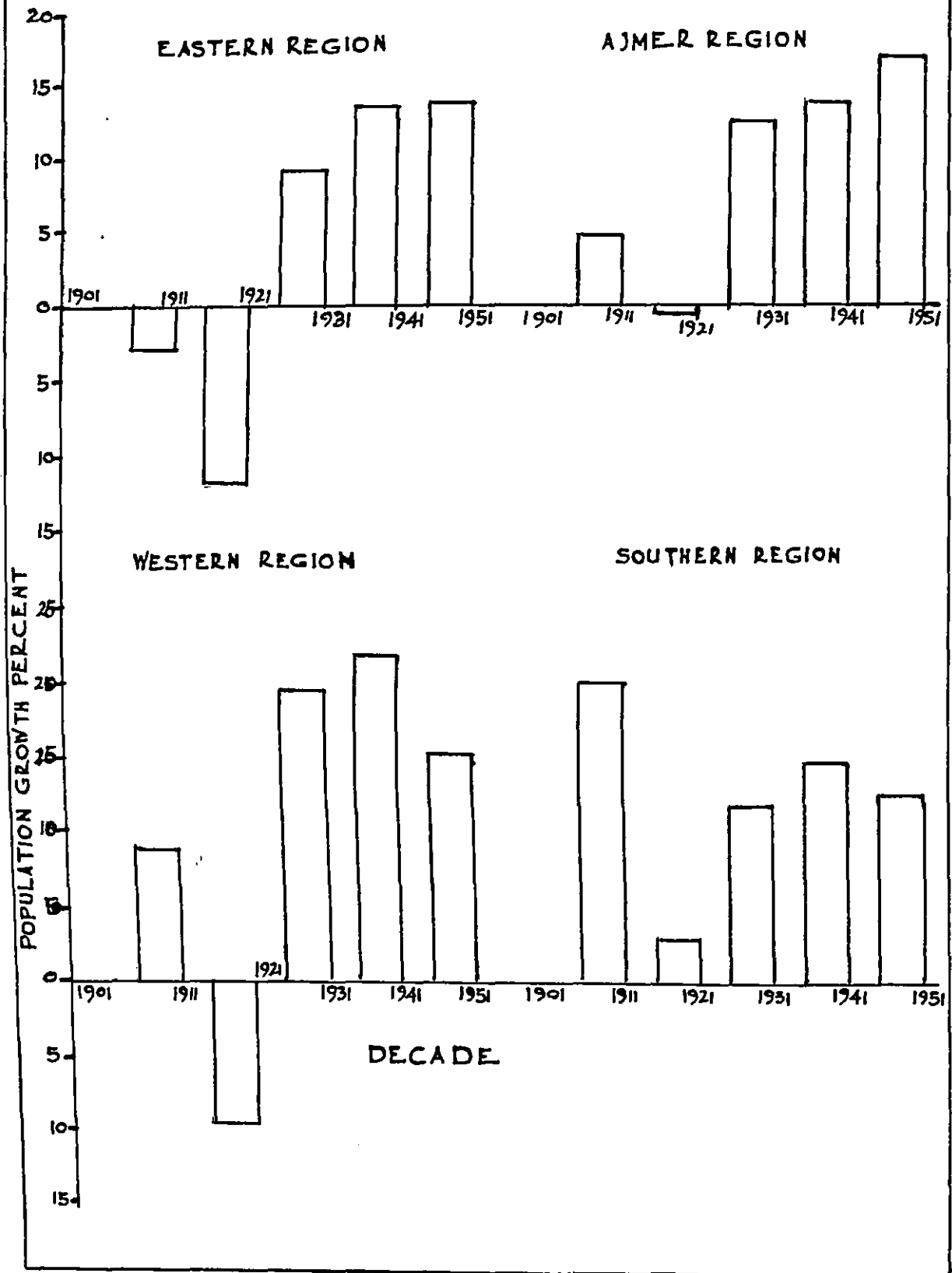
Mean Decennial Growth Rate in Rajasthan and in some of the States of India and the country as a whole:

S.No.	State	Growth Rate		
		1921-30	1931-40	1941-50
1	Rajasthan	13.21	16.52	14.12
2	Madhya Pradesh	11.9	9.8	7.9
3	Madhya Bharat	11.2	13.0	10.4
4	Bombay	12.4	15.3	20.8
5	Bihar	10.9	11.5	9.6
6	Madras	9.4	11.0	13.4
7	Travancore Cochin	23.3	17.3	21.2
8	Orissa	11.3	9.7	6.2
Total	India	10.5	13.3	12.5

Note: Data for other States have been taken from Census of India 1951 Vol. X . Rajasthan and Ajmer Table 26.p.23.

The figures show that the growth of population in Rajasthan from 1921 onwards is quite considerable as is in Bombay and Travancore-Cochin. The growth in all other States is declining, instead of rising. In 1951, the increase of population in Rajasthan may have been affected by the movement of population to and from Pakistan.

PERCENTAGE GROWTH OF POPULATION IN THE
NATURAL REGIONS OF RAJASTHAN



4. GROWTH IN THE NATURAL REGIONS:

As each region is endowed with a peculiar climate, rainfall, physical features and economic conditions, the study of growth of population should start with an examination of the relationship between man and natural factors. As has been pointed out by Dr. Radha Kamal Mukerjee, "Man and the region are not two separate factors. They mutually influence each other and form a natural balance, each part of which can be understood only in terms of the other.⁹" Here a study of the growth of population in the four natural regions of Rajasthan has been attempted.

TABLE III.5

Variations in Population and Growth rate in the Natural Regions of Rajasthan from 1901 to 1951.

S.N.	Census Year	Population	Difference	Percentage variation	Growth Rate
1	2	3	4	5	6
<u>EASTERN PLAIN REGION:</u>					
1	1901	4,738,572	-	-	-
2	1911	4,587,901	-150,671	-3.2	-3.2
3	1921	4,070,865	-517,036	-11.3	-11.9
4	1931	4,459,474	+388,609	+9.5	+9.1
5	1941	5,100,320	+640,846	+14.4	+13.4
6	1951	5,858,024	+757,704	+14.9	+13.8
<u>SOUTHERN HILLY REGION:</u>					
1	1901	2,527,211	-	-	-
2	1911	3,090,838	+563,627	+22.3	+20.1
3	1921	3,197,930	+107,092	+3.5	+3.4
4	1931	3,634,235	+436,305	+13.6	+12.8
5	1941	4,237,754	+603,519	+16.6	+15.3
6	1951	4,815,586	+577,832	+13.6	+12.8

9. "The Regional Balance of Man" by Radha Kamal Mukerjee p. 47.

1	2	3	4	5	6
<u>WESTERN DRY REGION:</u>					
1	1901	2,601,986	- -	- -	- -
2	1911	2,855,537	+253,551	+ 9.7	+ 9.3
3	1921	2,577,012	-278,525	- 9.8	-10.3
4	1931	3,147,301	+570,289	+22.1	+19.9
5	1941	3,942,038	+794,737	+24.5	+22.4
6	1951	4,603,794	+661,706	+16.8	+15.5
<u>AJMER REGION:</u>					
1	1901	426,127	- -	- -	- -
2	1911	449,232	+ 23,105	+ 5.4	+ 5.3
3	1921	446,842	- 2,370	- 0.5	- 0.5
4	1931	506,964	+ 60,122	+13.5	+12.6
5	1941	583,693	+ 76,729	+15.1	+14.1
6	1951	693,372	+103,679	+18.8	+17.2

Note: Variation in population and the growth rate for natural regions have been estimated for the decades from 1901 to 1951 as the data for natural regions for the previous decades were not available. The rates have been compiled from the data corrected for the changes in the boundaries.

Table III.5, gives a very interesting picture of the regional growth of Rajasthan. The Eastern region which has the largest population of the four regions and which exhibits the greatest density has suffered seriously from plague, influenza and other epidemics during two decades 1901-1911 and 1911-1921. It has shown a constant increase after 1921 and the increase roughly corresponds to the increase in Rajasthan as a whole. The Southern region has all along been progressive and has been constantly showing an increase from decade to decade from 1901. The region was also comparatively free from influenza of 1918. The region is believed to have suffered twice in last sixty years, once very severely during the famine of 1898-1900, and the second time, though not

heavily, during 1942-43, due to scarcity of food grains in the region. The low rate of increase in the decade 1941-1951 which is perhaps the lowest for the regions of Rajasthan is due to this fact. Though no official records are available of the scarcity condition in the region during the war time, it is generally known fact that the condition of Bhil tracts was far from satisfactory. The rise in population in the region is mainly attributed to the Animist tribes of Minas and Grassias who are believed to be more prolific.

The outstanding feature of the table III.5 is the very heavy growth in the population of the western region in the decades 1921-31 and 1931-1941". This high figure is chiefly due to an increase of 41.9 percent in 1921-31 in Bikaner State on account of an increase in irrigated land and a consequent flow of immigrants."¹⁰ The Ganga Canal in Bikaner State was opened in 1928 which irrigates about 300,000 acres of land. This facility for irrigation attracted people from the neighbouring State of Punjab and from other States of Rajasthan in the region, to start cultivation in the new land. Immigration continued for a few years and hence the effect is observed in two decades.

Ajmer region was also comparatively less affected by the influenza epidemic. It has shown a continuous increase at a very high rate, the rate being highest for the regions except for the western region in 1921-31 and 1931-41, which was a temporary change due to favourable circumstances. Since Ajmer State was centrally administered, it had better facilities for medical aid and was also far more advanced economically, having more industries and trade and also better facilities

for education than Rajasthan. The administration of the State was also better than the Rajasthan State. Two interesting facts regarding the regional growth, which have been observed by the census Superintendent for Rajasthan, 1931, will be worth noting here. One is regarding the growth in the former State of Bharatpur, which lies in the Eastern region of Rajasthan, and which considerably influences the total growth of the region. He says, "This is the only State in Rajputana and possibly, the whole of India, which has never, since the first census of 1831, recorded an increase in its population. The losses in the several decades are shown below :-

<u>Year:</u>		<u>Decrease percent:</u>
1831-91	...	0.8
1891-01	...	2.1
1901-11	...	10.8
1911-21	...	11.2
1921-31	...	1.9

and represent a net loss since 1831 of 24.6 percent ...

The Darbar considers that the loss in population is due to the floods, meagre rainfall in the last years, reduction in the Army and other State departments and the stagnant condition of industry and trade. All these adverse features have undoubtedly led to increased emigration".¹¹ The reasons given for the decrease by the Darbar do not sound very convincing. In our opinion possibly there could be two reasons. Firstly it may be due to heavy death rate in the State. Since no records of Vital Statistics for the State are available, it is difficult to find the truth. The informa-

11. Ibid p.6.

-tion gathered from scattered sources suggests that Bharatpur was a malarial region and there could be heavy mortality due to Malaria in the absence of any medical facilities in the State. The second reason could be emigration from the State. This also could be an effective cause. Bharatpur is situated in the east of Rajasthan which comes near Agra and Aligarh districts of Uttar Pradesh. It is quite near to Delhi and is well connected with Agra Delhi and other places by road and rail. It is, therefore, assumed that the new industrial development in Agra, Delhi, and other places in Uttar Pradesh in the past might have attracted the people of this State. Bharatpur itself was not industrialised. Bharatpur showed an increase of 19% for the first time in 1941 and since then was showing continuous increase in population. The other striking feature is the high increase of population in the "large type of villages" with the population of 500 to 2000. The Census Superintendent points out that "It is interesting to note that the majority of the towns which have recorded a large increase are the homes of wealthy persons who in all parts of India are known by the comprehensive appellation of 'Marwaris'. Their business concerns lead them to every corner of the Indian empire, and the success of their enterprise is reflected in the stimulation of local trade and such beneficent undertakings as the building of palatial residences, sinking of wells for drinking water and the maintenance of schools and dispensaries in their native towns.¹² This makes one think that the economy of the region mostly depends on the income poured in from outside and the prosperity of the region, in the absence of industrialisation, is due mainly to this reason. We have no

more data to delve deeper.

In Table III.6 is given the variations in population and the growth rate with respects to males and females in the four natural regions of Rajasthan from 1901 to 1951.

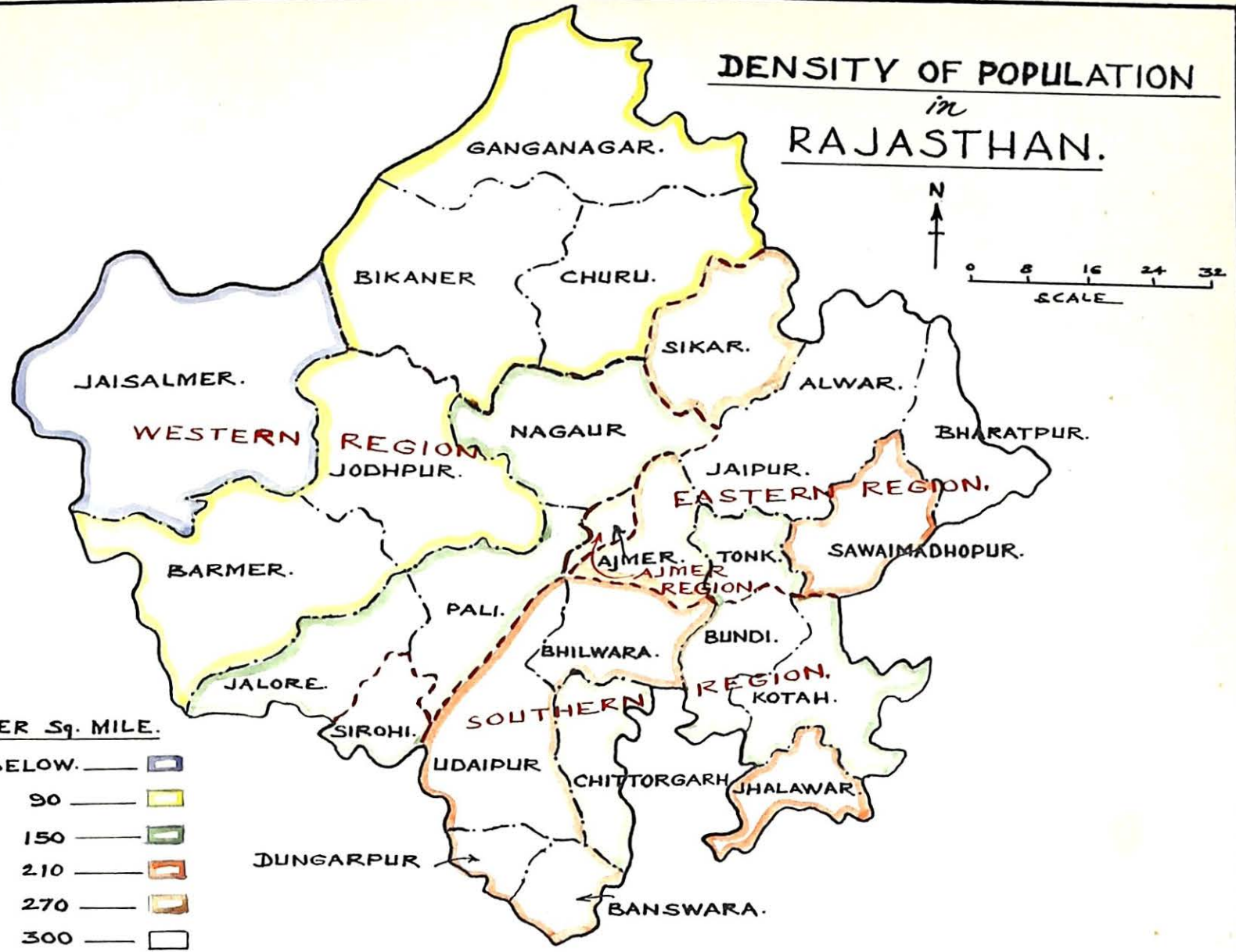
TABLE III.6

Male, Female, Variations in Population and the Growth Rate in Natural regions of Rajasthan 1901-1951 :

MALES:			FEMALES:		
S.N.	Census Year	Variation per cent.	Growth Rate	Variation per cent.	Growth Rate
1	2	3	4	5	
1. EASTERN REGION:					
1	1911	- 3.24	- 3.29	- 3.11	- 3.16
2	1921	-10.25	-10.80	-12.42	-13.24
3	1931	+ 8.66	+ 8.30	+10.57	+10.04
4	1941	+14.11	+13.18	+14.67	+13.67
5	1951	+13.82	+12.93	+16.02	+14.83
2. SOUTHERN REGION:					
1	1911	+21.81	+19.67	+22.83	+20.49
2	1921	+ 3.36	+ 3.40	+ 3.47	+ 3.41
3	1931	+13.47	+12.62	+13.83	+12.93
4	1941	+16.74	+15.44	+16.47	+15.22
5	1951	+13.02	+12.22	+14.29	+13.34
3. WESTERN REGION:					
1	1911	+ 9.82	+ 9.36	+ 9.66	+ 9.22
2	1921	- 9.26	- 9.71	-10.30	-10.86
3	1931	+21.83	+19.68	+22.47	+20.20
4	1941	+25.86	+22.90	+24.57	+21.88
5	1951	+15.77	+14.62	+17.93	+16.45
4. AJMER REGION:					
1	1911	+ 6.4	+ 6.21	+ 4.32	+ 4.23
2	1921	+ 2.28	+ 2.26	- 3.73	- 3.80
3	1931	+ 9.76	+ 9.80	+17.92	+16.45
4	1941	+14.45	+13.48	+15.90	+14.73
5	1951	+17.28	+15.90	+20.47	+18.57

Note: The above table has been compiled from the data adjusted for the changes in the boundaries upto 1st November, 1956.

DENSITY OF POPULATION in RAJASTHAN.



PERSONS PER Sq. MILE.

30 & BELOW.	—	
31 TO 90	—	
91 TO 150	—	
151 TO 210	—	
211 TO 270	—	
271 TO 300	—	

The Table III.6 indicates that in the Southern region the rise in population since 1901 is regular and constant both in respect of males and females. This also indicates that the increase in female population in general is more than that of male and this is quite prominent in the decade 1941-51. In the decade 1911-21, the Eastern region was most affected, specially the females, by famine and plague. The effect in the Western region is no less but in Ajmer region only the female population was affected. The regions after 1921, are showing a constant steady increase in population from decade to decade with females outnumbering males, which is quite prominent in Ajmer region in the decade 1941-51.

5. DENSITY:

Density indicates the relation of population with total area.

In Table III.7, is given the total area population and density of Rajasthan and that of its natural regions.

TABLE III .7.
Population, Area and Density of Rajasthan and its
Natural Regions:

S.No.	Natural Regions	Area in Sq.miles	Percent of total area.	Population	Percent of total population	Pers ons per sq. mile 1951
:	1	2	3	4	5	6
1	Eastern Region	24,738	18.7	5,858,024	36.67	236.3
2	Southern "	29,585	22.4	4,815,586	30.15	162.7
3	Western "	75,309	58.1	4,603,794	28.82	61.1
4	Ajmer "	2,416	1.8	693,372	4.36	286.9
	Total Rajasthan	132,098	100.0	15,970,776	100.00	120.9

Note:

The figures for Area and Population in the above table have been corrected for the changes in the boundaries.

Rajasthan with an area of 11.23 percent of the total area of Indian Union supports only 4.2 percent of the total population of the country. The density of population in Rajasthan is 120.9 persons per square miles, whereas in the whole of India it is 231. But sheer density tells nothing about the true picture of the State and its capacity to support more or less people, or of its growth. To have a clearer idea of the State we must discuss the distribution of population in relation to its natural environment.

Looking to the Table III.7 we see that the Western region which forms about 58 percent of the area of the State supports only about 29 percent of the population. The density in the region is the lowest being 61.10 persons per square mile which is probably the lowest in the whole of India. If we further analyse the density of the western region by districts, we see that in the complete desert region i.e. Jaisalmer division the density is only (6)¹³ persons per square mile. In Bikaner district it is 39 and in Barmer it is 43. The highest density in the region is in Pali district which is about 139.

The density in Ajmer region is maximum and next in density is the Eastern region. The high density in the Ajmer region is mainly due to its better position regarding industrialisation and water supply. In the Eastern region which forms only 19 percent of the total area of Rajasthan we see that about 37 percent of the population is concentrated. Its density is about 236 persons per square mile. This shows

that about one third of the population of the State lives in one fifth of the total area. If we look to the variation in density of the Eastern region we see that the extreme eastern portion of the region i.e. Bharatpur division has the maximum density, which is about 290 persons per square mile. The density in all the districts of the Eastern region is greater than that in other districts of Rajasthan. This high density of the region is mainly due to the openness of the region and due to water facilities.

In the Southern region which forms about 22 percent of the total area and which is hilly in character we see that it supports only about 30 percent of the population of Rajasthan. Its density is about 162.70 persons per square mile. The maximum density in the region is found in Dungarpur division about 210, and Banswara division about 182, which are inhabited mostly by Bhils.

From the above study of the density of population in different natural regions of Rajasthan we come to the general conclusion that the density of the State goes on increasing as we proceed from West to East or from South-West to North-East. The increase in rainfall was also observed in the same direction.

AGE COMPOSITION

CHAPTER IV

AGE COMPOSITION

1. KIND OF DATA AVAILABLE:

"When we come to consider the following intimate and allied aspects of our people -- Age, age-composition, expectation of life, fertility of married women, civil condition, sex and sex-ratio, we are on safe grounds only in respect of the last three items. The first four depend on the correctness of age-returns and of all data collected at each census in India it is accuracy in the matter of age, which is the most defective"¹. For a country whose demographic data are scant and where there are no systems of registration of birth and deaths, marriages and migration, the importance of recording of correct age is next to the count of heads.

But, as the Census Superintendent for the 1921 census says, "it is not only in India, that the entries of age are most unreliable, but the complaint appears to be general even in the Western countries, due partly to carelessness and partly to deliberate concealment of true age."²

Mis-statement of age originates chiefly from ignorance and also from vanity and superstition. Where the age is not accurately known, there is a tendency to report it in numbers ending in 0's or 5's. The middle-aged wish that they may be considered younger. Older people seem to overstate their age in order to add to their prestige, which enhances with the advance of age. There is a superstition that telling one's

1. "These Ten Years" by A.W.T. Webb: p.81.

2. Census of India 1921 Vol. XXIV: p.110.

age correctly tends to reduce the span of life. The tendency of under-stating the age of an unmarried girl is based among Hindus on the stigma which attaches itself to a man whose daughter does not get married between 12 and 15 years of age.

People in villages and even in towns are completely unaware of their ages. The question of determining one's age comes only at the time of the marriage of a person, but there too it is roughly ascertained and not supposed to be important as long as the boy is older than the girl. In the villages the marriages generally take place at a very young age and hence the question of determining the exact age does not arise. They have no other source or aid by which they can determine the age. The registration of birth in the State was either not prevalent or was not taken seriously. Referring to the aids for ascertaining the correct age in the State the Census Superintendent of the 1901 Census writes, "Should he have been born during or within a year or two of some well-known event of local importance - such as a year of bad famine - his age can be recorded more or less accurately but if there is no such aid for determining his age the less intelligent he is the rougher will be the approximation which he is likely to give. The wealthier and higher classes have their horoscopes, but these are not always available at the time when the census is being taken and without these documents even their memories cannot always be relied upon."³

Further, referring to the vagueness of the estimates of age the Census Superintendent of 1941 writes, "Indians are

3. Census of India 1901 Vol. XXV: p.65.

anything but Statisticians by nature ----. Ask a peasant how old he is and he will, as likely as not, reply: 'Twenty or Thirty', or 'Haven't you eyes to see for yourself?' Ask him how far it is to his village and he will tell you "Eight or ten miles" and this surely turns out to be at least fifteen".⁴

This vagueness about ordinary measures of life is inherent in the Indians' method of handling phenomena. All one can say is that an ordinary educated person has a very vague idea about his own age. The uneducated one has practically no idea at all, and a person who does not know his own age correctly is more hopeless, even when educated and intelligent as an enumerator, about guessing the ages of others.

For the 1941 and 1951 censuses in Rajasthan each enumerator was supplied with a 'Local Calendar', a device intended to assist friendly but ignorant citizens in discovering their own age. In this calendar years were given corresponding to incidents likely to have been well known in local experience and unlikely to have been forgotten, e.g., the great war of 1914-18, the chief famines, floods or epidemics, the imposition of some new tax in the State, etc. When a person being enumerated declared that he did not know his age, he was supposed to be asked whether he remembered some of the incidents in this calendar, and the furthest back he remembered gave the key. But it has been observed that the conscientious reference to these calendars caused quite a lot of fuss, botheration and misunderstanding. Two such examples are quoted by Mr. Webb, the Census Superintendent for Rajasthan

4. "These Ten Years" by A.W.T. Webb: p.82.

1941, in his book "These Ten Years". One of these examples is of an old veteran from Tonk upon whom the author himself ventured to experiment with the calendar. He writes: "Hey! Grandpa what's your age?"

"Don't know".

"Nevermind, I'll soon work it out".

(Takes over Local Calendar).

"There you are. Let's see ...er...do....."

"You remember the Great War?"

"You bet I do; I'd just grown

a nice beard. Incidentally I got badly wounded in it, and have never been the same man since".

"Tough back that, Grandpa ---. That makes you about 52 years old. Anyway I suppose you got a pension or gratuity, and certainly a medal"?

"Devil a bit, I got nothing".

"That's ridiculous. Everyone, who took part in the Great War, got a medal, and a pension if disabled."

"Didn't you apply to the British Government"?

"What had the British Government to do with it?"

(Lengthy pause).

"Look here, old man, what Great war are you talking about?"

"The Great war between Lawa and Tonk, of course." (Small States in Rajasthan.)

"Gee! There's nothing about that great war in this calendar ... How long ago was it?"

"A long time ago, perhaps fifty years, or may be more, or may be less. I never was one for figures: that's a job for the Banias. I'm a soldier."⁵

The other conversation, recorded by Mr. Webb, was between an Alwar Enumerator and another old man which is also reproduced here:-

"Baba, what is your age?"

"I'm standing before you, please see for yourself."

"What was your age at the time when one of the walls of Jeysamand lake collapsed?"

"Oh: that happened only yesterday."

"Then, what was your age at the time of the Chappania Kal?⁶
(Famine of 1899-1900).

"I remember it very well. We all left our village and went to Ballupura."

"Splendid, but what was your age at that time?"

"I used to tend a flock of sheep and goats at that time."

"Yes, yes, but what was your age at that time?"

(Points to a small boy standing nearby).

"Well about the age of this boy, I should say".

"About 10 years, eh?"

"Well yes, about 10 or 20 years".⁶

The head of the family who answers the enumerator not only for himself but also for his family, generally has some idea of the age of his sons, especially if they attend a school, or hope to enter government service. He has little idea of the age of his daughters, and very little of that of his wife, and practically none of that of his daughters-in-law or aunts, who happen to be born in other towns. The age of young children is generally recorded correctly as their births

6. Ibid p.86.

would be fresh in their memory, but the birth of older people are seldom remembered correctly.

About the preferences for certain numbers in census enumeration, the Census Superintendent of 1941 writes: " when husbands are asked to give the ages of their wives, they almost invariably express them in such a way as to show that their wives are younger than themselves by 2 to 3 years, 5 years or 10 years - no other number enjoying any appreciable popularity. Local Knowledge computes the first (2 to 3 years) as from 1 to 2 years too low, the second (5 years) as about right, and the third (10 years) generally the face-saving reply of some old carnalist who has married a girl young enough to be his daughter or grand-daughter"⁷.

S.P. Jain, the Census Actuary for 1951 has scrutinised the age-returns of the Census of India and States and has come to the conclusion that there is a marked preference for particular ages and there is a marked dislike for other ages.(This was done in the earlier censuses also) he points out: " there is a pronounced tendency to return ages ending in the digits 0 and 5 ". He further points out: " next to the tendency to return ages in multiples of 10 and 5, the digits 2 and 8 are the two important centres of attraction ... In ages beyond 30 peaks at ages having end digits 2 and 8 are noticeable but their significance is much reduced ... At ages about 30,.... the tendency to return ages as multiples of 10 swamps ... The preferences discussed ... result in marked deficits in ages

⁷ Ibid p. 88

ending in 1,3,4,6,7 and 9. Of these 9 and 1 are the most unpopular." Referring to the progress in the ages from 0 to 5 Jain further writes : " the populations for ages 0,1,2,3 and 4 even in other countries progress rather erratically due to rapid changes in mortality, but in India they suffer from omissions in enumeration to a still greater extent, although their magnitude is not known"⁸.

Not only the age reporting is defective due to preferences but they are not strictly comparable for different censuses due to the changes in the way of recording i.e., recording of last Birth-day or next birth day or nearest birthday. Referring to this change in the way of recording of ages the Census Superintendent of 1951 for Rajasthan writes:

" The age ascertained upto the 1921 census was that attained at the last birth-day of the person enumerated. At the 1931 census, what was ascertained was the age attained at the nearest birthday, which might be either prior to the census date or subsequent to it. At the 1941 census, the more ambitious proposal to record not only the completed years but also the number of months which have elapsed since the last birthday and upto the census date, was tried. At the 1951 census, it was realised that this was too ambitious to attempt and the number of completed years of age, i.e., the age completed at the last birthday was ascertained."⁹

People in this State usually give their running age i.e. age next birth day when asked for. This fact was pointed out by the census Superintendents each time to the enumerators and

8. Census of India paper No.III, 1951 "Age Table" p.4
9. Census of India Vol. X. Rajasthan p.396. Part I A.

were asked to record carefully the age at the last birthday. But invariably in all the censuses it is the age at nearest birthday or the next birthday which is supposed to have been recorded.

Age statistics, therefore, obtained under conditions described, must be expected to be inaccurate throughout, but more accurate for men than for women and the young than for the old. " The factors making for inaccuracy have, however, been constant at each census, and the Statistics are, therefore, comparable with those of previous decades; and they are likely to approximate to the truth sufficiently to enable inferences to be drawn from them in regard to well-defined periods of life, such as infancy, the early married life of women, the reproductive ages, and senility."¹⁰

2. ADJUSTMENT IN AGE - GROUPS:

As has been pointed out in Chapter II, there was a change in the unit of collection of data in the censuses upto 1941 and that in 1951. The different census tracts have been broken and the portions are allotted to different districts of Rajasthan and even to other neighbouring States in the reorganisation of the States. The age distributions for these broken divisions are not available separately. Estimates and adjustments had to be done for all these changes. This was a difficult task because of the limitations of data and were time-taking. The method of adjustment is described in detail in the following pages.

10. Census of India 1951, Vol. X p. 353.

(i) Adjustment for Ajmer Region:

Some adjustment of population and Age distribution was necessitated for Ajmer region from 1901 to 1931 censuses. This was because of the inclusion of 115 villages of Marwar and Mewar States in Ajmer State and administered under the Central Government upto 1937. But in 1937 they were returned to their respective States, 22 going to Marwar and 93 to Mewar. The population of these 115 villages have, therefore, been reduced from the totals of Ajmer State for the censuses of 1901 to 1931 and the age distribution for the remaining population have been adjusted for quinquennial age-groups by assuming that the remaining population of the region bears the same proportion of age distribution as the total population of the region did.

The population of detached 115 villages was again split up into that of 22 villages of Marwar and 93 villages of Mewar and was added to the population of the respective States for 1901 to 1931. Here also the age distribution of the population of these villages was adjusted by assuming that the population of the detached villages had a similar age composition as shown by the parent States.

(ii) Adjustment for Abu Road:

With the reorganisation of States in 1956, the Abu Road taluka of Banaskantha district of Bombay State was merged in Rajasthan and has since formed a part of Sirohi district. Separate age distribution for the population of this taluka in 1951 was not available and hence its age composition was assumed to be similar to the Southern region, with which it has

been merged, and the total population was distributed accordingly in different age-groups. Abu road upto 1941 census was a part of Sirohi State of Rajasthan.

(iii) Adjustments for Sunnel
Tappa and Sironj.

The other change with the reorganisation was the addition of Sunneltappa of Bhanpura tahsil of Mandsoor district of Madhya Bharat State into Rajasthan and the detachment of Sironj sub-division of Kotah district of Rajasthan to Madhya Pradesh, Suneltappa, upto 1941 census formed a part of Indore State of Madhya Pradesh, but in 1951 Census it was included in the census of Madhya Bharat. Its population from 1901 to 1951 was taken from these censuses and was added in Southern region of Rajasthan to which it now belongs.

There was some difficulty in finding the population of Sironj, because in 1901 census this district of Tonk State was included in the census of Central States Agency with the other two districts of Tonk State. Whereas from 1911 to 1941, it was included in Tonk State of Rajasthan. In 1951 census this district formed a part of Kotah district and its population was included in that. Kotah district is included in the Southern region of Rajasthan. We have, therefore, tried to separate the population of Sironj for 1901 to 1951 from its various positions in different decades and subtracted it from the total population of Rajasthan. For this we took the difference in population of Sironj and Sunneltappa for the years 1901 to 1951 and subtracted the

difference from the Southern region of Rajasthan. The population of remaining portion was then adjusted according to the total population of the region, assuming similarity in age composition of total region and the remaining one.

(iv) Adjustments for Tonk Districts:

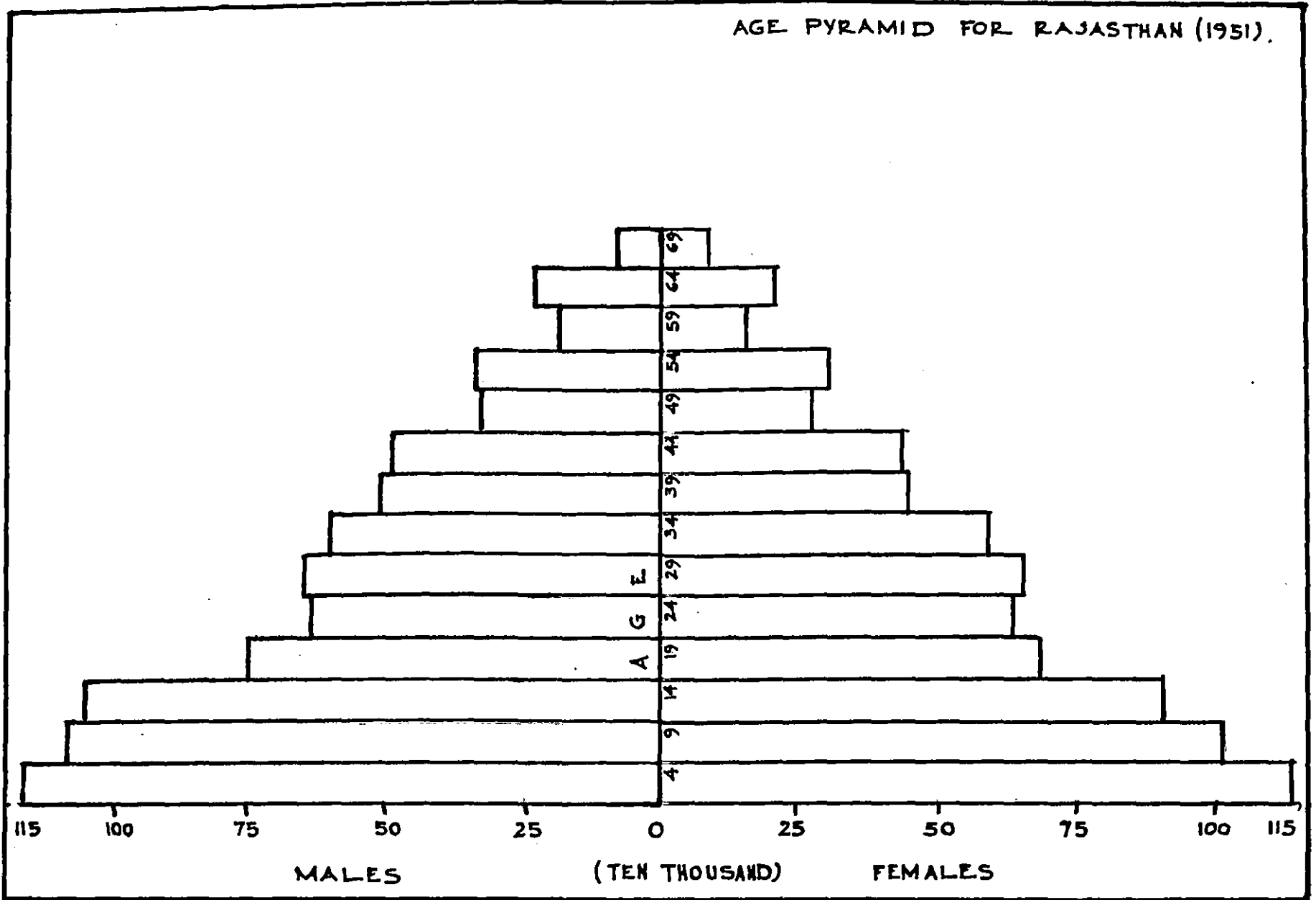
Tonk State has always been a problem for the censuses, because of its component parts being split into different parts which are situated at different places in Rajasthan or even in Madhya Bharat. It is not a State with a compact continuous territory but a State with several pockets unconnected with each other. In 1901 census the three districts of the State the Chhabra, Pirawa and Sironj were included in the census of Central India Agency for the sake of convenience of census. From 1911 to 1941 the censuses of these districts were included in the totals for Tonk State. But again in 1951, they were taken in different districts of Rajasthan where they fell. Sironj was taken in Kotah district, and Pirawa and Chhabra were included in the Chitorgarh District of Rajasthan. The districts of Chitorgarh and Kotah are included in the Southern region of Rajasthan. The remaining Tonk State with the Tonk City, Tonk Pargana and Aligarh pargana was included in Tonk district of Rajasthan which is formed by including Tonk State in Jaipur State and Malpura District of Old Jaipur State. This district forms the Eastern region of Rajasthan. Due to all these difficulties we have split up Tonk State from 1901 to 1941 into Tonk Eastern and Tonk Southern. Tonk Eastern formed the parts of Tonk City, Tonk Pargana and Aligarh Pargana and was included in Eastern region of

Rajasthan for the population of 1901 to 1941. The Tonk Southern was formed of 1) Chhabra town, 2) Chhabra Pargana, 3) Nimbhana Town, 4) Nimbhana Pargana, 5) Pirawa Town, 6) Pirawa Pargana. The Sironj Town and Sironj Paragana, which was also included in Tonk Southern, was detached as it was transferred to Madhya Pradesh under the reorganisation of States in 1956. Having formed Tonk Eastern and Tonk Southern, their population for 1901 to 1941, was taken for each census separately and was included in the regions where they are situated. Tonk Eastern was added to the population of Eastern Plain region of Rajasthan and Tonk Southern was added to the Southern region of Rajasthan and its age composition adjusted for each age group as determined previously for other regions.

(*) Other Adjustments:

There are a few other minor adjustments which have been made for the population and age composition of the State and the regions. Upto 1921 census, Nimrol village of Dholpur State was included in Gwalior State. Its population was added to the Eastern region for 1901, 1911 and 1921 censuses and age distribution adjusted. Again upto 1921 census the two villages of Gangapur and Pargana villages of Gwalior and Indore States were included in the census of Marwar. They were excluded from the totals of Marwar and the age composition adjusted accordingly. The 1941 census of Rajasthan includes the States of Palanpur and Danta, their population was excluded from total Rajasthan and the age composition of the State for 1941 adjusted. No adjustment has been made for the population of Sambhar Samlat, whose population is added half in Marwar and half in

AGE PYRAMID FOR RAJASTHAN (1951).



Jaipur States upto 1941 census. In compiling the regions, no account has been taken of inter-district transfers, if any, between 1951 census and November 1, 1956 other than those covered by the reorganisation of States Act of 1956.

3. ADJUSTED AGE-GROUPS:

Having made the adjustments for the changes in the boundaries and territories of the State and the regions in different censuses from 1901 to 1951, the age composition for Rajasthan as a whole and also for the four natural regions, both for males and females have been obtained. The age distributions for Rajasthan State as on 1st November, 1956 and for its natural regions have been given in the Appendix to this chapter, for the census years between 1901 to 1951. These are given for males and females separately. The age-distribution has been presented in the quinquennial age group of 0-4, 5-9 etc. upto age 20 and then bigger groups of 20-30, 30-40 etc. upto 60. At the end is given one broad group of 60 and over. For 1901 to 1951 the middle groups are 20-40, 40-60. This distribution has been adopted because of the availability of original age-distribution of 1901 in this form. So it was decided to have a uniform age distribution for all other censuses. In what follows the age distribution has been discussed.

(1) Quinquennial Age Distribution for Rajasthan:

In Table IV.I, is given the percentage of the population of Rajasthan in the quinquennial age groups, both for males and females from 1901 to 1951.

TABLE IV I.

Percentage of Males and Females by Age Group in Rajasthan from 1901 to 1951:-

S.No.	Age Group	1951	1941	1931	1921	1911	1901
<u>MALES:-</u>							
1	0 - 5	14.0	14.3	14.7	15.7	13.8	8.7
2	5 - 10	13.0	14.6	13.3	15.1	12.1	12.0
3	10 - 15	12.6	12.3	12.6	12.9	9.7	13.4
4	15 - 20	9.0	9.6	9.6	8.4	9.2	11.1
5	20 - 30	15.4	17.3	17.1	15.2)		
6	30 - 40	13.3	12.8	13.0	15.0)	33.8)	33.0
7	40 - 50	10.1	8.9	10.1	10.5))	
8	50 - 60	6.5	6.0	6.0	6.5)	17.3)	17.7
9	60 -	6.2	4.2	3.3	4.5	4.1	4.0
<u>FEMALES:-</u>							
1	0 - 5	14.8	15.2	16.3	16.8	15.2	9.4
2	5 - 10	13.3	14.6	12.9	15.4	11.8	12.2
3	10 - 15	11.8	11.5	11.6	11.1	8.0	11.7
4	15 - 20	8.9	9.4	9.4	7.1	7.9	9.9
5	20 - 30	16.9	17.6	17.4	15.7)	34.3	33.2
6	30 - 40	13.4	12.4	13.0	14.7)		
7	40 - 50	9.2	8.7	9.6	10.6)	17.7	18.6
8	50 - 60	5.9	6.2	5.9	6.6)		
9	60 -	5.7	4.3	4.0	5.3	5.0	4.8

Note: The percentages have been compiled from the age distribution data corrected for the changes in boundaries in Rajasthan.

Table IV.I shows a higher percentage of population in the age group 0-4, for all decades excepting 1901, which may have been low due to the famine of 1889-1900. A steady fall in the percentage of the population is noticed with the advance of age in all the decades. The fall in the proportions after age 4 is gradual in males than in the females where the fall is more sudden. The proportions of female in the age group 15-20 is prominently lower than in the other groups. This probably is either, due to high rate of mortality in the females at the early child bearing age, or due to the tendency in the married women to over state their ages.

The proportions of females in the age-group 15-20 in the census of 1911 and 1921, and in the age-group 10-15 in 1911, are remarkably low. This shows the high mortality of female in these age-groups due to the influenza of 1918 and the plague of 1906.

The year 1921 shows a very high proportion of children in the age group 0-4, which indicates that after the loss due to the influenza epidemic the population has increased at a faster rate. From this, one may conclude that the population tends to maintain itself. These figures reveal that the females predominate at all ages upto 5 and again at ages of 60 and over. The period in between is a period of struggle for survival for the females. Discussing the proportion of females in 1941 census Webb observed "judged over thirty years two periods in life are clearly highly dangerous for Indian women. They are apparently 12 to 13 and around 40 years. The first is certainly connected with

too early motherhood, and the second, probably, with the struggle to gain freedom from the slavery of the moon. And should there occur epidemics such as influenza or plague, then it is among women of these two ages that mortality is heaviest."¹¹

(ii) Age Distribution in the Natural Regions:

In Tables IV.3 and IV.4, are shown respectively the percentage of males and females in the natural regions of Rajasthan for the quinquennial age groups. The percentages have been compiled for the corrected population of the regions for the changes in the boundaries.

TABLE IV 2.

Percentage of Males by Age Group, in the Natural Regions of Rajasthan from 1901 - 1951:-

Age Group.	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60-
S. YEAR:									
N. <u>EASTERN PLAIN REGION:</u>									
1. 1901	9.9	13.0	12.4	9.8	32.1		18.3		4.6
2. 1911	11.7	11.9	11.3	9.8	31.9		18.5		4.9
3. 1921	11.5	13.9	12.1	9.0	16.3	14.3	10.4	7.2	5.3
4. 1931	14.1	13.0	12.4	9.2	17.2	13.7	10.0	6.2	4.1
5. 1941	13.8	14.3	12.0	9.4	16.4	12.8	9.7	6.7	4.8
6. 1951	13.5	12.1	12.5	9.1	15.5	13.0	10.2	7.1	7.0
<u>WESTERN DRY REGION:</u>									
1. 1901	9.3	10.4	14.4	12.7	29.1		18.9		5.2
2. 1911	14.2	12.0	9.8	9.5	33.6		16.9		4.0
3. 1921	11.8	15.4	14.0	8.2	15.1	14.8	10.1	6.3	4.4
4. 1931	15.2	13.5	12.7	9.9	16.6	12.4	9.9	5.9	3.7
5. 1941	13.8	14.5	13.1	10.3	17.2	12.0	8.6	6.2	4.2
6. 1951	14.2	13.0	12.9	8.8	15.3	13.0	10.1	6.7	6.1
<u>SOUTHERN PLATEAU REGION:</u>									
1. 1901	6.1	11.9	14.2	12.1	38.3		15.4		2.1
2. 1911	16.4	12.6	7.3	8.2	36.6		16.0		2.9
3. 1921	12.4	16.7	13.1	7.9	13.6	15.8	10.9	6.0	3.7
4. 1931	14.9	13.6	13.0	9.8	17.2	12.6	10.1	5.8	3.0
5. 1941	14.2	15.1	12.1	9.2	18.3	13.2	8.2	6.1	3.6
6. 1951	14.3	14.2	12.6	9.0	15.4	13.8	9.9	5.6	5.3

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¹¹ "These Ten Years" by A.W.T.Webb.p.92.

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Age Group	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60-
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S. YEAR:

N.

AJMER REGION:

1. 1901	6.7	10.9	13.7	11.7	21.1	14.9	11.6	6.4	3.0
2. 1911	13.9	11.2	8.2	8.6	21.2	16.3	10.2	6.8	3.7
3. 1921	13.1	13.3	12.7	8.5	16.5	16.7	11.7	6.1	4.0
4. 1931	14.3	12.3	11.6	10.9	18.7	13.5	10.7	6.0	3.1
5. 1941	12.1	13.8	11.9	9.8	18.9	14.0	9.3	6.5	3.7
6. 1951	14.6	12.1	12.4	9.3	16.5	13.7	10.2	6.0	5.2

Note: The percentages have been compiled from the new age distribution of the regions corrected for the changes in the boundaries.

TABLE NO. IV.3

Percentage of females by quinquennial age groups in the Natural regions of Rajasthan from 1901 to 1951:-

Age Group	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60-
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S. YEAR
N.

EASTERN PLAIN REGION:

1. 1901	10.9	13.2	10.5	8.6	32.8	18.5	5.6		
2. 1911	13.2	11.8	9.3	8.4	33.0	18.6	5.6		
3. 1921	13.4	14.2	10.2	7.7	17.0	14.2	10.5	6.9	5.8
4. 1931	15.9	12.5	11.3	9.1	18.1	13.5	9.4	6.0	4.2
5. 1941	15.5	14.4	11.4	9.4	16.8	12.9	9.1	6.1	4.5
6. 1951	14.5	12.8	11.8	9.0	16.3	13.6	9.7	6.3	5.9

WESTERN DRY REGION:

1. 1901	10.1	10.6	13.8	11.8	28.9	13.4	5.5		
2. 1911	15.3	11.6	8.4	8.0	33.7	17.5	5.5		
3. 1921	13.1	15.5	12.6	6.9	15.0	14.4	10.4	6.5	5.6
4. 1931	16.8	13.2	11.6	9.4	16.8	12.4	9.4	5.9	4.4
5. 1941	14.9	14.9	12.1	9.6	16.9	12.1	8.4	6.3	4.7
6. 1951	14.5	12.7	12.5	8.7	17.0	13.2	9.3	6.1	6.0

SOUTHERN PLATEAU REGION:

1. 1901	6.7	12.1	11.9	10.4	37.9	18.0	3.0		
2. 1911	18.0	12.0	5.8	7.0	36.5	16.8	3.8		
3. 1921	14.2	16.8	11.0	6.5	14.6	15.4	10.8	6.3	4.5
4. 1931	16.4	13.1	12.0	9.7	16.8	12.8	9.9	5.8	3.5
5. 1941	15.4	14.6	11.3	9.2	18.9	12.0	8.4	6.2	3.9
6. 1951	15.1	14.6	11.2	8.8	17.5	13.6	8.7	5.3	5.2

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contd.-

Age Group	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60 -	
S. N.	<u>YEAR:</u> <u>AJMER REGION:</u>									
1.	1901	6.8	11.2	12.4	10.8	21.0	14.6	11.8	7.0	4.3
2.	1911	15.6	11.4	6.8	7.8	21.1	15.3	10.6	6.8	4.7
3.	1921	15.5	14.4	11.2	7.6	16.0	15.9	11.0	6.4	5.1
4.	1931	16.2	12.2	11.0	9.9	18.1	13.2	9.9	5.7	3.8
5.	1941	13.2	14.0	11.5	9.8	19.1	13.0	8.8	6.4	4.2
6.	1951	15.9	12.0	12.0	10.3	17.7	12.0	8.5	5.9	5.7

Note: The percentages have been compiled from the new age distribution of the regions corrected for the changes in the boundaries.

The tables above show that the proportions at each age-group vary widely in different regions and give a vivid indications of the extent of irregularities in the age statistics.

The figures also show a higher proportion of children aged 0-5 and a lower proportion of people in the age-group 60 and over in the Southern region of Rajasthan. Southern region has a higher proportion of Bhils population living in the region. This shows that the Bhil population of the region may be more prolific but short lived. Ajmer region also shows a similar tendency of higher proportion in the age group 0-5 and lower proportion in the group 60 and over. The Western region has more older population than the other regions have. This population is showing a gradual increase since 1931.

The Table IV.3 shows a lower proportion of females in the age-group 15-20 in all the regions. It reaches the lowest figure for the Southern region in 1921. The proportions in western region are also low as compared to the eastern. Ajmer region shows a very low proportion of females only in the decades 1911 and 1921. It is also observed that the proportion of

females is increasing steadily in this age group since 1931.

In 1911 the lowest proportions of females are found to lie in the age-group 10-15 for the Southern and Ajmer regions. From the above analysis it is clear that there is a deficit of females in the age groups 10-15 and 15-20 in all the decades and for all the regions of Rajasthan. One wonders if this deficit is either due to a peculiar mortality rate prevalent in the population or is due to wrong reporting of age. This peculiar feature is found in other States of India as well. In 1901 the proportion of population in the age-group 0-5 is remarkably low in Ajmer and Southern regions. This may be due to temporary phase.

(iii) Age distributions in Rajasthan and All India:

Here the age compositions of Rajasthan are compared with those of all India, Table No.4 gives the age distributions of Rajasthan and those of All India for the years 1941 and 1951, both for males and females separately.

TABLE IV.4

Percentage age-distributions of population of Rajasthan and All India for the decades 1941 and 1951 for both sexes:-

S. No.	Age Group	Males 1951		Males 1941		Females 1951		Females 1941	
		Raj.	India	Raj.	India	Raj.	India	Raj.	India
	1	2	3	4	5	6	7	8	9
1	0-5	14.0	13.1	14.3	13.2	14.8	13.7	15.2	14.0
2	5-10	13.0	12.6	14.6	13.6	13.3	12.9	14.6	13.6
3	10-15	12.6	11.4	12.3	11.3	11.8	11.3	11.5	10.8
4	15-20	9.0	10.1	9.6	9.5	8.9	10.0	9.4	9.3
5	20-30	15.4	16.9	17.3	16.9	16.9	17.3	17.6	17.6
6	30-40	13.3	13.8	12.8	14.2	13.4	13.3	12.4	13.9
7	40-50	10.1	10.1	8.9	10.1	9.2	9.5	8.7	9.6
8	50-60	6.5	6.5	6.0	6.4	5.9	6.3	6.2	6.2
9.	60-	6.1	5.5	4.2	4.9	5.6	5.9	4.7	5.9

Note: Figures for All India have been taken from "Census of India 1951". Vol. I.

The figures in Table IV.4 show a wide disparity between the age-distribution of Rajasthan and that of All India. Rajasthan shows a higher proportion of its population in the age-groups 0-5, 5-10 and 10-15 than All India. Rajasthan then shows a lower proportion than All India in the middle age-group, which is considerably lower in the groups 15-20 and 40-50. The two populations then show nearly equal proportions in the older age-group 60 and over. This peculiar age distribution of Rajasthan may be due to the temporary migration of the earning members with their wives from the State leaving behind the school-going children and the old in their village homes.

4. SEX RATIO:

The proportion of males to females was another important demographic factor which has been discussed in the age-composition. It is interesting to see how the proportion changes from one age-group to the other and how famines and epidemics have differential effect on the two sexes.

In Table IV.5 is given the proportion of females per 1000 males in Rajasthan for the different age-groups. The table also presents the changes in the sex ratio of the population in each age-group for the years 1901 to 1951.

TABLE IV.5
Proportion of female to 1000 male of Rajasthan in
Quinquennial age group from 1901 to 1951:-

S.N.	Age Group	Sex ratio per 1000						
		1951	1941	1931	1921	1911	1901	
		1	2	3	4	5	6	7
1	0-1	964	980	1012	990	Not available		
2	0-5	975	966	1011	1023	1004	984	
3	5-10	944	905	879	912	889	920	
4	10-15	863	898	831	771	747	793	
5	15-20	912	887	888	754	777	803	
6	20-30	1003	919	919	927			
7	30-40	933	882	905	880)	921	910	

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Contd.-

S.N.	Age Group	Sex ratio per 1000							
		1951	1941	1931	1921	1911	1901		
		1	2	3	4	5	6	7	
8	40-50	846	883	863	901	)	930	)	952
9	50-60	841	941	886	903)			
10	60 -	846	931	1013	1053		1119		1083
A	Total	920	906	907	896		908		905

Note: The above table has been compiled from the corrected age distribution of Rajasthan for the changes in boundary.

Table IV.5 reveals that in the population of Rajasthan females generally predominate in the younger age group 0-5 and again in the older group 60 and over. In all other age groups males are in excess of females. It also shows that the age-groups 10-15 and 15-20 show a very low female ratio.

The excess of females over males in age group 0-5 shows a high mortality of male children in the early ages. But the neglect of female children is another common feature in India. The census Superintendent of 1931 census also supports this view and writes, "In the childhood, boys thrive at the expense of girls and the sudden drop in the proportion of females after the age 4 bears testimony to this."¹² The two views, one supported by the census figures that the females are in excess of males in age 0-5, and the other view of the Census Superintendent pointing that boys thrive at the expense of girls in early ages are contradictory to each other. If the boys in the early ages thrive at the expense of girls than in the early ages boys must be in excess of girls whereas if the mortality in boys

12. Census of India 1931 Vol. p.50.

is higher than girls, girls should always be in excess of boys . But in the age-group 5-10 it is observed that boys are in excess. None of the above views suitably explain the excess of females in the age - group 0-5.

The other feature observed in the Table IV.5 is the low proportion of females in the age-group 10-15. This is extremely low for the decades 1901, 1911 and 1921 which were the decades of famine, plague and influenza. For the low proportions of female in ages 10-15 the Census Superintendent of 1931 writes, "The low proportion of females in age-group 10-15 is undoubtedly caused by early marriage, premature child bearing and its attendant evils."¹³ This has been a problem age-group in many of the States or sub-regions of the country. It is very difficult to know the reason behind the smaller numbers of females in this age group; one wonders whether it could be due to mere under enumeration and not due to a real fall in the numbers. It may be due to a peculiar mortality pattern prevalent in the population. All this needs further research. The Table further shows that the proportions of females in the age-group 10-15 has been showing an increasing trend since 1931.

The Table IV.5 shows an excess of females over males in age-group 20-30 in 1951. This excess is probably due either to wrong reporting of ages or to the heavy influx of refugees from Sindh in the State in 1947, who left their families behind and went out of the State in search of employment or business.

13. Ibid p. 49.

5. SEX RATIO IN THE NATURAL REGIONS:

In Table IV.6, is given the sex ratio in the natural regions of Rajasthan by age groups for fifty years from 1901 to 1951.

TABLE IV.6.
Sex ratio in the Natural regions of Rajasthan by age-groups
from 1901 to 1951:-

Age Group:	0-5	5-10	10-15	15-20	20-30	30-40	40-50	50-60	60-	Total	
	1	2	3	4	5	6	7	8	9	10	11
EASTERN PLAIN REGION:											
1901	979	905	753	785	907		902	1089		870	
1911	1001	890	736	767	924		895	1020		892	
1921	1020	839	737	743	908	867	876	841	953	870	
1931	999	853	803	878	931	871	823	850	910	885	
1941	1001	891	843	886	909	894	836	807	840	890	
1951	977	960	860	893	954	951	867	806	756	907	
WESTERN DRY REGION:											
1901	979	925	863	839	899		931	956		905	
1911	975	880	771	763	903		932	1224		904	
1921	989	897	804	759	892	871	921	924	1146	894	
1931	992	877	822	850	907	898	848	896	1080	898	
1941	964	912	824	829	874	897	867	902	987	889	
1951	930	886	876	900	1002	923	839	820	883	906	
SOUTHERN PLATEAU REGION:											
1901	1021	950	780	808	924		1096	1344		934	
1911	1034	896	745	809	939		993	1236		941	
1921	1038	950	790	771	1011	918	936	987	1153	942	
1931	1043	912	873	935	922	962	924	933	1104	944	
1941	1022	915	877	948	972	860	973	956	1006	942	
1951	1011	931	848	932	1084	940	836	908	927	953	
AJMER REGION:											
1901	923	925	815	829	891	879	911	988	1272	897	
1911	985	889	728	797	874	826	915	837	1136	879	
1921	989	894	729	734	801	795	783	861	1047	827	
1931	1009	880	845	881	865	870	821	844	1118	889	
1941	982	913	873	902	909	838	849	883	1020	900	
1951	1004	921	893	1020	995	809	774	911	1014	925	

Note: Above table has been compiled from the corrected age distributions of the natural regions of Rajasthan for the changes in the boundary given in Appendix.

Southern region has shown an excess of females over males which is perhaps due to wrong reporting of ages. The excess of females in the age group 15-20 in Ajmer region in 1951 may be due to the influx of refugees from Sindh(Pakistan) who left their

families in the State and went for job or business to territories outside the region. "Among the districts of Rajasthan, the female ratio in 1951 is the highest in the Dungarpur district (Southern region) (1003) and the lowest in the Jaisalmer district (813)".¹⁴ (Western region.) "In one respect Rajasthan stands alone in that there are comparatively more females in the towns than in the villages".¹⁵

6. SEX RATIO IN RAJASTHAN AND SOME OF THE STATES IN INDIA:

In Table IV.7 is given the comparative figures for sex ratio in Rajasthan and in some of the States in India. Comparison is also made between Rajasthan and some of the foreign countries.

TABLE IV.7
Sex Ratio in Rajasthan and in Some of the States of India and in the selected foreign Countries:-

S.N.	State or Country	Year	Females per 1000 Males Sex ratio
1	2	3	4
1	Rajasthan	1951	920
2	India	1951	947
3	Uttar Pradesh	1951	910
4	Bihar	1951	989
5	Orissa	1951	1022
6	West Bengal	1951	853
7	Madras	1951	1006
8	Mysore	1951	949
9	Trvancore-Cochin	1951	1008
10	Bombay	1951	932
11	Madhya Bharat	1951	993
12	Madhya Pradesh	1951	925
13	Punjab	1951	863
14	Germany	1953	1130
15	France	1953	1070
16	England	1953	1078
17	Japan	1952	1039
18	U.S.A.	1953	1012
19	Brazil	1940	1000

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14. Census of India 1951 Vol. X p.368.
15. Census of India 1951 Vol. X p.47.

Contd.-

S.N.	1	2	3
20	Australia	1953	975
21	Canada	1953	974
22	Nepal	1941	959
23	Burma	1954	958
24	Ceylone	1946	885

- Note:
1. The figures for 1951 have been taken from Census of India 1951 Vol.I.
 2. The figures for Foreign countries are taken from the Demographic Year Book 1957.

Comparing the sex ratio of Rajasthan with the States in its north like the Punjab and Uttar Pradesh, it is observed that Rajasthan shows a higher sex ratio than these States. Again comparing the sex ratio of Rajasthan with the States which are in the East or South of it like Bihar, Orissa, Bombay, Madhya Bharat, Madhya Pradesh it is observed that these States show higher sex ratio than Rajasthan. The sex ratio is found to increase from north to south or from west to east. A similar view has been expressed by the Census Superintendent of Ajmer State in 1931 and he writes, "Previous censuses have revealed the fact that, taking the Indian Empire from North to South, the marked deficiency of females in North and North-West gradually decreases with a South-ward course till an actual excess is reached in Bihar and Orissa and Madras."¹⁶ This statement is also proved by the census of 1951, except West Bengal which stands out as an exception with sex ratio as low as 859, which may be due to the large scale migration of labour (only males) from Bihar, Orissa and eastern Uttar Pradesh to the

Industrial City of Calcutta and its suburbs.

Comparing the sex-ratio of Rajasthan with those of foreign countries we find that all the western countries show a higher proportions of females. But the sex ratio in the Southern or South Eastern countries like ceylone and Malaya is lower than that of Rajasthan.

7. SEX-RATIO IN THE REPRODUCTIVE GROUP:

In Table IV.8 is given the proportion of females aged 15-40 to males aged 15-40 per 1000 of population in Rajasthan and the Natural regions, from 1901 to 1951.

TABLE IV.8.

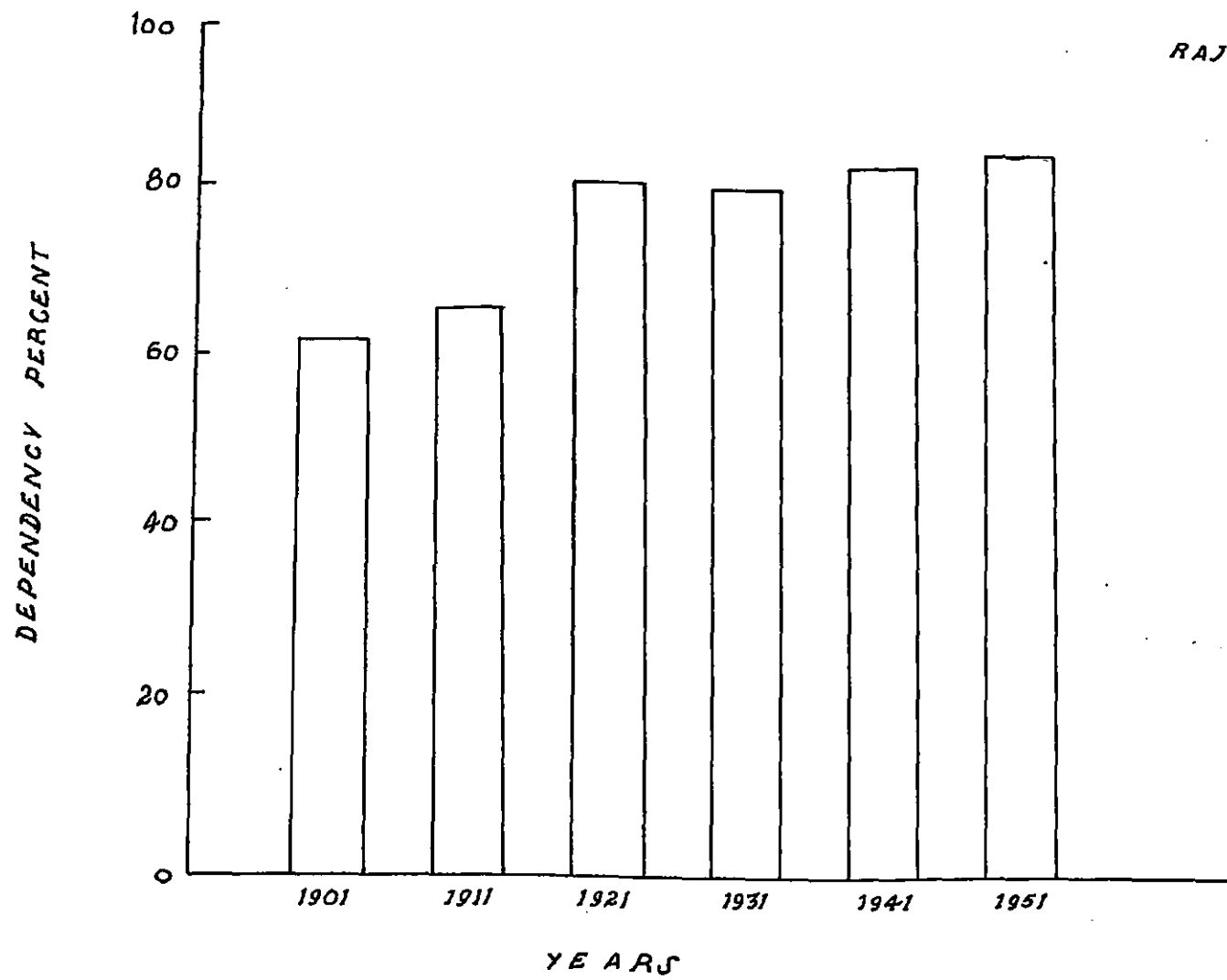
Proportion of females aged 15-40 to males aged 15-40 per 1000 of population in Rajasthan and Natural Regions from 1901 to 1951:
Effective Sex Ratio:

S.N.	Regions	1951	1941	1931	1921	1911	1901
1	Rajasthan	959	899	907	871	890	884
2	Eastern	933	898	898	856	887	890
3	Western	950	869	890	855	876	881
4	Southern	996	930	938	921	915	896
5	Ajmer	936	884	870	782	842	872

Note: The Table has been compiled from the corrected age-distribution of the State and the regions for changes in boundary.

By determining the sex-ratio in the reproductive age-group we get an exact picture of the number of females to males in the effective age group which contributes to the future population growth. It is interesting to note that the effective sex-ratio in Rajasthan for 1901 is quite low and

DEPENDENCY LOAD
IN
RAJASTHAN



is gradually increasing from census to census, reaching a high figure for 1951. The effective sex-ratio is quite high in the Southern region and is low in the Ajmer Region, the Eastern and Western regions standing in the middle. Due to Influenza in 1918, the effective sex-ratio in 1921 had considerably decreased, From the above table it is concluded that there was no great shortage of females in the reproductive age-group in Rajasthan to adversely affect the fertility of the State. In Chapter V the proportions of widows and married women in the reproductive age group have been estimated for the State. This will give the actual number of females contributing to the increase in population of the State, if the migration is taken to be negligible.

8. DEPENDENCY LOAD:

The percentage of population aged 0 -15 and 60 and over to the persons aged 15-59 has been taken as a measure of dependency load on the working population and is given in Table IV.9 for Rajasthan and its Natural regions from 1901 to 1951.

TABLE IV.9.
Dependency Load for Rajasthan and its Natural Regions
from 1901 - 1951:-

S.N.:	Regions :	<u>Dependency Load:</u> (Percentage)					
		'1951	'1941	'1931	'1921	'1911	'1901
1.	Rajasthan	84.0	83.7	80.1	81.1	66.1	61.8
2.	Eastern	82.0	83.0	77.9	76.0	66.4	66.6
3.	Western	84.8	85.4	83.6	85.8	67.8	65.5
4.	Southern	86.1	82.2	80.9	85.7	65.0	51.5
5.	Ajmer	81.6	73.0	72.9	71.5	60.4	52.7

Note: The Table has been compiled from the corrected age distribution of Rajasthan and its regions for the changes in the boundaries.

From the Table IV.9 it appears that the dependency load in Rajasthan has been constantly increasing from 1901 to 1951. This shows that the proportions of younger children and older people have been constantly increasing in the State. The increase in the dependency load in the Southern region is very great, whereas in the Eastern and Western regions it is practically equal. Ajmer region has also shown a high increase in the dependency load.

APPENDIX TO CHAPTER IV

(1)

APPENDIX TO CHAPTER-IV

CORRECTED AGE DISTRIBUTION FOR RAJASTHAN 1901

S.No.	Age Group	Males	Females	Sex Ratio
1	1	2	3	4
1.	0 - 5	469,533	462,020	984
2.	5 - 10	643,124	596,090	920
3.	10 - 15	724,492	574,305	793
4.	15 - 20	601,885	486,429	808
5.	20 - 40	1,784,725	1,623,820	910
6.	40 - 60	956,394	910,493	952
7.	60 -	218,689	236,853	1,083
8.	Age not stated.	29	15	
9.	Total	5,403,871	4,890,025	905

(ii)

I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1901.

<u>S.N.</u>	<u>Age Group</u>	<u>Males</u>	<u>Females</u>	<u>Sex Ratio</u>
1	0 - 5	247,753	242,543	979
2	5 - 10	326,209	294,411	903
3	10 - 15	310,731	234,102	753
4	15 - 20	244,388	191,735	785
5	20 - 40	805,561	732,013	909
6	40 - 60	457,510	412,707	902
7	60 -	114,359	124,521	1,088
8	Age not stated.	25	5	
9	Total	2,506,536	2,232,036	870

II. CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1901:

1	0 - 5	127,153	124,466	979
2	5 - 10	141,702	131,137	925
3	10 - 15	197,109	170,140	863
4	15 - 20	173,539	145,515	839
5	20 - 40	397,996	357,733	899
6	40 - 60	257,627	239,771	931
7	60 -	70,608	67,490	956
8	Total	1,365,734	1,236,252	905

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III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION: 1901:

S.No.	Age Group	Males	Females	Sex Ratio
1	0 - 5	79,507	81,212	1,021
2	5 - 10	155,814	147,979	950
3	10 - 15	185,939	145,043	780
4	15 - 20	157,626	127,341	808
5	20 - 40	500,218	462,356	924
6	40 - 60	200,907	220,162	1,096
7	60 -	26,914	36,179	1,344
8	Age not stated.	4	10	
9	Total	1,306,929	1,220,282	934

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION: 1901:

1	0 - 5	15,120	13,799	913
2	5 - 10	24,399	22,563	925
3	10 - 15	30,713	25,021	815
4	15 - 20	26,332	21,838	829
5	20 - 30	47,496	42,326	891
6	30 - 40	33,454	29,392	879
7	40 - 50	26,017	23,691	911
8	50 - 60	14,333	14,162	988
9	60 -	6,808	8,663	1,272
10	Total	224,672	201,455	897

(iv)

CORRECTED AGE DISTRIBUTION FOR RAJASTHAN 1911:

S.No.	Age Group	Males	Females	Sex Ratio
1	2	3	4	
1	0 - 5	792,170	795,535	1,004
2	5 - 10	696,028	618,949	889
3	10 - 15	556,798	415,705	747
4	15 - 20	531,132	412,890	777
5	20 - 40	1,948,203	1,794,547	921
6	40 - 60	997,400	927,298	930
7	60 -	234,475	262,378	1,119
8	Total	5,756,206	5,227,302	908

(v)

S.No.	Age Group	Males	Females	Sex Ratio
	1	2	3	4

I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1911:

1	0 - 5	284,727	285,063	1,001
2	5 - 10	298,847	257,117	890
3	10 - 15	273,091	200,917	736
4	15 - 20	237,830	182,452	767
5	20 - 40	772,873	713,821	924
6	40 - 60	443,705	401,654	895
7	60 -	119,238	121,566	1,020
8	Total	2,425,311	2,162,590	892

II. CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1911:

1	0 - 5	212,978	207,596	975
2	5 - 10	179,258	157,834	880
3	10 - 14	147,534	113,715	771
4	15 - 20	142,067	108,346	763
5	20 - 40	503,349	457,281	908
6	40 - 60	254,000	236,709	932
7	60 -	60,642	74,228	1,224
8	Total	1,499,828	1,355,709	904

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S.No.	Age Group.	Males	Females	Sex Ratio
1		2	3	4

III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION 1911:

1	0 - 5	261,163	270,090	1,034
2	5 - 10	201,100	180,144	896
3	10 - 15	116,617	86,845	745
4	15 - 20	130,603	105,657	809
5	20 - 40	582,443	547,092	939
6	40 - 60	254,222	252,367	993
7	60 -	45,845	56,644	1,236
8	Total	1,591,999	1,498,839	941

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION 1911:

1	0 - 5	33,302	32,786	985
2	5 - 10	26,823	23,854	889
3	10 - 15	19,556	14,228	728
4	15 - 20	20,632	16,435	797
5	20 - 30	50,636	44,240	874
6	30 - 40	38,896	32,113	826
7	40 - 50	24,313	22,235	915
8	50 - 60	16,160	14,333	887
9	60 -	8,750	9,940	1,136
10	Total	239,068	210,164	879

CORRECTED AGE DISTRIBUTION FOR RAHASTHAN 1921:

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4
1	0 - 5	642,041	657,073	1,023
2	5 - 10	819,090	746,669	912
3	10 - 15	699,800	539,607	771
4	15 - 20	457,912	345,315	754
5	20 - 30	824,794	764,386	927
6	30 - 40	812,357	715,103	830
7	40 - 50	572,594	515,871	901
8	50 - 60	354,678	320,117	903
9	60 -	246,107	259,135	1,053
10	Total	5,429,373	4,863,276	896

S.No.	Age Group	Males	Females	Sex Ratio
1	2	3	4	

I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1921:

1	0 - 5	250,675	253,542	1,002
2	5 - 10	302,315	268,638	889
3	10 - 15	262,709	193,546	737
4	15 - 20	195,222	144,965	743
5	20 - 30	355,693	322,825	908
6	30 - 40	311,024	269,696	867
7	40 - 50	227,471	199,347	876
8	50 - 60	155,661	130,873	841
9	60 -	116,030	110,583	953
	Total	2,176,800	1,894,065	870

II. CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1921:

1.	0 - 5	161,237	158,780	979
2	5 - 10	209,646	187,952	897
3	10 - 15	190,363	152,997	804
4	15 - 20	113,344	84,467	759
5	20 - 30	204,886	182,842	892
6	30 - 40	201,013	175,143	871
7	40 - 50	137,194	126,338	921
8	50 - 60	85,306	78,845	924
9	60. -	59,947	68,707	1,146
	Total	1,360,936	1,216,076	894

S.No.	Age Group	Males	Females	Sex Ratio
	1	2	3	4

III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION 1921:

1	0 - 5	204,699	219,603	1,023
2	5 - 10	274,510	260,875	950
3	10 - 15	215,747	170,465	790
4	15 - 20	130,464	100,547	771
5	20 - 30	223,770	226,328	1,011
6	30 - 40	259,460	238,070	913
7	40 - 50	179,442	167,890	936
8	50 - 60	98,746	97,511	987
9	60 -	60,276	69,527	1,153
10	Total	1,647,114	1,550,816	942

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION 1921:

1	0 - 5	25,430	25,148	989
2	5 - 10	32,613	29,154	894
3	10 - 15	30,981	22,599	729
4	15 - 20	20,882	15,336	734
5	20 - 30	40,445	32,391	801
6	30 - 40	40,860	32,189	796
7	40 - 50	28,437	22,296	783
8	50 - 60	14,665	12,898	861
9	60 -	9,854	10,318	1,047
10	Total	244,523	202,319	827

(x)

CORRECTED AGE DISTRIBUTION FOR RAJASTHAN 1931:

S.No.	Age Group	Males	Females	Sex Ratio
	1	2	3	4
1	0 - 5	902,636	912,640	1,011
2	5 - 10	818,292	719,412	879
3	10 - 15	778,482	647,188	831
4	15 - 20	591,558	525,197	888
5	20 - 30	1,055,968	970,072	919
6	30 - 40	802,309	725,750	905
7	40 - 50	619,272	534,260	863
8	50 - 60	370,181	328,127	886
9	60 -	221,912	224,718	1,013
10	Total	6,160,610	5,587,364	907

S.N.	Age Group	Males	Females	Sex Ratio
1	2	3	4	

I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1931:

1	0 - 5	333,688	333,908	1,001
2	5 - 10	307,740	262,556	853
3	10 - 15	293,787	235,921	803
4	15 - 20	217,641	191,072	878
5	20 - 30	407,604	379,331	931
6	30 - 40	324,360	282,395	871
7	40 - 50	236,424	195,859	828
8	50 - 60	146,748	124,770	850
9	60 -	97,232	88,438	910
10	Total	2,365,224	2,094,250	885

II. CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1931:

1	0 - 5	251,841	250,041	993
2	5 - 10	223,656	196,209	877
3	10 - 15	210,800	173,061	822
4	15 - 20	164,805	140,021	850
5	20 - 30	275,968	250,374	907
6	30 - 40	206,388	185,382	898
7	40 - 50	164,699	139,685	848
8	50 - 60	98,500	88,253	896
9	60 -	61,344	66,268	1,080
10	Total	1,658,001	1,489,300	898

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4

III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION 1931:

1	0 - 5	278,809	290,065	1,040
2	5 - 10	253,885	231,612	912
3	10 - 15	242,709	211,867	873
4	15 - 20	182,300	170,485	935
5	20 - 30	322,316	297,040	922
6	30 - 40	235,356	226,480	962
7	40 - 50	189,512	175,192	924
8	50 - 60	108,910	101,571	933
9	60 -	55,204	60,922	1,104
10	Total	1,869,001	1,765,234	944

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION 1931:

1	0 - 5	38,298	38,626	1,009
2	5 - 10	33,011	29,035	880
3	10 - 15	31,186	26,339	845
4	15 - 20	26,812	23,619	881
5	20 - 30	50,030	43,327	865
6	30 - 40	36,205	31,493	870
7	40 - 50	28,637	23,524	821
8	50 - 60	16,023	13,527	844
9	60 -	8,132	9,090	1,118
10	Total	268,384	238,580	889

CORRECTED AGE DISTRIBUTION FOR RAJASTHAN 1941:

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4
1	0 - 5	1,039,066	1,003,729	966
2	5 - 10	1,061,727	961,306	905
3	10 - 15	896,123	760,240	848
4	15 - 20	700,259	620,865	887
5	20 - 30	1,260,527	1,158,345	919
6	30 - 40	927,441	817,606	882
7	40 - 50	648,050	572,259	883
8	50 - 60	433,595	408,070	941
9	60 -	307,831	286,756	931
10	Total	7,274,679	6,589,176	906

(xiv)

S.N.	'Age Group'	Males	Females	Sex Ratio
	1	2	3	4

I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1941:

1	0 - 5	373,622	373,211	999
2	5 - 10	387,292	345,232	891
3	10 - 15	323,344	272,587	843
4	15 - 20	254,103	225,024	886
5	20 - 30	442,983	402,683	909
6	30 - 40	346,003	309,361	894
7	40 - 50	261,986	219,121	836
8	50 - 60	180,039	145,417	808
9	60 -	129,514	150,798	840
10	Total	2,698,886	2,401,434	890

II CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1941:

1	0 - 5	288,110	277,096	962
2	5 - 10	302,869	276,165	912
3	10 - 15	272,341	224,286	824
4	15 - 20	215,700	178,775	829
5	20 - 30	359,476	314,271	874
6	30 - 40	251,398	225,412	897
7	40 - 50	179,506	115,665	867
8	50 - 60	129,511	116,828	902
9	60 -	87,909	86,770	987
10	Total	2,086,820	1,855,268	889

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4

III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION 1941:

1	0 - 5	310,102	316,876	1,022
2	5 - 10	329,116	301,159	915
3	10 - 15	263,873	231,430	877
4	15 - 20	200,388	189,944	943
5	20 - 30	400,067	388,684	972
6	30 - 40	287,052	246,796	860
7	40 - 50	177,914	173,165	973
8	50 - 60	134,091	128,211	956
9	60 -	79,198	79,688	1,006
10	Total	2,131,801	2,055,953	942

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION 1941:

1	0 - 5	37,232	36,546	982
2	5 - 10	42,450	33,750	913
3	10 - 15	36,565	31,937	873
4	15 - 20	30,068	27,122	902
5	20 - 30	58,001	52,707	909
6	30 - 40	42,988	36,037	838
7	40 - 50	28,544	24,308	849
8	50 - 60	19,954	17,614	883
9	60 -	11,270	11,500	1,020
10	Total	307,172	276,521	900

CORRECTED AGE DISTRIBUTION FOR RAJASTHAN 1951:

S.No.	Age Group	Males	Females	Sex Ratio.
1	2	3	4	
1	0 - 5	1,159,648	1,130,184	975
2	5 - 10	1,080,230	1,019,540	944
3	10 - 15	1,049,128	905,040	863
4	15 - 20	747,027	681,502	912
5	20 - 30	1,284,119	1,294,756	1,008
6	30 - 40	1,102,444	1,029,120	933
7	40 - 50	836,925	707,675	846
8	50 - 60	541,140	454,808	840
9	60 -	507,375	429,416	846
10	Age not stated .	5,847	4,852	
11	Total	8,313,883	7,656,893	921

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4
I. CORRECTED AGE DISTRIBUTION FOR EASTERN REGION 1951:				
1	0 - 5	413,444	403,963	977
2	5 - 10	372,668	357,737	960
3	10 - 15	383,195	329,563	860
4	15 - 20	231,095	251,102	893
5	20 - 30	475,565	453,896	954
6	30 - 40	398,270	378,924	951
7	40 - 50	313,075	271,308	867
8	50 - 60	218,875	176,434	806
9	60 -	211,293	159,757	756
10	Age not stated	4,448	3,362	756
11	Total	3,071,928	2,786,096	907

II. CORRECTED AGE DISTRIBUTION FOR WESTERN REGION 1951:

1	0 - 5	341,960	318,038	930
2	5 - 10	313,396	277,657	886
3	10 - 15	311,323	272,711	876
4	15 - 20	211,523	109,410	900
5	20 - 30	370,470	371,282	1,002
6	30 - 40	313,799	289,749	923
7	40 - 50	243,594	204,383	839
8	50 - 60	162,815	133,488	820
9	60 -	146,940	129,748	883
10	Age not stated.	134	374	
11	Total	2,415,954	2,187,840	906

(xviii)

S.N.	Age Group	Males	Females	Sex Ratio
	1	2	3	4
III. CORRECTED AGE DISTRIBUTION FOR SOUTHERN REGION 1951:				
1	0 - 5	351,490	355,233	1,011
2	5 - 10	350,721	344,151	981
3	10 - 15	309,865	262,827	848
4	15 - 20	220,723	205,645	932
5	20 - 30	373,809	410,610	1,034
6	30 - 40	340,965	320,497	940
7	40 - 50	243,643	203,647	836
8	50 - 60	137,855	125,153	903
9	60 -	130,424	120,937	927
10	Age note stated.	1,265	1,116	
11	Total	2,465,765	2,349,821	953

IV. CORRECTED AGE DISTRIBUTION FOR AJMER REGION 1951:

1	0 - 5	52,754	52,950	1,004
2	5 - 10	43,445	39,995	926
3	10 - 15	44,745	39,939	893
4	15 - 20	33,681	34,345	1,020
5	20 - 30	59,275	58,968	995
6	30 - 40	43,410	39,950	809
7	40 - 50	36,613	28,337	774
8	50 - 60	21,595	19,678	911
9	60 -	18,718	18,974	1,014
10	Total	360,236	333,136	925

MARITAL STATUS

CHAPTER V

MARITAL STATUS

1. INTRODUCTION :

An attempt has been made in this Chapter to analyse the statistical data of social conditions given in the census reports of Rajasthan. This will give us an idea of the proportion of persons married, unmarried and widowed, the annual average marriage rate, the average age at marriage and the variation in the age at marriage in the State in different decades. The mating habit of males and of females generally differs widely in the State. An estimate of the marriage rate and age at marriage for both sexes separately has been made.

The classification by marital status of persons has been made at each decennial census beginning from 1901, but the meaning of the word "married" has changed from census to census. From 1901 to 1931 census, persons who were recognised by custom as married have been entered as such, even though they had not gone through the proper ceremony, e.g. widows who had taken a second husband by the rite commonly known as "Karva" or "Nata"¹ or persons living together with the sanction of their religion or social tenets allowing cohabitation without preliminary formalities have been taken as married. No questions were asked regarding the validity of the marriage, but the statements made by the person concerned, or in the case of children, by their relatives, were accepted. The only explanation asked was whether the wife or husband

1. Karva or Nata. Wedding without any of the religious rites, but with the sanction of the Society. But the wife is free to leave her husband whenever she likes.

(as the case may be) was alive. In 1941 and 1951 census the above practice was given up and only those who had gone through the full marriage ceremony were entered as married. In these censuses women who had not undergone full marriage ceremony, even though they had children, were treated as unmarried. Kept women or concubines were shown under their former civil condition. Only those widows who had taken a second husband by the rite of "Karva or Nata" were treated as married.

The change in the meaning of the word "married" in the censuses from 1901 to 1951 has made the data not fully comparable. The number of single persons in the age group 15-20 in 1941 census went up by twice the number in the previous census. There is also a great possibility of the data becoming defective due to the "age factor" involved in it, which is only guess work. There was a tendency of deliberate misreporting in the case of married women separated from their husbands and elderly single unmarried women describing themselves as widows, and some single women with illegitimate children as married or widows.

There is another possibility of the records being wrong due to the insufficient knowledge of the informant of the marital status of the person. One such example that happened during the 1941 census of Rajasthan has been given by Webb. An enumerator arrived at a house where the only male member was a small chubby boy. In reply to the question of civil condition of his mother he replied, "I find she must be married or how else could I be here?"² It should be remembered in this context that strict 'Purdah' was observed in some

2. "These Ten Years" by A.W.T. Webb. p.95.

parts of Rajasthan and the women folk were not allowed to see an outsider.

The cases of mock marriages are not uncommon in Rajasthan. A girl is married to a bunch of flowers and then remarried as 'widow', or starts living with a man as married woman. Again according to the custom, a bachelor cannot marry a widow, so he is first married to a "Shamil tree" (*prospisspicigera*) and then he starts living as married man with the widow.

"Instances are still reported of brides and bridegrooms aged one month who are kept in the laps of their respective mothers and fed several times during the marriage ceremony."³ In the "Statesman" dated February 20, 1957 was published a report from Bikaner that about 1,500 boys and girls between the ages 4 to 16 belonging to the Pushkarna Brahmin community were married in Bikaner city at the same time. According to the age-old custom of the Pushkarna Brahmans, marriages are performed once in four years, when members of the community, scattered throughout the country, get together in their home town to arrange and celebrate the marriages."⁴

Taking in view the limitations of the data, analyses have been made for the proportions married, single and widowed at different censuses, without trying to adjust for the wrong reporting of age or misreporting of the marital status.

3. "Population Problem in India" by P.K. Wattal 1930, p. 86.

4. "Statesman" dated February 20, 1957.

2. PROPORTIONS MARRIED, SINGLE & WIDOWED:

In Table V.1, is given the proportion of married, single, and widowed for males and females in age groups, per 1,000 of the total population of Rajasthan from 1901 to 1951.

TABLE V.I.

Marital status of 1,000 of each sex by Age, in Rajasthan from 1901 to 1951.

Age Groups	SINGLE						MARRIED						WIDOWED					
	1951	1941	1931	1921	1911	1901	1951	1941	1931	1921	1911	1901	1951	1941	1931	1921	1911	1901
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
MALES:																		
0 - 5	1000	994	990	996	998	994	-	5	10	4	2	6	-	1	-	-	-	-
5 -10	921	964	938	977	980	965	77	33	60	21	19	31	2	3	2	2	1	4
10-15	804	851	852	885	888	854	192	144	144	108	108	129	4	5	4	7	4	17
15-20	517	588	510	648	677	629	473	400	474	331	309	328	10	12	16	21	14	43
20-40	351	162	173	205	220	223	695	790	767	634	722	691	44	48	68	101	58	96
40-60	92	64	63	69	71	90	728	749	717	688	752	715	180	187	220	243	177	195
60 & over	70	56	48	62	62	69	569	562	538	515	564	572	361	382	414	423	374	359
All ages	472	502	491	511	494	479	472	437	438	395	438	432	56	61	71	94	68	89
FEMALES:																		
0 - 5	1000	990	981	991	994	987	-	9	18	8	6	12	-	1	1	1	-	1
5 -10	920	905	824	920	934	910	78	92	173	76	64	84	2	3	3	4	2	6
10-15	554	605	592	589	558	603	440	388	401	396	433	374	6	7	7	15	9	23
15-20	233	193	85	108	91	197	755	790	888	849	878	738	12	17	27	43	31	65
20-40	16	13	13	11	8	17	873	895	860	832	869	806	85	92	127	157	123	177
40-60	9	5	4	6	4	6	549	542	476	465	472	497	442	453	520	529	524	437
60 & over	9	9	3	6	3	6	220	205	161	144	141	242	771	786	836	850	856	752
All ages	377	377	348	353	317	303	514	491	496	457	501	499	109	132	156	190	182	198

- Notes:
1. The data represents the marital status of the population of Rajasthan for the boundaries as they were upto 1951 census.
 2. No adjustments of data have been made for the changes in the boundaries of the State due to reorganisation of the States in 1956.
 3. The data for the proportions married, single and widowed for the decades 1901 to 1941 have been taken from the Census of Rajasthan and Ajmer-Merwara 1941."
 4. The data for 1951 have been compiled from the marital status data given in 1951 census of Rajasthan.

(1) Method of compilation of 1951 marital status data by age-groups:

In the 1951 census of Rajasthan, the marital status data of the population by age are not given in the similar quinquennial age-groups as are available for the previous census, but new age groups of 5-14, 15-24, 25-34 etc., have been formed and data have been presented in different manner. This has rendered the data of 1951 incomparable with the previous censuses.⁵ To obtain the data of marital status for Rajasthan from the 1951 census in the same groups as are available for the previous decades, the following method has been adopted.

The new age-groups of 1951 are first made cumulative for married, single and widowed separately. The cumulative data are then plotted on the graph papers for males and females. From the graphs, the values for the quinquennial groups are noted. From the cumulative values in the quinquennial age groups the original values for the group are obtained by subtracting the total of lower group from that of the higher group. This gives a rough estimate of the marital status of the population of Rajasthan in 1951 in the standard quinquennial age-groups, and from these the proportions per 1,000 in each group have been estimated. The estimates obtained involved certain assumptions regarding mating habits in past and hence are rough. But in order to have comparability some estimate had to be obtained.

Table V.I, shows a high proportion of widowed males in the age-groups 20-40, 40-60 and 60 and above, for the decade 1911-20. The proportion of females widowed in the same decade do not show any appreciable change from the previous decade. This indicates heavy mortality of females in

⁵ The practice of presenting data in different age-groups should be avoided.

Rajasthan in the decade 1911-20 due to influenza.

The above table also shows a constant decrease in the proportion of single males in the age group 20-40, during 1901 to 1951, and a constant increase of married males in the same age-group from decade to decade. The proportion of single females in the age-group 20-40 is very low, showing that most of the women in Rajasthan marry before the age of 20. The proportion of married females in age-group 20-40, in all the decades is quite high which also supports the above view.

It is interesting to note that the proportion of female widows in the population of Rajasthan, though very high, is continuously decreasing and that of unmarried women increasing during the period 1921-1950. The other interesting feature revealed by the table is the phenomenal increase in the number of married persons, more prominently of males, in 1951. This is indicative of slackening of social restrictions and increase in age at marriage of females.

The excess of married females over males in each decade, may be either due to polygamy prevalent in the State, or due to the temporary absence of husbands who have gone out of State for business or for employment leaving their wives at home. Talking of Polygamy in the State the Census Superintendent of 1901 census writes: " By law and custom a Musalman may have four and a Hindu two or more wives. But except among the wealthy sections of the community, and the Bhil tribes, the privilege is not often taken advantage of by the Hindus and rarely by the Musalmans unless

the first wife is barren or bears only female children. The custom of "Karwa" by which the widow contracts a second marriage with her deceased husband's younger brother is common to almost all lower castes who form the bulk of the population and this of course leads in many cases to a man having more wives than one." He further writes: "Turning to religion we find that polygamy is far more common among the Jains, Hindus and Animst (Ehils) than among the Musalmans, and that it is most prevalent in the Western Division ... Polyandry is not practised in Rajasthan".⁶

3. PROPORTIONS OF SINGLE, MARRIED AND WIDOWED IN NATURAL REGIONS:

In Table V.2, is shown the proportion of married, single and widowed persons in the natural regions of Rajasthan for the 1951 census. The table also shows the proportions in rural and urban areas of the natural regions.

Regional figures for marital status by age and for other decades are not available.

6. Census of India 1901, Vol. XXV Rajputana p. 90-91.

TABLE V . 2.

Proportions of married, single and widowed and in rural, urban, in the
Natural regions of Rajasthan in 1951: Populations:
(Per 1,000)

S. No.	Natural Regions	Single				Married				Widowed			
		Males	Females	in Rural	in Urban	Males	Females	in Rural	in Urban	Males	Females	in Rural	in Urban
	1		2				3				4		
1	Eastern Region	444	371	415	385	491	529	500	549	65	100	85	65
2	Southern "												
	(a) Hill Region	521	432	480	459	434	457	444	458	45	111	76	83
	(b) Plateau	460	347	405	410	477	520	495	512	63	133	99	78
3	Western Region	495	373	448	392	458	517	478	517	47	110	74	91
4	Ajmer Region	448	352	378	442	485	527	525	471	67	121	97	87
5	Total Rajasthan	472	377	433	391	472	514	485	527	56	109	82	77

Notes: 1. The data of marital status for the natural regions have been compiled from the "Census of India 1951 Vol. X Rajasthan and Ajmer," Tables 343, 345, 348 and 351 pages 391 to 395.
2. Southern region have been shown split in two divisions, the hill and the plateau division.
3. No adjustments have been made for the changes in the boundary of the State due to the reorganisation of States in 1956.

Table V.2, indicates a high proportion of single persons, males as well as females, in the hilly parts of the Southern region. It is also high in rural than in urban areas. This region is the home of Bhil tribes of Rajasthan. It appears, therefore, that the marriages of both males and females in Bhil tribes may be taking place at a grown-up age. The proportion of single is also high in the western region, which is higher for the males than for the females. The sex-ratio of females to males in the region is very low. This is an area with abnormal demographic conditions in the sense that the living conditions are tiring and have abnormal sex-ratio: about 800 females per 1000 males. All these conditions have their effect on the age composition and mortality conditions which have been discussed earlier. It indicates that the condition of living in the desert region is so uncertain that men prefer to live single and that fewer women prefer to live in the region. The proportion of single persons is lowest in the Eastern region.

In the East, West and Southern regions the proportion of singles is higher in rural than in urban areas whereas in Ajmer region it is high for urban than for rural areas. The percentage of literacy in the urban areas of Ajmer region is high compared to other regions of Rajasthan, hence the age at marriage is also high.

Considering the proportion of single at district level, the Census of 1951 points that "Barmer, in the Western region has the highest proportion of single males about 641 per 1,000 and Bharatpur, in the Eastern region has the highest proportion

of single females about 437. The lowest proportion for single males is in Bharatpur (408) and for females in Jhalawar 334.

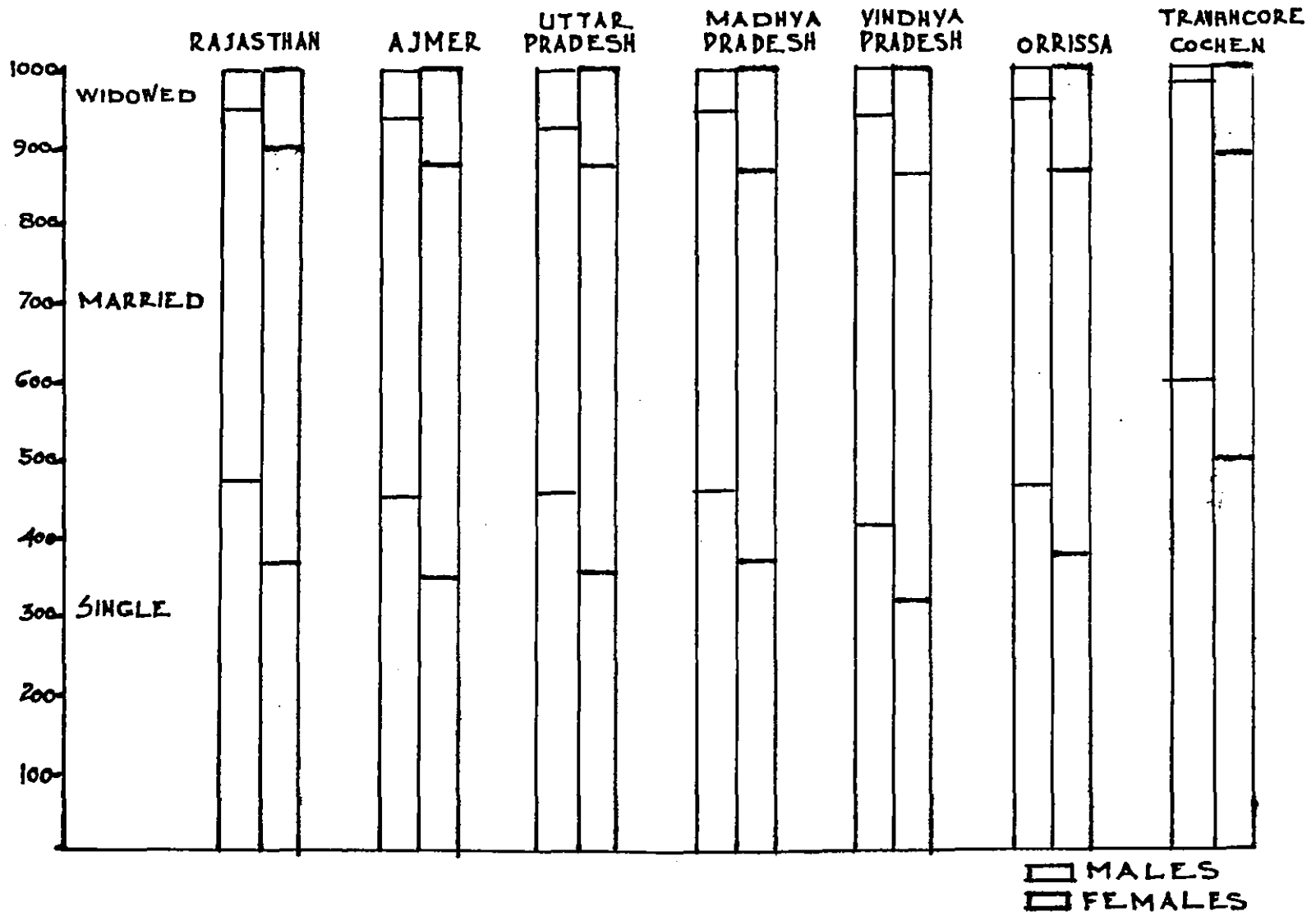
Eastern region, which shows lower proportion of single, has the highest proportion of married, but the hilly region has the lowest. The proportion of married is higher in urban than in rural areas in all the regions excepting Ajmer, where it is just the opposite. More females are married than males in all the regions of Rajasthan.

At the district level Jaipur, in the Eastern region, and Churu, in the western region, have the highest proportions of married males, about 522 per 1000. While the lowest proportion of married males is in Barmer, in the western region, which is about 319, per 1000. In case of married female the highest proportion is in Sikar, Eastern region, about 622 per 1,000, and lowest in Barmer, western region, about 434⁷.

The number of widows is double the number of widowers in all the regions and particularly so in Southern Plateau and high regions. The proportion of widowed persons in rural areas of eastern, Southern Plateau and Ajmer regions is high whereas in the Southern hill and Western regions it is high for urban.

In the districts of Rajasthan, the highest proportion of widowed is found in Sirohi, Southern region, about 109 per 1000, and the lowest in Banswara also in Southern region about 31 per 1000. The Sirohi district of the Southern region is mostly inhabited by Marwari businessmen and Jains among whom the widow remarriage is not permitted by custom, whereas the Banswara district is mostly inhabited by Bhils among whom widow remarriage is permissible. The proportion of widowed females is the

MARITAL STATUS OF POPULATION IN SOME STATE OF INDIA (1951)



highest in Jhalwar (Southern) about 145 per 1000 and the lowest in Jhunjuna (Eastern Region) about 78 per 1000. Jhalawar is again a home of Marwaris and Jains among whom widow remāriage is phohibited, whereas Jhunjunu is the home of Jats where widow remarriage is not taboo.

4. PROPORTIONS OF SINGLE, MARRIED AND WIDOWED PERSONS IN SOME OF THE STATES OF INDIA:

In Table V.3, is given the proportion of single, married and widowed persons in Rajasthan compared with the other States of India for 1951 Census.

TABLE V.3.

Proportion of single, married and widowed in some of the States of India for 1951, per 1000 of population.

S.N.	States	Single		Married		Widowed	
		Male	Female	Male	Female	Male	Female
1.	Rajasthan	472	377	472	514	56	109
2.	Ajmer State	448	352	485	527	67	121
3.	Uttar Pradesh	463	359	466	521	71	120
4.	Madhya "	457	374	494	495	49	131
5.	Vindhya "	418	315	523	556	59	129
6.	Orissa	471	386	490	483	39	131
7.	Travancore-Cochin.	607	497	367	388	26	115

Note:- 1. The proportions of single, married and widowed in the States of India have been compiled from the "Census of India (95) Vol. X. Tables 346, 349 and 352, p. 394, 396, 398.

2. No adjustments have ben made for Rajasthan for the changes in the boundaries due to the reorganisation of States in 1956.

Table V.3, shows a similarity in the marital status between Rajasthan, Ajmer State and Uttar Pradesh. Ajmer State is now a part of Rajasthan and Uttar Pradesh forms the eastern boundary of the State. Travancore -Cochin shows high proportion of singles, low proportion of married and the lowest proportion of widowed for its population compared with other States of India. Orissa shows a higher proportion of married males than females. Whereas in all other States the proportion of married females is more than that of males. It also shows a very high proportion of female widows as in Madhya Pradesh and Vindhya Pradesh. The proportions of the married in Madhya Pradesh and Rajasthan are practically equal. Rajasthan also shows the lowest proportion of widows as compared to other States of India as given in Table V.3.

5. VARIATION IN THE CIVIL
CONDITION OF RAJASTHAN:

In Table V.4 , are given the variations and percentage change in the civil condition of the population of Rajasthan from 1901 to 1951 , for males and females separately. The variations in the civil condition have been estimated by differencing the number of single, married and widowed in each decade: . The percentage change in the civil condition has been obtained by estimating the proportion of increase or decrease in the numbers of single, married and widowed with the numbers in the previous decade and estimating it per 100.

TABLE V. 4.

Variations and percentage change in married, single and widowed males and females from 1901 to 1951 for Rajasthan:

S.N.	Years	Single			Married			Widowed
		Persons	Variation	Percent Variation	Persons	Variation	Percent Variation	
	1	2	3	4	5	6	7	
MALES :-								
1.	1901	2478324	-	-	2231139	-	-	456071
2.	1911	2723755	+245431	+ 9.9	2418819	+187680	+ 8.4	372701
3.	1921	2651196	-72559	-3.7	2046415	-372404	-15.4	487280
4.	1931	2888862	+237666	+9.0	2579453	+533038	+26.0	416713
5.	1941	3598509	+709647	+24.6	3130291	+550828	+21.4	440727
6.	1951	3756440	+157931	+ 4.4	3754842	+624551	+20.0	450374
FEMALES :-								
1.	1901	1416062	-	-	2333603	-	-	926566
2.	1911	1590523	+174461	+12.3	2512649	+179046	+ 7.6	911985
3.	1921	1647049	+56526	+ 3.6	2129155	-382494	-15.3	883289
4.	1931	1857155	+210106	+12.8	2648241	+519086	+24.4	835288
5.	1941	2449428	+592273	+31.9	3192445	+544204	+20.5	858808
6.	1951	2764966	+315538	+12.9	3764926	+572481	+17.9	799238

- Note:** - 1. The estimates of variation and percentage change in civil condition have the data of married, single, widowed given in the Census Reports of Rajasthan decades.
2. No adjustments have been made for the changes in the boundaries of the State reorganisation of States in 1956.

Table V.4, shows the remarkable increase of singles in the decade 1931-40, both for males and females as compared to other decades. The percentage increase in females is more than in males. This may be due to the change in the definition of married in 1941 census. All those males and females who had not undergone the full marriage ceremony were treated as single in 1941 census, whereas in the previous censuses no question regarding the validity of marriage was asked. This change in the definition has inflated the number of singles in 1941.

The above table also shows a considerable fall in the proportions of single males as well as females in the decade 1911-21. It also shows a fall in the proportions married in the decade 1911-20 and rise in the proportions married in the decade 1921-30. The reason given by the Census Superintendent of 1931 census for this temporary increase in the proportions married in 1931 is that the people of Rajasthan were keen at that time to get the young children married before an Act known as the Sarda Act, prohibiting the marriages of young females below 14 and that of males below 18, was passed. This Act was passed in 1928 and became Law in 1930. During this period large number of marriages took place in the younger age group and thereby increased the proportions of married for the decade.

Table V.4, also shows a very high increase in the proportion of widowers for the decade 1911-20, whereas the proportion of widows for the decade has gone down.

The variation in the percentage married, single and widowed is quite erratic and all these erratic runs of figures

in the Table V.4 are very difficult to explain. Something could be said about 1931, for reasons given here, otherwise there is no reason why the marital status should change so much from one decade to other. The erratic run could be the composite effect of either under-enumeration of females with certain civil condition, the change in the definition of married and the differential mortality incidences among people with various civil conditions.

6. PROPORTION OF SINGLE, MARRIED AND WIDOWED IN THE REPRODUCTIVE AGE GROUP:

In Table V.5, is given the proportion of married, single and widowed, aged 15 to 44, to the total population from 15 to 44, in Rajasthan, for the three censuses from 1931 to 1951, for males and for females separately. The Table also shows the proportion of single and widowed males and females to total married males and females respectively for the three decades 1931 to 1950 for the population of Rajasthan. These three decades have been taken for showing the above proportions because there were normal decades for Rajasthan, where there were no abrupt changes in the population structure.

TABLE V.5.
Proportions of married, single and widowed in the reproductive ages in Rajasthan for males and females since 1931 to 1951:-

S.N.	Proportion of	1951		1941		1931	
		Males	Females	Males	Females	Males	Females
1	1	2	3	3	4	4	4
1.	Married aged 15-44 to total population (15-44)	75.4	87.1	70.8	85.4	70.6	84.0
2.	Single age 15-44 to total population (15-44)	20.6	5.0	24.5	5.1	23.3	2.7

Contd.-

S.N.	Proportion of	1951		1941		1931	
		Males ¹	Females ²	Males ³	Females ⁴	Males ⁴	Females ⁴
3.	Widowed age 15-44 to total population (15-44)	4.1	7.9	4.7	9.5	6.1	13.3
4.	Total single to total married.	100.0	73.4	115.0	76.7	111.9	70.1
5.	Total widowed to total married.	12.0	21.2	14.1	26.9	16.2	31.5

Note:- 1. The above proportions have been estimated from the civil condition data available in respective censuses of Rajasthan.

2. No adjustments have been made for the changes in the boundaries of the State due to reorganisation of States in 1956.

Table V.5, shows a constant increase in the proportion of the married, aged 15-44 in the population aged 15-44, since 1931. The increase in the case of males, in 1951, is very sudden i.e., from 70.77 per thousand in 1941 to 75.38 per 1000 in 1951. Because of the restrictions on child marriage all those married in ages 10 to 15 generally overstate their ages hence the proportion of married in 1951 increased. The proportion of the widowed, males, females, aged 15-44 in the population 15-44, has been constantly decreasing since 1931. The fall in widows is quite significant, showing thereby that the taboo widow remarriage is breaking in the State. It also indicates the possibility of declining mortality in the reproductive age-group in the State. In the words of the census

Superintendent of Rajasthan (1951), " this gratifying feature can be accepted as one of the indications that fewer people die prematurely and more people tend to live long." ⁸ The proportion of singles shows no considerable change.

The above table shows the higher proportion of single males than single females to the total married in the respective sex. Also the proportion of widows is higher than that of widowers to the total married population in the respective sex.

7. MARRIAGE RATES BY AGE:

Here an attempt has been made to calculate the marriage rates for males and females by the quinquennial age groups for the five decades 1901 to 1951, and to study the change in marriage rate by age.

There is no system of registration of marriages in India in general and in Rajasthan in particular. In this circumstance it is advisable to attempt and determine the annual number of marriages by an indirect method for Rajasthan, based on the data concerning the marital status of the State obtained from the population census. The reliability of census data and of the age returns have already been discussed in Chapter IV.

The method adopted in this calculation and explained below is based on the method adopted by Dr. G. Mortara,⁹ for the calculation of marriage rates by age of the Brazilian population 1940, with some slight modification to suit the data

8. "Census of India 1951 Vol. X. p.

9. Population Studies No.7 Vol.49, p.17.

available.

8. DESCRIPTION OF THE PROCEDURE USED:

The procedure adopted is explained below :-

" Suppose we observe a given group of population, say women, over a period of time, from the youngest age "x" at which marriage may occur, noting the number of these women who reach each subsequent birthday, and divide them into two groups, those who remained unmarried and those who are or have been married.

If " l_x " represents the total number of survivors at the x^{th} birthday and " m_x " the number of married or formerly married (or ever married) women, the cumulative frequency of marriage (frequency of marriages of single women once) up to the x^{th} birthday, say N_x , for the women then surviving will be expressed as follows"¹⁰.

$$N_x = \frac{m_x}{l_x} \dots\dots (1)$$

Let p_x be the probability of surviving at age x, then p_{x-1} will be the probability of surviving at the age x-1. Let q_x be the probability of dying at the age x and q_{x-1} will be the probability of dying at age x-1.

$$p_x = 1 - q_x \quad \text{and} \quad p_{x-1} = 1 - q_{x-1}$$

$$\text{But } q_{x-1} = \frac{l_{x-1} - l_x}{l_{x-1}} \quad (\text{ from Chapter IX of Life Tables}).$$

Where l_x and l_{x-1} represent: the total number of survivors at ages x and x-1 respectively.

$$\begin{aligned} \therefore P_{x-1} &= 1 - \frac{l_{x-1} - l_x}{l_{x-1}} \\ &= \frac{l_{x-1} - l_{x-1} + l_x}{l_{x-1}} \\ \text{or } P_{x-1} &= \frac{l_x}{l_{x-1}} \dots\dots\dots (2). \end{aligned}$$

m_x and m_{x-1} represent the total number of ever-married persons at the ages x & $x-1$, respectively. Therefore the number of newly married persons between the ages $x-1$ to x are given as $m_x = m_{x-1} P_{x-1} \dots\dots\dots (3)$

where P_{x-1} the probability of surviving of age $x-1$.

This excludes all those newly married between the ages $x-1$ and x and who die in that particular year.

\therefore The marriage rate will be
 $= \frac{\text{Survivals of the newly married between the ages } x-1 \text{ and } x}{\text{Survival of the total single living at the ages } x-1 \text{ upto age } x.}$

Single at the age $x-1$ is S_{x-1} where

$$S_{x-1} = l_{x-1} - m_{x-1} \dots\dots\dots (4)$$

Or $S_{x-1} + m_{x-1} = l_{x-1}$ or $m_{x-1} = l_{x-1} - S_{x-1}$

But there are some singles who have died between the ages $x-1$ and x . They have to be excluded from the calculation.

\therefore Survivals at the age x out of the single at age $x-1$ is
 $= (l_{x-1} - m_{x-1}) \times P_{x-1} \dots\dots\dots (5)$

\therefore The marriage rate $= \frac{(l_{x-1} - m_{x-1}) P_{x-1}}{(l_{x-1} - m_{x-1}) P_{x-1}} \dots\dots\dots (6)$

As those who have married and those that are dead during the same year x , do not appear either in the numerator or in the denominator and as those singles who are dead during the same year x , also do not appear in the numerator or denominator, the formula is not affected.

Replacing p_{x-1} by $\frac{l_x}{l_{x-1}}$, we have

$$= \frac{m_x - m_{x-1} \frac{l_x}{l_{x-1}}}{(l_{x-1} - m_{x-1}) \frac{l_x}{l_{x-1}}}$$

$$= \frac{\frac{m_x l_{x-1} - m_{x-1} l_x}{l_{x-1}}}{\frac{(l_{x-1} - m_{x-1}) l_x}{l_{x-1}}}$$

Dividing both numerator and denominator by l_x we have

$$= \frac{\frac{m_x l_{x-1} - m_{x-1} l_x}{l_{x-1} \times l_x}}{\frac{(l_{x-1} - m_{x-1}) l_x}{l_{x-1} \times l_x}}$$

$$= \frac{\frac{m_x}{l_x} - \frac{m_{x-1}}{l_{x-1}}}{\frac{l_{x-1}}{l_x} - \frac{m_{x-1}}{l_{x-1}}}$$

by (1)

$$\frac{l_{x-1}}{l_{x-1}} - \frac{m_{x-1}}{l_{x-1}}$$

where

$$\frac{m_x}{l_x} = N_x \quad \text{and} \quad \frac{m_{x-1}}{l_{x-1}} = N_{x-1}$$

$$= \frac{N_x - N_{x-1}}{1 - N_{x-1}}$$

which shows that, by subtracting from the cumulative marriage rate upto the ages of x that upto the age ($x-1$) and dividing it by one minus the cumulative marriage rate at $x-1$ (or the cumulative single age) we get the marriage rate at the x^{th} year of the age of the female surviving at the x^{th} birthday.

Since civil condition data for Rajasthan are available in the quinquennial age groups and hence the marriage rate so obtained will be five yearly marriage rates: To calculate the annual marriage rates for the age-group, the following procedure was adopted.

We have
$$U^5 = \frac{N_x - N_{x-1}}{1 - N_{x-1}}$$

where U is the marriage rate for a particular age- group.

Let U' , represent the annual marriage rate.

Supposing that the annual marriage rate for the age-group

40 - 44, be $U'_{40}, U'_{41}, U'_{42}, U'_{43}, U'_{44}$.

Let $S_{40}, S_{41}, S_{42},$ etc., represent the single at ages

41, 42, etc.,

Then married at age 40 will be $U'_{40} S_{40}$.

Single at age 41 out of single at 40 = $S_{41}, = S_{40} - U'_{40} S_{40}$

\therefore married at age 41 last birthday = $S_{41} U'_{41}$

or $S_{40} U^5_{40} = S_{40} \left(U'_{40} + U'_{41} (1 - U'_{40}) + \right.$
 $U'_{42} (1 - U'_{41}) (1 - U'_{40}) + \dots$

$$U'_{44} (1 - U'_{43}) (1 - U'_{42}) (1 - U'_{41}) (1 - U'_{40}) \}$$

Where U'_{40} is five yearly marriage rate at age 40.

If all the U's are equal

$$\text{then } S_{40} U'^5_{40} = S_{40} U' \{ 1 + (1 - U') + (1 - U')^2 + (1 - U')^3 + (1 - U')^4 \}$$

$$= S_{40} U' \left\{ \frac{1 - (1 - U')^5}{U'} \right\}$$

$$= S_{40} \{ 1 - (1 - U')^5 \}$$

$$\text{or } U'^5 = \{ 1 - (1 - U')^5 \}$$

$$\text{or } (1 - U')^5 = 1 - U'^5$$

$$\text{or } 1 - U' = \{ 1 - U'^5 \}^{1/5} \quad \text{Taking logs}$$

$$\log (1 - U') = 1/5 \log (1 - U'^5) \quad \text{Taking Anti logs}$$

$$1 - U' = \text{Anti-log } \frac{1}{5} \log (1 - U'^5)$$

$$\therefore \underline{U' = 1 - \text{Antilog } \frac{1}{5} \log (1 - U'^5)}$$

This will give us the Average Annual Marriage Rate for a particular age group, which is expressed as the percentage.

or This gives us the proportion of the number of persons married in a year, of a particular age-group to the number of single persons in that age-group.

Taking five-yearly marriage rates " U'^5 " as the frequency and the given age-groups as the number the mean age at marriage for the each decade, both for males and females has been estimated.

The changes in the age at marriage of males and females in the population of Rajasthan in the five decades

have been compared, and the comparison is given below.

For the purpose of present study it was considered advisable to confine graduation of the age-group to the number of single woman only. The graduation is done by the "wave cutting method" i.e. by taking the number of each group in the proportions of 1 : 2 : 1 and dividing by 4. This gave the numbers for the central group. In some cases of single further graduation was necessary and has been made by the free hand graphic method, which smoothed the curve of single persons without changing the shape and maintaining approximately the same proportion of singles in the total population.

The graduated figures for total males and females in each age group have been taken from chapter IX, where they are graduated for the estimation of Life Table.

9. AVERAGE ANNUAL MARRIAGE RATES
BY FIVE-YEARLY AGE-GROUPS

In Table V.6, are shown the average annual marriage rates by five-yearly age-groups for the male and female population of Rajasthan during the period 1901 to 1951.

The Table indicates the proportion of number of persons married in a year in a particular age-group to the total number of the singles in the same age-group. The proportion has been estimated for the ever married persons in the five decades for males and females separately.

TABLE V.6.

Average annual marriage rates for males and females by five-yearly age-groups from 1901 to 1951, for the population of Rajasthan:

(Percentage)

S.No.	Age Group	1901	1911	1921	1931	1941	1951
	1	2	3	4	5	6	7
MALES: -							
1.	5 - 10	0.4500	0.33	0.79	0.79	0.19	0.90
2.	10 - 15	0.6690	4.26	1.14	3.06	2.91	3.98
3.	15 - 20	6.2197	5.41	16.99	10.35	10.53	5.73
4.	20 - 25	18.2301	28.06	33.15	23.84	28.81	29.01
5.	25 - 30	20.4267	20.48	13.93	22.35	30.00	21.01
6.	30 - 35	13.2981	11.84	10.30	21.18	19.95	19.24
7.	35 - 40	9.7399	11.32	8.74	5.73	7.99	5.07
8.	40 - 45	4.4052	6.60	6.83	3.95	4.06	4.50
9.	45 - 50	2.3635	1.58	3.47	3.00	0.23	3.04
10.	50 - 55	1.8396	0.89	1.73	2.49	0.61	2.12

FEMALES: -

1.	5 - 10	4.41	4.98	4.12	4.23	2.33	3.16
2.	10 - 15	4.54	10.74	7.21	8.02	6.91	9.32
3.	15 - 20	14.66	19.70	14.81	16.89	15.92	16.30
4.	20 - 25	24.30	28.17	23.22	29.17	24.44	27.63
5.	25 - 30	23.43	18.95	26.06	18.70	26.79	23.51
6.	30 - 35	8.24	6.32	11.45	11.12	10.75	10.08
7.	35 - 40	4.98	4.44	3.71	4.21	5.74	5.09
8.	40 - 45	4.71	3.18	1.53	4.82	1.76	1.91
9.	45 - 50	2.74	2.69	0.76	4.05	0.26	0.21
10.	50 - 55	1.03	0.50	0.09	2.52	0.08	0.09

Note:- 1. The marital status data for the 1931 census have been smoothed by the Census Superintendent before publication. These data are, therefore, not fully comparable with the marital status data for other decades which are subjected to smoothing formula.

2. The marital status data for 1951 census have not been uniformly presented in different age-groups as in the previous decades. The 1951 data have been estimated for

single males and females, as has been explained earlier.

3. The above table has been compiled from the marital status data as given in Rajasthan Censuses for different decades.

4. No adjustments have been made for changes in boundaries of the States.

Table V.6, shows the highest marriage rate in the age-group 20-25 for males as well as for females. This shows that the marriage rate i.e., the proportion of ever married in an age group to the single in that age-group reaches the maximum value in the group 20-25, in Rajasthan. In 1901 and 1941, the marriage rates are maximum in the age groups 25-30 for males, whereas in 1921 and 1941, the marriage rates are maximum for females in the same age-groups. In 1941 the marriage rate is very low in the early age-groups of 5-10 because of the change in the definition of "married" in that census. In 1951 census all persons below age five were taken single.

In males, the marriage rate is low in the early age-groups. It starts rising high from the age-group 15-20 and shows higher rise upto the age 45; thereafter it suddenly falls. However, in females, the marriage rate goes on increasing from the lowest age group of 5-10 years. It reaches the highest value in the age group 15-20 years and remains higher still upto the age 35. In the age-group 40-45, it then shows a sudden fall.

This indicates that the marriages of females, in Rajasthan, take place at an earlier age than those of males. The marriages of females generally take place between the ages 5 and 30, whereas those of males are generally between

MEAN AGE AT MARRIAGE IN RAJASTHAN

(1901-1951)

SCALE ALONG OX $\bar{1}$ = 10 YEARS

» OY $\bar{1}$ = 1 YEAR AGE

N

MEAN AGE

21 Y

20

19

18

17

16

15

14

13

MALES

FEMALES

1901

1911

1921

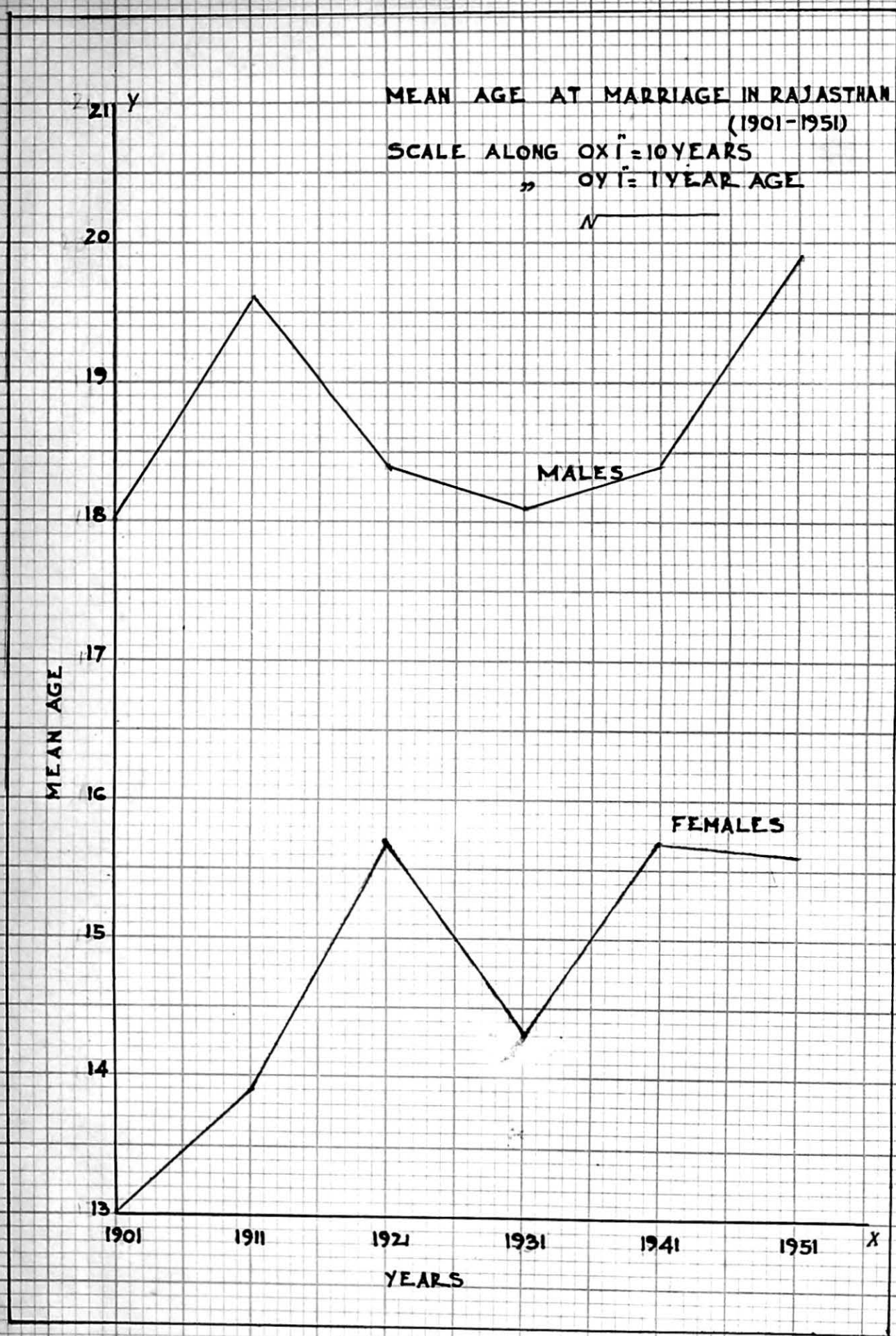
1931

1941

1951

X

YEARS



15 and 40 years.

The table also shows a declining trend of marriage rates of females in the age groups 5-10 and 10-15 for the years 1941 and 1951, which shows that female child marriages are decreasing in Rajasthan.

10. MEAN AGE AT MARRIAGE IN RAJASTHAN:

In Table V.7, is given the mean age at marriage of males and females in Rajasthan for the six decades from 1901 to 1950.

TABLE V.7.

Mean age at marriage in Rajasthan from 1901 to 1951
For males and females separately :

S.No.	Year	Mean
<u>MALES:-</u>		
		(18.00)
1.	1901	21.89
2.	1911	19.63
3.	1921	18.42
4.	1931	18.06
5.	1941	18.43
6.	1951	19.89
Average		18.8
<u>FEMALES:</u>		
		(13.00)
1.	1901	15.67
2.	1911	13.93
3.	1921	15.66
4.	1931	14.27
5.	1941	15.69
6.	1951	15.55
Average		14.7

Note:- The mean age at marriage of males and females for the five decades have been determined from the

frequency of marriage, obtained from the marriage rate. The number of unmarried at age 0 was taken as hundred and by multiplying the survivors of unmarried in age-group from the marriage rate of the group, the frequency of marriage was obtained. From the frequency of married so obtained and the age-groups the mean age at marriage was calculated.

Table V.7 , shows that the mean age of marriage for males in Rajasthan varies between 18.1 in 1931 to 21.9 in 1901, whereas for females it varies between 13.9 in 1911 to 15.7 years in 1941. The mean age at marriage shows fluctuation from year to year. The mean age at marriage in 1901 as estimated by the method explained above appears to be high both for males and females. Since the 1901 census was the first enumeration in some parts of Rajasthan, the age reporting in this year was very wrong. The age of married persons may have been conjectured to be high. Hence it gives a high mean age at marriage. The value in the brackets are the estimated probable mean ages for males and females for that decade.

The mean age at marriage for Rajasthan for males and females and for other States of India have also been estimated by S.N. Agarwal. His values of mean age at marriage for Rajasthan and those estimated by us have been compared in Table V.8 below.

TABLE V.8.

Mean Age at Marriage in Rajasthan and All India by
Two Methods:

S.No.	State	Sex	1901	1911	1921	1931	1941	1951	Average
	1	2	3	4	5	6	7	8	9
			(18.0)						
1.	Rajasthan	Male	21.9	19.6	18.4	18.1	18.4	19.9	18.8
		Female	(13.0)						
			15.7	13.9	15.7	14.3	15.7	15.6	14.7
2.	Rajasthan*	Male	19.7	21.0	20.4	18.4	18.7	18.7	19.3
		Female	13.7	13.0	13.1	12.4	13.5	14.2	13.3
3.	India	Male	20.0	20.4	20.7	18.4	20.3	19.9	20.0
		Female	12.8	13.1	13.5	12.5	14.9	15.4	13.7

- Notes:- 1. The values of mean age at marriage in Rajasthan given in column 2 and for All India have been taken from the "Population Index", Vol.23, No.2, April, 1957. "The Age at Marriage in India" by S.N. Agarwal Table 3 p.103.
2. The two mean age at marriage have been estimated by different methods. Agarwal has used Dr. Majual John's Method, vide "Population Studies No.7, Nov.1953".
3. It may be pointed out that Agarwal has estimated the mean age for females from the age-groups from 0 to 32 only whereas we have estimated from age groups 0 to 55. By this weighing is given to lower ages in Agarwal's value and hence his values for females are lower than those estimated by us. We have also accounted for those persons marrying in a particular year and dying in that year.

* Estimated by S.N. Agarwal.

Table V.8, gives the difference in the mean age at marriage estimated by two different methods. The second values of mean age are higher for males and lower for females than the first estimate.

The mean age at marriage for females in Rajasthan is higher than that for All India. This may be due, firstly, to the weightage given to the lower age, in the second method for the estimation of mean age for All India, and secondly, due to the large number of tribal population of Rajasthan among whom the age at marriage is, in general, high.

TRENDS OF THE BIRTH RATE

CHAPTER VI

TRENDS OF THE BIRTH RATE

1. LIMITATIONS OF VITAL STATISTICS:

No records have been maintained of births and deaths in the Princely States of Rajasthan in the past. Although some States are said to have kept a limited record of the vital events but either they are incomplete or have never been published and analysed.

The Imperial Act of 1886, which governed the registration of births and deaths in British India, was not applicable to the Princely States of Rajasthan. Hence it was not compulsory for the Darbars to register the births or deaths in their States. It was only in the bigger States like Jaipur and Kotah, which had their own law governing the registration of vital events, but the registration in these States was also incomplete and the full records were not available for all the decades. The Imperial Act was only applicable in this region in the British province of Ajmer State, for which Vital Statistics data are available. But during the War time the data were not analysed and hence are available only for certain years. Since the area of Ajmer State is only 1.4 percent to the total area of Rajasthan, its data cannot be used for drawing inferences for the whole of Rajasthan.

"Even though an area may be under registration this

CHAPTER VI

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"Even though an area may be under registration this does not mean that its reporting of births and deaths are complete. On the contrary there are reasons even to believe that in Ajmer State also the number of births reported was, on the average, about 44 percent¹ below the actual number. To

¹ The estimates of under enumeration have been made by the Census Superintendent of 1951. "Census of India 1951, Vol. X, Rajasthan & Ajmer Part I-A-Report-Vital Statistics p.75.

understand the reason of this deficiency which existed and which still exists, one has simply to recall the illiteracy and rural character of the population and the man, the village Patwari, who usually serves as the registrar." The areas under Jagiri and Istimarardari tenure (land lords) in Ajmer State were the most defective in respect of registration where there was no satisfactory arrangement for the recording of vital events.

An analysis based on the actual figures of population from the census and the registered figures of births and deaths for Ajmer State have been made by the census Superintendent of 1951 to estimate the percentage of omissions in the registration data. In conclusion he states that " if the deficiency in the registration of births and deaths be the same, it would indicate that the percentage under-registration of vital events was of the order of 65 percent. And if the percentage omission in births is higher than that in deaths the figure of 65 percent would indicate the lower limit for the deficiency in the registration of births in the State."² The estimate further puts the limitations on the reliability of the data of the State.

With reference to the degree of completeness and efficiency of the registration of vital Statistics in India, the Census Actuary for 1951, had divided the entire area of the country into four categories. Ajmer State was put in the Category A, " the area for which birth-death registration data are available for all the three decades 1921-30,

2. Ibid p.103.

1931-40 and 1941-50, and where omissions are not unduly large and the registration may, therefore, be regarded as being reasonably satisfactory."³ Rajasthan was put in the category D- " the areas for which births-death registration data are not available at all."³ The deficiency of vital statistics in the case of Ajmer State, which has been put in category A by Census Actuary 1951, has already been seen above and the condition of data for other part in category A may well be imagined.

2. ESTIMATION OF BIRTH RATE:

The deficiency of registration statistics being what it is, efforts have been made to estimate the birth rates for Rajasthan and its natural regions for the five decades from 1901 to 1951 by an indirect method. In an area not possessing trustworthy statistics about migration the importance of the population census is still greater, because it provides an approximate knowledge, at least in parts, of certain fundamental data about such movements. For example the number of persons living during the early years of life is less than the annual number of births during the period immediately preceding the census; comparison between the number of the living in successive age-groups may give some indications concerning the number of deaths between the ages in questions; the anomalies of the distribution of population in respect of age indicate the extent of migratory movements.

From time to time Statisticians have made estimates for the All India birth and death rates. These were generally based on the census age returns, life tables and migration statistics,

³, Census of India Paper No.6-1954. "Estimation of Birth and Death Rates in India during 1941-50 Census, p.2.

independent of the registration data and were something in the absence of anything. For instance, G.F.Hardy, the Census Actuary for the Censuses of 1891 to 1911, had estimated, for the first time, the birth rate for three decades. Estimates of birth rates were also made by A.E. Porter, the Census Superintendent for Bengal, for the decade 1931 for that province. Kingsley Davis, in his book "The Population of India and Pakistan, has made estimates of birth and death rates for the decades ending in 1931 and 1941, for All India and Provinces. Recently some estimates of birth and death rates for all India and All States separately have been made by S.P. Jain, the Census Actuary for 1951.

Using the Census returns of age distributions and following a method similar to the one used by A.E. Porter for the estimation of birth rates for Bengal in 1931, estimates for the birth rates of Rajasthan and its natural regions for males and females have been made for all the five decades from 1901 to 1951. The estimated birth rates have been expressed per mille of the average population of the decade in consideration.

The method assumes migration to be negligible. But such assumption for Rajasthan may not be true, since the State show a heavy emigration of population. In the absence of migration statistics for the State recourse has been taken to this method which may atleast give some rough idea of the birth rates for the State for the five decades and indicate the change, if any. Full reliance cannot be put

4.Census of India, 1931, Vol.V. Bengal and Sikkim. Part I-Report by A.E.Porter-Section 148. "An estimate for census figures of the birth and deaths, 1921-30, p.127.

on the rates estimated but in the absence of any estimates they give atleast some idea.

3. A RESUME OF THE METHOD:

In short the method of estimation of birth rates is as follows. If the effects of migration be neglected, the difference between the total population of 1951 and 1941 gives the number of persons born in the decade 1941-50. To this difference the total deaths, estimated in the manner explained in Chapter VIII, in the decade are added which gives the estimate of total birth in the decade. Dividing the estimated total birth to the mean population of 1941, 1951 and representing the ratio per thousand gives the estimates of the birth rate for the decade.

The detailed method of estimation of birth and death rates have been discussed in Chapter VIII "Death Rates".

The estimation of birth rates have been made for the entire Rajasthan and its natural regions for males and females separately for the five decades from 1901 to 1951 by the same method explained above. The estimate of birth rate for both sexes is made by averaging the birth rates of males and females.

4. BIRTH RATES FOR TOTAL RAJASTHAN:

In Table VI.1. are given the estimated birth rates for Rajasthan males and females for the five decades 1901 to 1951. The estimated birth rates for All India, for the same decades are also shown in the table for comparison.

BIRTH RATE IN RAJASTHAN AND ALL INDIA
(1891-1951)

SCALE ALONG OX1" = 10 YEARS

" OY1" = 10 BIRTHS
PER THOUSAND

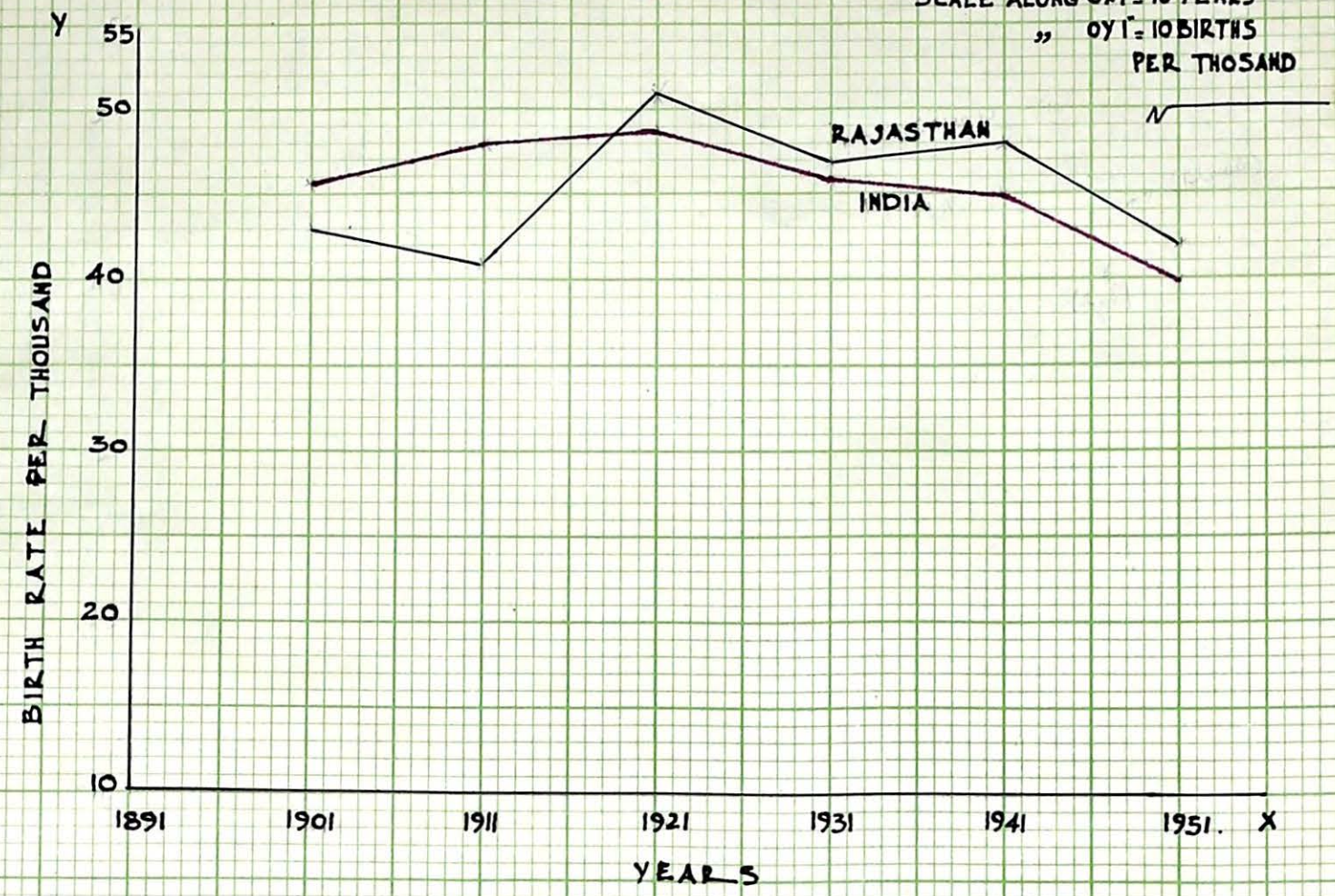


TABLE VI.1.

Estimated Birth Rates for Rajasthan And All India, for the
the decades 1901 - 1951 (Per 1000):

S.No.	Year	Males	Females	Both Sexes.	All India Both sexes.
1	2	3	4	5	6
1.	1901	42.3	43.1	42.7	46
2.	1911	40.6	41.0	40.8	48
3.	1921	49.8	51.8	50.8	49
4.	1931	46.5	48.2	47.3	46
5.	1941	47.4	49.0	48.2	45
6.	1951	42.3	43.9	42.6	40

Note:- 1. Birth rates for Rajasthan have been estimated from the corrected age distribution (Chapter IV) of Rajasthan corrected for the changes in boundaries .

2. The estimated birth rates for All India upto 1941 have been taken from Kingsley Davis' book "Population of India and Pakistan" page 69.

3. Birth rate estimates for 1951 have been taken from the " Census of India Paper No.6-"1954 page 10.

Although the estimates of birth rates are very rough yet they atleast are something in the absence of any estimates and did show the magnitude of Rajasthan's birth rate at the turn of the decades. The estimated birth rates for the decade 1901 and 1911 are lower than the one shown by All India. This may be due to the lower proportion of population in the child bearing age in these decades in Rajasthan as was shown in

Chapter IV. From 1921 to 1951, the birth rates of Rajasthan are more or less equivalent to the All India rates. The 1951 rates have shown a declining trend as shown by All India. Nevertheless, Table VI.1 shows that Rajasthan's birth rate has been, and still is, exceedingly high.

A similar estimate of the birth rate of Rajasthan for the decade 1941-50, has been made by S.P. Jain, the Census Actuary 1951, His estimate of Rajasthan's birth rate by "Diffeencing method" is 42.5 and by "Reverse Survival method" is 47.8: He has also estimated the birth rates for other States of India for the same decade, and his estimates for some of the important States are : Bombay (39.0), Punjab (41.2), Madhya Bharat (44.2), Madhya Pradesh (46.1), Uttar Pradesh (38-6), and Ajmer State (45.0).⁵

Not much reliance can be placed on these tendencies or inferences as different estimates of birth rate for the same year 1951 differ so much from one another that conclusions based on each of them will be different from those based on others.

(5. REGIONAL BIRTH RATES:

Birth rates for the four natural regions of Rajasthan have also been estimated for males and females for the five decades from 1901 to 1951 in the same manner as have been used for the entire Rajasthan. For the estimation of regional birth rates the corrected age distribution for changes in the boundary (given in Chapter IV) have been made use of to estimate the rates for the uniform areas in all the decades.

5. Census of India Paper No.6- 1954 "Estimation of Births and Deaths" by Shri S.P. Jain . Table No.3 p. 10.

(1) Birth rate for Ajmer Region:

In Table VI.2, are given the estimated birth rates from the age distribution data and those calculated from the vital Statistics of the region. The estimated birth rates from the vital Statistics have been taken from the Census of Rajasthan and Ajmer 1951.

TABLE VI.2.

Estimated Birth Rates for Ajmer Region 1901-1951
(Per thousand) :

S.No.	Year	Estimated birth Rates			Birth Rates estimated from Vital Statistics.
		Males	Females	Both sex.	
	1	2	3	4	5
1.	1901	41.2	41.0	41.1	-
2.	1911	39.4	41.8	40.6	48.0
3.	1921	40.4	48.5	44.5	38.1
4.	1931	46.0	44.6	45.3	32.3
5.	1941	43.3	44.5	43.9	38.0
6.	1951	40.2	40.6	40.4	29.0

- Notes:-
1. Birth rates for Ajmer region have been compiled from the data corrected for the changes in the boundaries.
 2. Estimated birth rates from vital statistics have been taken from "Census of India 1951" Vol.X, Rajasthan and Ajmer Part I--Report, Table No.70, p. 77.

The estimate of Birth Rate as made by S.P. Jain, the Census Actuary 1951, for Ajmer State for the decade 1941-50 is 45.0 by the "differencing method" and 46.5 by the "reverse survival method"⁶. His estimates appear to be too high and cannot be taken to represent the tendency. The estimates of birth rate made from the Vital Statistics data are quite low and hence indicate the unreliability of such statistics. The estimate for the decade 1901 to 1911 of birth rate which is 48.0 is quite high and may be by chance.

The estimates of birth rate from the age distribution show a constant trend of the rate. The rates after 1931 show signs of constant decline which may be considered a favourable indication.

(ii) Birth Rates of Eastern Region:

In Table VI.3, are given the estimated birth rates for the Eastern region of Rajasthan, made from the corrected age distribution data of the region for the changes in boundary and for the uniform area for all decades. The estimates are made in the same manner as for total Rajasthan.

TABLE VI.3.

Estimated Birth Rate for the Eastern Region of Rajasthan from 1901-1951 (per thousand).

S.N.	Year	Estimated Birth Rate		
		Males	Females	Both Sex
	1	2	3	4
1.	1911	41.4	41.7	41.5
2.	1921	50.3	54.5	52.4
3.	1931	47.8	49.3	48.0
4.	1941	49.1	51.3	50.2
5.	1951	42.6	45.0	43.8

6. "Census of India Paper No.6-1954 p.10.

Note:- The estimate of birth rate has been made from
 1. the data corrected for the changes in the boundaries.

2. The estimates of birth rate from Vital Statistics data for the region could not be made as subh data for the region are not existing. Also the estimates of birth rate for the decade 1891 to 1901 were not made as the age distribution records in the quinquennial groups for the 1891 census for the region were not available.

As has been seen in Chapter III, the eastern region is most thickly populated of all the regions of Rajasthan. It supports about onethird of the total population of the State. The region is comparatively fertile and has its industries developed. It is seen from the above table that the birth rate of the region is also high.

(iii) Birth rate for Western Region:

In Table VI.4, are given the estimated birth rates for the Western region of Rajasthan for five decades from 1901 to 1951. Estimates here are also made from the age distribution data of the corrected population for changes in the boundary and are for uniform area in all decades.

TABLE IV.4.
Estimated Birth Rates for Western Region of Rajasthan
1901-1951 (Per 1000):

S.N.	Year	Estimated Birth Rates		
		Males	Females	Both sex.
	1	2	3	4
1	1911	39.7	39.8	39.8
2	1921	52.8	54.9	53.8
3				

....

Contd.-

S.N.	Year	Estimated Birth Rates		
		Males	Females	Both sex.
	1	2	3	4
3	1931	43.1	45.5	44.3
4	1941	41.1	44.9	43.0
5	1951	41.9	40.5	41.2

Note:- The estimate of birth rate has been made from the data corrected for the changes in the boundaries.

The Western region of Rajasthan is mostly desert.

The region has scanty rainfall and is very often subject to famines. The living conditions and the climate of the region are not good. The sex ratio in the region is the lowest in the whole of India indicating that very few females like to live in the region. The birth rate estimates indicate a low rate for the region. The estimates for the decade 1911-20 are quite high for males and females which may be due to chance otherwise the region shows a constant birth rate for all decades.

(iv) Birth rates for Southern Region:

Table VI.5 gives the estimated birth rate for the Southern region of Rajasthan for the five decades 1901 to 1951 for males and females.

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TABLE VI.5

Estimated Birth rate for Southern Region of Rajasthan
1901 - 1951 (per thousand).

S.N.	Year	Estimated Birth- rate		
		Males	Females	Both sex.
	1	2	3	4
1	1911	40.3	40.8	40.5
2	1921	49.3	52.2	50.7
3	1931	47.6	49.6	48.6
4	1941	49.3	50.5	49.9
5	1951	46.0	47.3	46.6

Note:- The estimate of Birth rate has been made from data corrected for the changes in the boundaries.

Southern region of Rajasthan is a hilly tract and has well watered valleys. It is also the home of Bhils and Graseia tribes of Rajasthan who are most prolific. The region is comparatively free from famines and water scarcity and even did not suffer much from the influenza epidemic of 1918.

The estimated birth rates for the Southern region are comparatively higher than those in the other regions of Rajasthan. This high rate is maintained in all the decades except for 1901-1911, which is low in the region, as also in other regions.

In Table VI.6, are shown the estimated birth rates for Rajasthan compared with the rates in its natural regions for the five decades 1901 to 1951.

TABLE VI.6 -130-
 Estimated birth-rates for Rajasthan and its natural regions
 for years 1911-1951 (Per 1000)

S.N.	Year	Estimated birth rate both sexes.				
		Rajasthan	Ajmer Region	Eastern Region	Southern Region	Western Region
1	1911	40.8	40.6	41.5	40.76	39.8
2	1921	50.8	44.5	52.4	50.63	53.8
3	1931	47.3	45.3	48.0	48.52	44.3
4	1941	48.2	43.9	50.2	49.91	43.01
5	1951	42.6	40.4	43.8	46.75	41.2

Note:- The estimates of birth rate have been made from the data corrected for the changes in the boundaries.

It may be pointed out that the birth rates for total Rajasthan are not the average of the birth rates of natural regions but are different. The birth rates for total Rajasthan and for all the natural regions are estimated independent of the age distribution data of each of them.

One thing is very clear from the table that the birth rate for Rajasthan and its natural regions is quite high and this high rate is maintained constantly through. It is only in decade 1941-50 that the rate shows a declining trend. The birth rates of the Eastern region are the highest in Rajasthan and are closely followed by the Southern region. The western region and Ajmer region show a similarity to that of the State as a whole. The decade 1901-1910, in general, has shown a lower birth rate whereas the decade following it has shown a high rate which shows that population tends to maintain itself.

FERTILITY

CHAPTER VII

FERTILITY

1. Fertility data in 1941 Census
of Rajasthan:

It was for the first time in 1941 that an attempt was made by the Census Superintendent of Rajasthan to collect fertility data, and gather information on mother's age at the time of birth of the first child, total number of children born to her and the number surviving. The information, however, was restricted to women belonging to three caste-groups, namely, Brahmin, Jat and Chamar, falling under high, intermediate and lowest-caste categories respectively. Numerically, they were the largest groups in the population. No other fertility data are available in Rajasthan excepting for 1941. This Chapter deals only with these fertility data.

The fertility data of all the twentyone Princely States of Rajasthan and Ajmer-State were collected. But later on the data of eleven States¹ were found defective and were excluded from final assessment.

For this purpose replies were sought from all married women to the following two questions :

- (1) How many children were born and how many were surviving ?
- (2) What was the age at the birth of the first child ?

2. Limitations of the data:

The data thus collected were defective on account of two factors. One was 'age of the married women', and the other

1. States which were excluded from the fertility group were:-
1. Alwar, 2. Bharatpur, 3. Bikaner, 4. Dholpur, 5. Jaisalmer,
6. Jaipur, 7. Kotah, 8. Marwar (Jodhpur), 9. Mewar (Udaipur),
10. Sirohi, 11. Tonk.

was a 'superstitious belief'. It is well-known that age returns in the census were seldom correct and this factor could not be lost sight of while examining the fertility data. Secondly the people believed in superstitions and did not like to tell the true number of their children as they were afraid they may incur the wrath of God for boasting about the number of children they had and may be punished by Him by taking away their children. This has a bearing on the first part of the question asked and could not be ignored.

As regards the first question, the Census Superintendent wrote², quite apart from the consideration that to answer it truthfully was deemed by many to be unlucky there were literally hundreds of cases where, with the best will in the world, the question could not be answered accurately. For instance, among the Meos- when a widow remarries, she leaves her children by her first husband with his family. There was a case in Alwar State where a Meo lady had been married three times. She could state accurately the number of children she had borne, but had no idea whether those by her first and second husbands were still alive or not. There was a similar difficulty among the Chamar lady, if she wants a change of mate, need not wait until her husband dies. She looks round for a man of her fancy, then goes and sits in his house. If he approves, he pays a bride-price to the ex-husband, hands over any children begot by him, and lives happily with the lady till she again feels the urge for a change in bed-mates. And so the game goes merrily on."

But there were other difficulties, too, pointing those the census Superintendent wrote: "What is one to do with a
2. These Ten Years by A.W.T. Webb.p.101-102.

lady who counts upon her fingers the number of children she has had seriously and for a long time, and then blandly admits that she simply cannot remember? or with the poor old soul who had borne numerous children and lost them all, and who, bursting into tears at the memory, proceeded to pour a torrent of abuse upon the Enumerator for having reminded her of her loss, finally refusing absolutely to answer any further questions?"³ As

against those cases where facts were hazy, one sometimes ran up against superaccuracy (if there can be degrees in accuracy !) The census Superintendent gives a few examples of such super accuracies. " There was a lady, who smilingly announced that she had three children. All were alive, "thank you", and there was another child of eight months alive in her womb ! ... Another optimistic (or sarcastic ?) dame begged the Enumerator, in the name of God, to restore all her lost children so that she might be able to reply to the question after actual counting."⁴

A few more interesting facts as given by the Census Superintendent may also be recorded in connection with the Fertility Tables to have a clear idea of the reliability of the data: He writes: " From Tonk comes the news of one Hindu woman who had her first child at the ripe (very ripe for India) age of 53, and of one Hindu girl of Barwa (Brahmin) caste who began her maternal duties at nine. In Banswara one woman of 43 had given birth to 21 children, of whom only 3 survived. So perhaps when the Superintendent of that State wrote 'Fatality' for Fertility he was not far wrong."

The fertility data also include those sterile women

3. Ibid p. 102.

who stated that they had one or more live births (called for the sake of brevity "fertile" women). The table also includes the still born children whom the women had enumerated as live born. Also there may be some women who would not like to announce the dead child, (as it may be painful), and hence would have excluded them from her total.

3. FERTILITY TABLES:

The fertility tables given in the 1941 census of Rajasthan have been reproduced here for a detailed study. The Fertility Table I gives the number of married women in the three castes, in the age groups 9-11, 12 -13, 14 -16 and then in the quinquennial age groups of 17-21, 22-26 and so on upto age 71. The last group being 72 and over. The Fertility Table II gives the age of the mother by single year at the birth of the first child from the age of 11 to 30 years. They then give the total number of children ever born to the married women in the above ages and the total number of children surviving at the time of the census. The average number of children born to the married women in each age and the proportion of survival to 1000 born for each group has also been calculated and is presented for each caste separately in the tables.

TABLE VII. I

FERTILITY TABLE I.

Social Groups

S. No.	Age Group	B r a h m i n s					J a t s					C h a m a r s				
		No. of Married women.	Total No. of children Born.	Average of children surviving to 1000 born.	Total No. of children surviving to 1000 born.	Proportion of survival to 1000 born.	No. of married women.	T.No. of children born.	Average of children surviving to 1000 born.	T.No. of children surviving to 1000 born.	Prop. of survival to 1000 born.	No. of married women.	T.No. of children born.	Av. of children surviving to 1000 born.	T.No. of children surviving to 1000 born.	Proportion of survival to 1000 born.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
RAJPUTANA & AJMER-MERWARA:																
1.	9-11	279	-	-	-	-	823	1	-	1	1000	633	11	0.2	3	273
2.	12-13	560	9	-	4	444	884	-	-	-	-	842	101	0.1	27	267
3.	14-16	2007	277	0.2	174	628	1504	33	-	23	718	1697	621	0.4	178	287
4.	17-21	4034	3883	1.0	2724	702	3258	1494	0.6	1001	670	3935	4671	1.2	3002	643
5.	22-26	4883	12460	2.6	7966	639	2632	5347	2.2	3658	626	5257	13707	2.6	9400	686
6.	27-31	3935	16006	4.1	10094	631	2450	8672	3.5	5661	653	4452	17520	3.9	12276	701
7.	32-36	2787	14246	5.1	8872	623	1638	7604	4.6	5067	666	2626	13429	5.1	9112	679
8.	37-41	2120	12326	5.8	7197	534	1205	6664	5.5	4234	635	2323	13035	5.6	8613	658
9.	42-46	1337	7901	5.9	4538	531	729	4069	5.6	2505	616	1361	7895	5.9	5091	645
10.	47-51	1364	8038	5.9	4329	539	759	4252	5.6	2516	592	1443	7962	5.5	5016	630
11.	52-56	607	3700	6.1	1946	526	355	1772	5.0	1024	578	575	3222	5.6	1993	619
12.	57-61	590	3180	5.4	1549	487	311	1692	5.4	914	540	641	3348	5.2	1809	570
13.	62-66	230	1314	5.7	593	451	63	331	4.9	165	498	154	878	5.7	460	540
14.	67-71	164	910	5.5	430	473	45	217	4.8	103	475	175	855	4.9	417	488
15.	72-	129	698	5.4	285	408	22	127	5.8	59	465	96	563	5.9	253	458
16.	Total	25076	84948	3.4	50751	597	15833	42731	2.7	26936	630	26215	87868	3.4	57655	656

Note:- The following States have been excluded :-

1. Alwar, 2. Bharatpur, 3. Bikaner, 4. Dholpur.
5. Jaisalmer, 6. Jaipur, 7. Kotah, 8. Marwar.
9. Mewar, 10. Sirahi, 11. Tonk.

1. Alwar, 2. Bharatpur, 3. Bikaner,
4. Dholpur, 5. Jaipur, 6. Kotah
7. Marwar, 8. Mewar, 9. Tonk,
10. Jaisalmer,

1. Alwar, 2. Bharatpur, 3. Bikaner
4. Dholpur, 5. Dungarpur, 6. Jaipur
7. Kotah, 8. Lawa, 9. Marwar,
10. Mewar, 11. Tonk.

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TABLE VII. II
FERTILITY TABLE II

SOCIAL GROUPS

S. No.	Age at the birth of first child.	Brahmins				Jats				Chamars				Proportion of survival to 1000 born.			
		No. of married women.	Total No. of children born.	A.V.	Total No. of children surviving to 1000 born.	No. of married women.	Total No. of children born.	A.V.	Total No. of children surviving to 1000 born.	No. of married women.	Total No. of children born.	A.V.	Total No. of children surviving to 1000 born.				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RAJPUTANA & AJMER-MERWARA:																	
1.	11	17	73	4.3	46	630	4	18	4.5	8	444	10	40	4.0	25	625	
2.	12	62	292	4.7	156	534	26	129	5.0	82	636	115	511	4.4	322	630	
3.	13	226	980	4.3	539	611	102	483	4.8	317	643	302	1304	4.3	849	651	
4.	14	762	3513	4.6	2131	607	273	1197	4.4	769	642	855	3602	4.2	2307	640	
5.	15	2286	10686	4.7	6366	596	882	3995	4.5	2456	615	2305	10541	4.6	6972	661	
6.	16	2623	11949	4.6	7022	588	998	4258	4.3	2545	598	2364	9976	4.2	6418	643	
7.	17	2297	9278	4.0	5590	603	913	3694	4.0	2354	637	1852	7314	3.9	4779	653	
8.	18	3438	15422	4.5	8923	579	1721	7195	4.2	4580	637	3394	13830	4.1	9024	652	
9.	19	1611	5749	3.6	3767	655	856	3199	3.7	2030	635	1652	5855	3.5	3929	671	
10.	20	3202	15351	4.8	8923	581	2149	9182	4.3	5818	634	4020	18446	4.6	11735	636	
11.	21	640	2432	3.8	1522	626	489	1877	3.8	1103	588	815	3027	3.7	2111	697	
12.	22	748	3108	4.2	1952	628	652	2601	4.0	1676	644	981	3932	4.0	2648	673	
13.	23	366	1378	3.8	903	655	283	997	3.5	671	673	475	1714	3.6	1194	697	
14.	24	250	962	3.8	657	683	221	743	3.4	481	643	428	1461	3.4	1039	711	
15.	25	537	2391	4.5	1381	578	449	1843	4.1	1149	622	825	3591	4.4	2474	689	
16.	26	73	238	3.3	154	647	70	268	3.8	179	668	134	495	3.6	317	654	
17.	27	74	256	3.5	169	660	62	210	3.4	138	657	120	466	3.9	305	655	
18.	28	64	217	3.4	129	594	83	285	3.4	197	691	139	493	3.5	361	732	
19.	29	62	101	1.6	65	644	34	88	2.6	60	682	46	153	3.3	100	654	
20.	30	158	572	3.6	296	517	152	503	3.3	323	642	293	1127	3.8	746	662	
21.	Total	19496	84948	4.4	50751	597	10424	42781	4.1	26936	630	21125	87868	4.2	57655	656	
22.	Mean Age	18.2					19.2					18.7					

Note:- 1. The following States have been excluded :-

1. Alwar, 2. Bharatpur, 3. Bikaner,
4. Dholpur, 5. Jaisalmer, 6. Jaipur
7. Kotah, 8. Mewar, 9. Marwar, 10. Sirahi,
11. Tonk.

1. Alwar, 2. Bharatpur, 3. Bikaner
4. Dholpur, 5. Jaisalmer, 6. Jaipur
7. Kotah, 8. Marwar, 9. Mewar, 10. Tonk

1. Alwar, 2. Bharatpur, 3. Bikaner
4. Dholpur, 5. Dungarpur, 6. Jaipur
7. Kotah, 8. Lava, 9. Marwar, 10. Mewar
11. Tonk.

Note:2:- The mean age in this table was calculated by Hardy's Summation Method as given by Elderson W.P., F.I.A.

Note:3:- Fertility Tables 1 and 2 have been reproduced from the "Census of Rajputana & Ajmer 1941". p. 82.

By examining the fertility tables it appears that among the women of these three castes the period of greatest productivity is from 17 to 44 years of age, and the mean age at the birth of the first child approximate to 19 years. The averages of children born and children survived during this productive period (from 17 to 44 years) of a woman from each caste are given below:-

S.No.	Caste	No. Born	No. survived
1	Brahmins	5.04	3.2
2	Jats	4.28	3.1
3	Chamars	5.12	3.4

This shows that there is little difference in the fertility rates of women of different castes for which data are available.

The above fertility tables, however, are defective. Firstly, the over or the under-statement of age has not been corrected and it leaves scope for undue concentration in some attractive age groups. Secondly, the distribution of births has been made by married mothers in the quinquennial age groups 17-21, 22-26 and so on, whereas the distribution of total women, in the 1941 census of Rajasthan, has been given in the normal quinquennial age groups of 5-9, 10-14 etc. This has created difficulties in the calculation of the fertility rates for all the women in the population and has made the task difficult.

4. FERTILITY RATE:

"The fertility rate represents the number of female children born each year per 1000 women between 15 and 49 years of age."⁵

It, therefore, has become customary to measure fertility rate by relating the number of births to the number of women of child-bearing age. If then, child-bearing age is assumed to cover the period from 15 to 49 years, the general fertility rate is the number of births per 1000 women between 15 to 49 years.

If, in a given population, the percentage of women of child-bearing age is large, the birth-rate is likely to be high even if fertility is small; while, if the percentage of women of child-bearing age is small, the birth-rate is likely to be low, even if the fertility is large.

In this chapter, fertility performance of married women and all women in Rajasthan for the year 1941 has been calculated in order to arrive at the prevailing fertility rates.

(a) Fertility rates of married women:

From Fertility Table VII.I, the number of married women in all the three castes, and the total number of children born to them have been added up and are shown in the Table VII.3, in the quinquennial age-groups, for the calculation of Age-specific fertility-rates of married women in the sample population of Rajasthan for the year 1941.

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GRAPH NO: I

CUMULATIVE FERTILITY RATE
OF MARRIED WOMEN IN RAJASTHAN
(1941)
SCALE ALONG OX I = 10 YEARS
" OY I = 50 FERTILITY



TABLE VII.3.

Age Specific Fertility Rates of Married Women in three castes of Rajasthan (1941)

S.No.	Age Groups	Mid. Points	No. of Married Women.	Total No. of children born to 'married women'	Cummulative fertility rate of married women.	'Cummulative' fertility rate of married women per 100.	Five yearly fertility rate of married women per 100.	Annual fertility rate per 1000 of married women.
1	2	3	4	5	6	7	8	
1	12 - 16	14	7494	1047	0.13971	13.971	13.971	27.94
2	17 - 21	19	11277	10048	0.89102	89.102	75.131	150.26
3	22 - 26	24	12822	32014	2.49680	249.680	160.578	321.16
4	27 - 31	29	10837	42198	3.89388	389.388	139.703	279.42
5	32 - 36	34	7051	35279	5.00340	500.340	110.952	221.90
6	37 - 41	39	5653	32075	5.67398	567.398	67.058	134.12
7	42 - 46	44	3427	19865	5.79662	579.662	12.264	24.53
8	47 - 51	49	3566	20252	5.67919	567.919	5.338	10.68
						(585.000)		

- Notes:-
1. The above table has been compiled from the fertility Table I given in the "Census of Rajputana and Ajmer 1941" p.82.
 2. It represents the fertility of married women in three castes of Brahmins, Jats and Chamars of Rajasthan.

In Table VII.3, are shown the total number of married women in the three castes, Chamars, Jats and Brahamins in Rajasthan and the number of children born to them in 1941. With the help of the number of children born and the total number of married women the cumulative fertility rate of married women in the age groups have been estimated and are shown in column 5 of Table VII.3.

The cumulative fertility rates of married women are expressed per 100 of married women, which are then plotted on a graph paper (Graph No.1) against the upper age of the particular age group. A smooth free hand curve approaching the plotted points as closely as possible is then followed to eliminate the erratic values which have occurred due to wrong reporting of ages. From the graph the graduated cumulative fertility rates in different age groups are read for the given age-group as well as for the normal quinquennial age-groups of 10-15, 15-20 etc.

From the cumulative fertility rates the five-yearly fertility rate in a group and then the annual fertility rate per 1000 of married women were estimated for the given age-groups. The annual fertility rate per 1000 of married women are shown in column 8 of Table VII.3.

Column 8 of Table VII.3, shows that the fertility rate of married women in Rajasthan is low, about 28 per 1000 in the age group 12-16, which then gradually rises to 150 in the age group 17-21. The fertility rate reaches a maximum value in the age-group 22-26 which is about 321 per thousand. The fertility rates thereafter show a gradual fall after reaching the maximum. The fertility rates remain high upto the age 41 and then fall suddenly. It shows that a large number of children are born to married women between the ages 17 to 36.

The annual fertility rate of married women per 1000 are plotted on a graph paper and from the graph the fertility rate in single year ages have been read off, which are shown in Table VII.5.

In Table VII.4, a comparison of the marital fertility rate in Rajasthan has been made with the rural and urban areas of Nasik and Kolaba districts of Bombay State which have been calculated on the basis of a sample survey by Prof. Sovani and Mrs. Dandekar. These districts have been taken for comparison for they are the only estimates of their kind available.

TABLE VII.4.

Age- Specific fertility rate of married women in Rajasthan
and in the rural and urban areas of Nasik and Kolaba
districts of Bombay State.

...
....

S.N.	Rajasthan			Nasik Distt.		Kolaba District		Remarks
	Age Group	Marital fertility per 1000	Age-Group	Rural	Urban	Rural	Urban	
	1	2	3	4	5	6	7		8
Marital Fertility rate per 1000.								
1	12-16	27.9	13-17	33.3	66.7	80.8	58.8	
2	17-21	150.3	18-22	273.6	268.8	304.4	272.7	
3	22-26	321.2	23-27	228.6	253.2	256.9	218.4	
4	27-31	279.4	28-32	196.8	240.5	196.1	201.8	
5	32-36	221.9	33-37	113.2	146.3	119.6	161.3	
6	37-41	134.1	38-42	111.1	21.7	71.4	17.0	
7	42-46	24.5	43-47	25.0	-	13.9	-	
8	47-51	10.7	48-52	-	-	-	-	

Note:- 1. The value of fertility rate for Nasik and Kolaba have been taken from "Fertility Survey of Nasik, Kolaba and Satara (North) Districts" by Prof. N. V. Sovani and K. Dandekar Tables 4.2 and 4.3 p. 65-66.

Table VII.4 divulges that the fertility rate in Rajasthan shows a gradual rise from the age group 12-16 and reaches the maximum value in the age group 22 to 26, whereas in the districts of Nasik and Kolaba it shows a sudden rise from the age group 13 to 17 and reaches the maximum in the age-group 18 to 22 years. In Rajasthan the fertility rates are high from the age 22 to 36 years whereas in the urban areas of Nasik and Kolaba districts the fertility rates are high from the ages 18 to 32 years and in rural areas it is high in the ages 18 to 27 years only. Table VII.4 also shows that the fertility rates in Rajasthan are, in general, higher than those in the districts of Nasik and Kolaba.

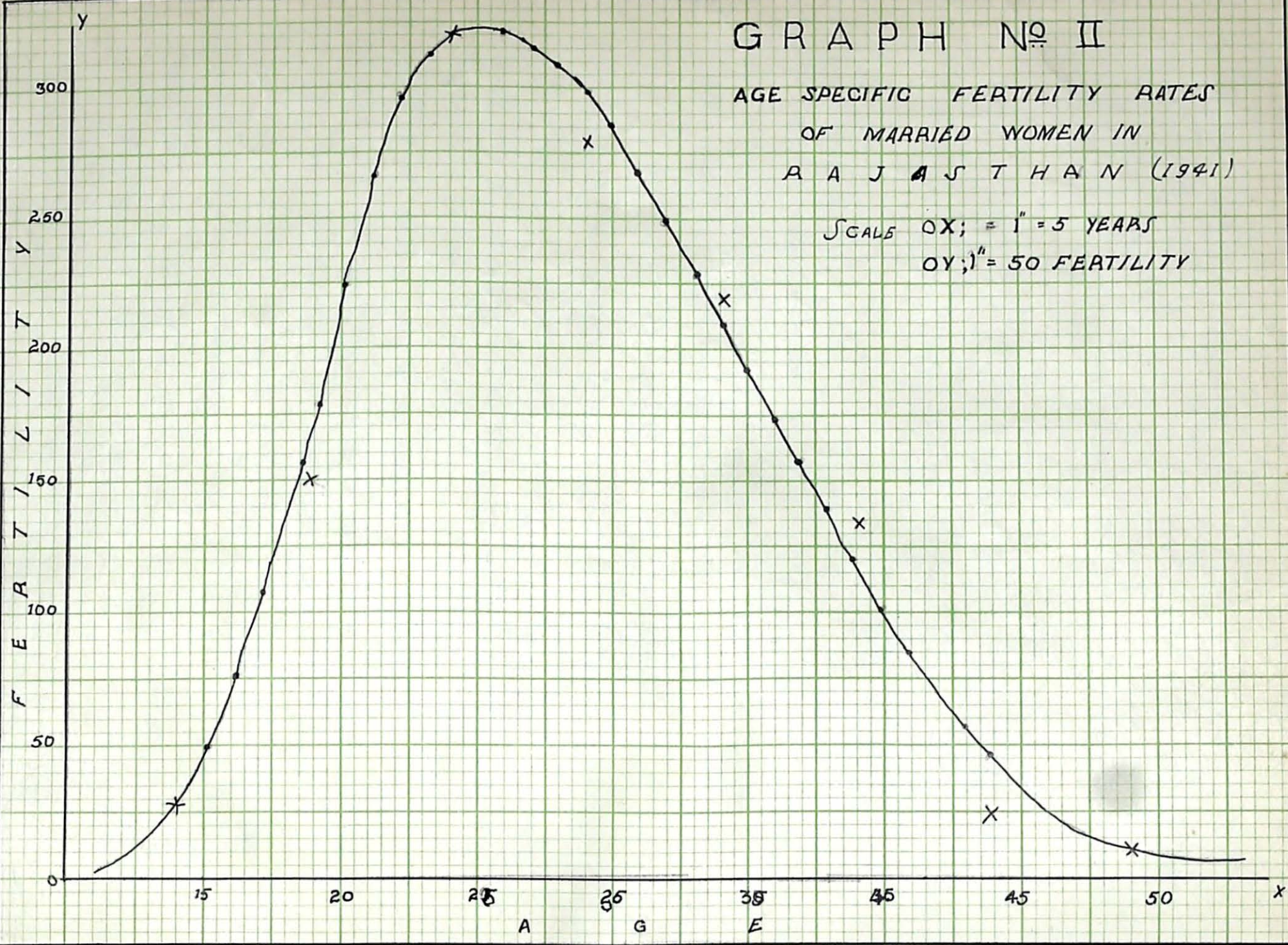
(b) Single year Age-Specific fertility rate of married women:

In Table VII.5, is given the age-specific fertility-rate of married women by single-year age in Rajasthan. A comparison of

GRAPH NO II

AGE SPECIFIC FERTILITY RATES
OF MARRIED WOMEN IN
RAJASTHAN (1941)

SCALE OX; = 1" = 5 YEARS
OY; 1" = 50 FERTILITY



the single year age specific fertility rate of married women in Rajasthan have been made with those of married women in the East, North East and South Western regions of Madhya Pradesh and those of Travancore-Cochin. They have been chosen for comparison as the fertility rates of these States are only available in India.

The single year age-specific fertility rates for Rajasthan have been read off from the graph Eo.II of annual fertility rate of married women in age groups. By doing so, all the discrepancies in the age-specific fertility rates have been removed and more probable values of fertility rates in single year have been obtained.

TABLE VII.5

Single-Year age-Specific fertility-rates of married women in Rajasthan and East, North East, South west Madhya Pradesh and Travancore-Cochin.

Age S.No.	Age 1	Madhya Pradesh				
		Rajas- than. 2	East 3	North East 4	South-West 5	Travancore- Cochin. 6
1	15	50	129	135	129	114
2	16	77	150	149	146	123
3	17	107	170	165	163	145
4	18	158	194	181	181	161
5	19	180	217	197	200	178
6	20	225	240	213	219	196
7	21	275	263	227	236	213
8	22	297	232	241	253	231
9	23	312	299	252	268	248
10	24	322	312	262	280	262
11	25	321	318	263	283	275
12	26	320	320	272	294	286
13	27	315	315	273	296	293
14	28	308	305	271	293	296
15	29	297	290	265	287	297
16	30	285	271	257	277	294
17	31	268	251	246	264	287
18	32	248	227	233	249	277

.....

Contd.-

	1	2	3	4	5	6
19	33	227	204	220	232	264
20	34	210	180	204	214	251
21	35	192	159	185	195	234
22	36	175	138	175	177	216
23	37	156	118	157	158	199
24	38	137	102	141	142	182
25	39	120	86	127	125	164
26	40	100	74	113	110	147
27	41	83	62	101	97	132
28	42	70	52	88	84	116
29	43	55	43	79	73	103
30	44	46	37	68	63	91

Note:- 1. The fertility rates for the districts of Madhya Pradesh and Travencore-Cochin have been taken from the "Census of India Paper No.", 1953. "Maternity data -1951 Census. Annexure table to Part II p.89.

2. The fertility rates for Rajasthan have been read from graph No.II.

Table VII.5, indicates that the fertility rate of married women in Rajasthan is low in the early ages upto the age 19, thereafter it rises suddenly immediately reaching the highest value at the age 24. It then continues to remain high upto the age 35; thereafter it falls suddenly. In Madhya Pradesh the fertility rates in all the districts are quite high in the early age from 15 and shows a gradual rise, reaching the peak at age 26 in East and at age 27 in the North East and South West Madhya Pradesh. The fertility rates are high between the ages 20 and 34 in Madhya Pradesh and then shows a gradual fall except in the Eastern district. In Travancore-Cochin the fertility rates are quite high in the early ages from 15. It shows a very gradual rise reaching the

peak quite late at age 29 years. It then shows a very gentle fall. The fertility of Rajasthan shows some similarity to the East Madhya Pradesh, the region which borders on Rajasthan, showing a similarity in the fertility pattern in the adjacent regions of the country.

(c) Fertility of All Women:

So far, the fertility rates of married women in three castes in Rajasthan have been discussed. The fertility rates of married women in three castes do not clearly indicate the fertility pattern of the State as a whole and of all women in the State. To have a clear idea of the fertility pattern of the total State and of all women the fertility rates of all women irrespective of their marital status have been estimated for Rajasthan by relating the number of birth to married women in different age-groups to all women in these age-groups.

In Table VII.6, is given the age-specific fertility rates of all women in Rajasthan for 1941. The cumulative fertility rates of married women in the standard age groups 15-19, 20-24 etc., have been read out from graph I. From the cumulative fertility rate the quinquennial fertility rates of married women are obtained. The quinquennial fertility rates of married women are then multiplied by the ratio of the married women to total women in the population of Rajasthan to obtain the five yearly fertility rate of all women in quinquennial age groups. From the quinquennial fertility rates the annual fertility rates of all women in Rajasthan per 1000 of total women were obtained and are shown in column 6 of Table VII.6. From the five-yearly fertility rates of all women the gross reproduction rates for women in Rajasthan are also estimated, which will be discussed later.

TABLE VII .6.

Annual age-specific fertility-rates of All women in Rajasthan 1941:

S.No.	Age - Groups	Cumulative fertility rate of married & women.	Quinque-ennial fertility rate of married women.	Ratio of married women to total women.	Five yearly fertility rate of all women	Annual fertility of all women per 1000.
	1	2	3	4	5	6
1	15 - 19	0.59	0059	0.789577	0.465864	93.1728
2	20 - 24	1.86	1.27	0.941343	1.195451	239.0902
3	25 - 29	3.23	1.42	0.923672	1.311654	262.3303
4	30 - 34	4.53	1.25	0.882170	1.102750	220.5500
5	35 - 39	5.58	1.05	0.793856	0.833595	166.7190
6	40 - 44	5.76	0.18	0.713744	0.128466	25.6932
7	44 - 49	5.85	9.09	0.560006	0.050400	10.0800
					5.088180	
					.46	
					<u>2.340563</u>	<u>G.R.R.</u> for females.

Notes:- 1 Column 2, cumulative fertility rate of married women in the age groups 15-19, 20-24, etc. have been read out from graph No. I.

2. Column 4, the ratio of married women to total women have been compiled from the number of married women and total women given in the census of Rajasthan 1941.

3. No adjustments have been made for the changes in the boundaries in 1956.

Table VII.6, shows that the annual fertility rates of all

women in Rajasthan is low in the age group 15-19, which is about 93.2 per 1000 of all women. It then shows a sudden rise in the age group 20-24 reaching the value 239.1. The fertility rates reaches the peak value in the age group 25-29 and then shows a gradual fall upto age 33 and thereafter shows a sudden fall. This shows that the majority of children are born between the ages 20-35 in Rajasthan.

(d) Single Year Age Specific Fertility
Rate of All women:

For estimating the fertility rates by single-year, the usual procedure to plot on the graph the annual fertility rates in the broader age-groups and then to draw a smooth free hand curve approaching the plotted points as closely as possible, is followed.

In Table VII.7, the annual age specific fertility-rates by single year ages as read out from the smooth graph No.III of annual age specific fertility rates in age groups, are given for Rajasthan for the year 1941. A comparison of the single year age specific fertility rate of Rajasthan is made with the single year age specific fertility rates of Nasik and Kolaba districts of Bombay State in the same table. These districts are taken for comparison as these are the only data available. The rates are expressed as number of births to be expected in one year to 1000 women at specific ages.

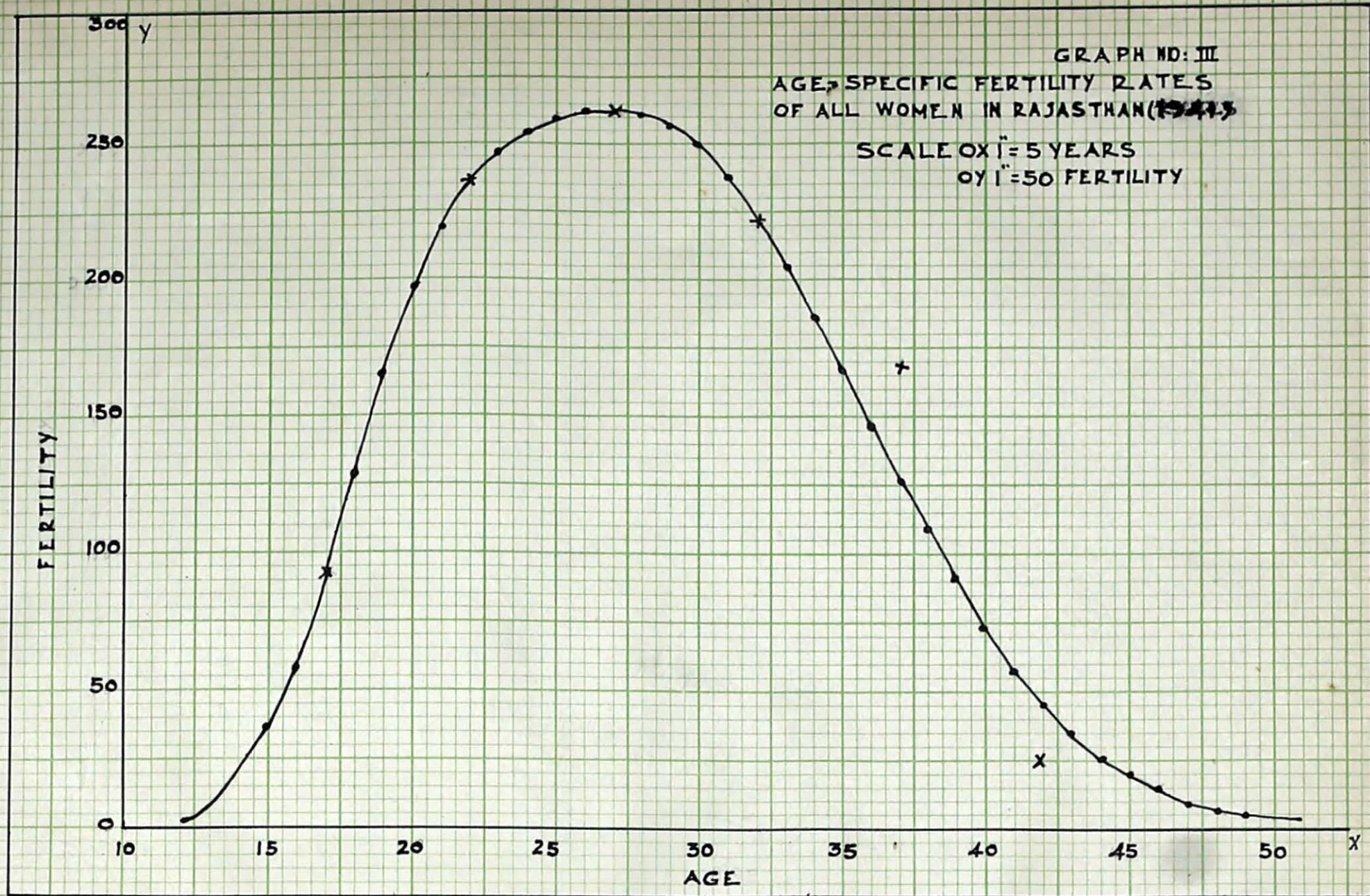


TABLE VII.7.

Single-year age specific fertility rate of total women in Rajasthan and in Nasik and Kolaba districts, per 1000.

S.No.	Age	Rajasthan	Nasik	Kolaba
1	2	3	4	
1	15	37	27	37
2	16	57	130	140
3	17	93	188	193
4	18	130	226	222
5	19	167	247	240
6	20	198	253	247
7	21	222	253	248
8	22	237	251	246
9	23	247	246	242
10	24	256	240	234
11	25	261	232	224
12	26	264	222	212
13	27	265	213	200
14	28	263	202	188
15	29	257	192	177
16	30	251	182	164
17	31	237	170	152
18	32	223	160	140

.....

Contd.-

S.N.	1	2	3	4
19	33	205	148	130
20	34	186	132	117
21	35	167	127	107
22	36	148	114	95
23	37	127	103	85
24	38	111	92	74
25	39	92	81	62
26	40	75	71	50
27	41	57	62	40
28	42	46	52	30
29	43	36	42	22
30	44	27	34	15
31	45	21	26	9

Note:- 1. The values of fertility rate for Nasik and Kolaba have been taken from the "Fertility Survey of Kolaba and Nasik and Satara" by Prof. N.V. Sovani and Mrs.K.Dandekar Table 4.6 p.69.

2. The single year fertility rate for Rajasthan have been read off from graph No.III.

Table VII. 7 shows that the fertility rate of Rajasthan shows a gradual rise from the age of 15 thereby reaching a peak at the age of 27, whereas in Nasik and Kolaba the fertility rises suddenly from the age 15, reaching a peak at the age of 21 years. It is very difficult to say whether the difference in the age at maximum fertility is real or not. These are after all the census age returns for Rajasthan and one does not know the accuracy of the level of age reporting. Also, in Rajasthan

the fertility is quite high between the ages 20 to 35, whereas in Kolaba and Nasik it is high between the ages 17 to 30 years. In general, the fertility in Rajasthan is low in the early ages and gradually rises in the middle ages and then falls gradually, whereas in Nasik and Kolaba, the fertility rises suddenly in the early ages and then falls suddenly in the later ages.

5. GROSS REPRODUCTION RATE:

The gross reproduction rate gives the total number of female children that would be born to 1000 women in their life time if they lived through the whole of the child-bearing period. The gross reproduction rate is a rough measure of reproduction and indicates the extent to which a sex is replacing itself in a given population. The gross reproduction rate defined by Cox "Is a function lying in the region of unity and has been regarded as a measure of the extent to which a sex is 'replacing' itself, unity being the criterion for exact replacement."⁶

A certain interest is attached to the gross reproduction rate computed without allowance for mortality of infant children and young adults, for this indicates an upper limit above which the rate of increase per generation cannot possibly be raised, under existing conditions of fertility, by merely improving mortality.

In table VII.8, are shown the gross reproduction rates for Rajasthan in 1941. The gross reproduction rates of Rajasthan have been compared with those of Rural and Urban areas of

6. "Demography" by P.R.Cox, Chapter 8, Fertility p.146.

Nasik and Kolaba. The gross reproduction rates in some foreign countries are also shown in the table for the sake of comparison.

TABLE VII.8.

Gross reproduction rates for females in Rajasthan, Nasik Kolaba and in some foreign countries.

S.No.	Region.	Gross Reproduction rate.
	1	2
1	Rajasthan (1941)	2.3406
2	Nasik (Rural, 1951)	2.3102
3	Nasik (Urban, 1951)	2.1170
4	Kolaba (Rural, 1951)	2.0624
5	Kolaba (Urban, 1951)	1.6313
6	U.S.A. (1942)	1.2700
7	Japan (1937)	2.1400
8	Egypt (1937)	3.1100

- Note:-
1. The gross reproduction rates for Nasik and Kolaba have been taken from the "Fertility Survey of Nasik, Kolaba, N. Satana" by Prof.N.V.Sovani and Mrs. K.Dandekar.
 2. The gross reproduction rates for foreign countries have been taken from "The polulation of India and Pakistan " by Kingsley Davis.
 3. The gross reproduction rates for Rajasthan have been computed from Table VII.6.

Table VII.8, shows that the gross reproduction rate of females in Rajasthan is higher than those of females in Nasik and Kolaba districts. It is also higher than that of U.S.A.

and Japan but is lower than Egypt, which is quite high. No clear idea of the replacement of population can be had from gross reproduction rates unless we see to the net-reproduction rate of the region. The difference between the gross and net-reproduction rates gives, roughly, the extent of replacement of the population. In the next section the method of estimation of net reproduction rates for Rajasthan females has been discussed.

6. NET-REPRODUCTION RATE:

In order to make allowance for the depletion in the number of newly born children through death which must occur before they grow up and can replace their parents in the population, the net reproduction rate has been devised. Its formula of estimation as given by Cox is

$$E_x = \sum_{x=0}^w l_x^s p_{0,x}^s$$

whereas $p_{0,x}^s$ is the chance of survival from birth to age x according to a life table for the sex under consideration based on the mortality in the year under consideration. Hence the net reproduction rate has been defined by Cox as "an index of fertility which attempts to show to what extent adults at the fertility ages are currently replacing themselves in the next generation. The net reproduction rate gives a measure of the increase per generation corresponding to a given fertility and mortality."⁷

It must not, however, be deduced that reproduction rates are in any sense 'forecasts' of future population change. They merely show current tendencies in one of the

⁷ "Demography" by P.R.Cox p.147.

number of possible forms of index.

To calculate the net reproduction rates the use of life tables are involved because in net reproduction rates both the fertility and mortality conditions prevalent in a population are taken into consideration. The life table shows the average number of survivors at each year of age in a hypothetical generation distributed in normal proportions between the two sexes and subject in each year of age to a probability of death equal to that of the population at the period to which the life table refers. By applying the fertility rate of total women determined for the age groups in question to the average number of women alive in that age group, the number of live births in that age group are obtained. The sum of these numbers gives the total number of children who would be born alive to the hypothetical generation in the course of their existence. Dividing these numbers by the total number of population in the hypothetical generation and multiplying by the ratio of female birth to total births, the corresponding net reproduction rates are obtained.

For the estimation of net reproduction rates for Rajasthan the use of life table for 1921-31, constructed by the census Actuary and the life table for 1931-41, constructed by us and given in Chapter IX, have been made. In the case of Rajasthan the construction of life table is a little difficult. The difficulties have been explained in the Chapter IX on life tables. Here it can be simply stated that the use of a life table specific for Rajasthan does not leave us on sound or firm footing. Rajasthan does not behave as a typical State like a country. Migration conditions in Rajasthan are different

and it is a heavily emigrating State. The estimates of the extent of emigration are difficult to make. So the life table for Rajasthan alone should be relied as different from that of all India. The necessary data of migration being difficult to get we have simply stated the results honestly as have been obtained. This proves to be simply an exercise in the methods of computation. Findings or results where the application of a life table is needed, we do not feel confident about our finding. This is mainly due to the fact that the life table is constructed on certain assumptions which do not strictly hold good for Rajasthan. In Table VII.9, is given the net reproduction rates for Rajasthan obtained from two life tables and that in Nasik, Kolaba and some foreign countries.

TABLE VII.9

Net reproduction rate in Rajasthan, Nasik, Kolaba and in some foreign countries:

S.No.	Region		Net reproduction rate.
	1		2
1.	Rajasthan (1921-31)	...	1.0255
2.	-ditto- (1931-41)	...	1.2261
3.	Nasik Rural 1951)	...	1.2071
4.	" Urban(1951)	...	1.1248
5.	Kolaba Rural 1951)	...	1.0940
6.	" Urban(1951 )	....	0.8597
7.	U. S. A.	...	1.1900
8.	Japan	...	1.4400
9.	Egypt	...	1.4400

Note:- 1. Source for Nasik, Kolaba and for foreign countries is same as for the gross reproduction rate.

2. The net reproduction rates for Rajasthan have been compiled from the life tables of 1921-31, prepared by Census Actuary and 1931-41, prepared by us.

Table VII.9, shows that the net reproduction rate of Rajasthan for 1931-41, is higher than that for 1921-31 and is also higher than that of Masik, Kolaba and U.S.A; Egypt and Japan have high net reproduction rate than all other regions.

Comparing the difference between the net and gross reproduction rates it is observed that there is a wide difference between the two rates in India than in foreign countries. Referring to the difference in the gross and net reproduction rates Kingsley Davis wrote, "The contrast between the Indian population and the advanced countries in this regard shows the wastefulness of Asiatic reproductive behaviour. A great many children are born, but most of them die. The people of India therefore, expend a tremendous amount of biological and social energy in obtaining a fairly modest rate of population growth. In this respect their reproduction is like their agriculture, for there too, they have to spend much labour in producing only mediocre results."⁸

7. MEAN LENGTH OF A GENERATION:

The mean length of a generation (as derived by Lotka)⁹ is the length of time for which a generation would survive. The mean length of generation for females in Rajasthan obtained from the two net reproduction rates explained above, are given below.

Mean length of generation for Rajasthan:-

1921-31	.....	25.8822 years.
1931-41	.....	31.3839 "

The second rate of 31.39 appears to be high for

Rajasthan. No definite reason can be given for such a high rate

8. "The population of India and Pakistan" by K.Davis p.87.

9. "Length of Life" by Dublin-Lotka-Spiegelmen p.240.

It may ably be pointed here that the high rate may be due to the use of defective life table.

8. TRUE RATE OF NATURAL INCREASE:

With the aid of a life table and the corresponding fertility table, it is possible to calculate the constant annual rate of natural increase which would occur in a hypothetical closed population (i.e., not subject to migration out of or into the area) in which the mortality rate at each year of age and the fertility rate at each year of age of the female reproductive period remained constantly equal to those indicated in the tables in question. This rate (the true rate of natural increase, developed by Lotka)¹⁰ have been estimated for the female population of Rajasthan for the two decades in question and are shown below:

True rate of Natural increase for Rajasthan:-

1921 - 31	...	...	0.00042256.
1931 - 41	...	...	0.0028241.

In other words, the rate of natural increase of the hypothetical population, whose age composition is constant over time, would be about 04 for 1921-31 and 28 for 1931-41 per 1000 of females, according to the mortality rates assumed in two decades.

DEATH RATES

CHAPTER VIII.

DEATH RATES

1. LIMITATIONS OF VITAL STATISTICS:

A simple index of the health of a community is the crude death rate which gives the number of deaths per year per 1000 of population. The lower the death rate, better is the state of public health. The calculation of the index of crude death rate calls for data on the total number of deaths as well as the size of the population. Normally, information on the total number of deaths is provided by the registration, while that on population is given by the census. The system of registration in Rajasthan (indicated in Chapter VI) was practically non-existent. Only for the former Ajmer State, the registered deaths were available; but the data were not without defects.

The need for hesitation in placing reliance on the available figures of births and deaths is due mainly to the fact that in rural areas generally the births are recorded with greater accuracy than deaths, while the reverse is the case in urban areas. Because birth entries are subject to a check by the vaccinators who perambulate the district from month to month and from year to year, while the death of an individual, in rural areas, is the concern of none but his nearest relations. It is likely that registration is markedly defective in the case of females and that the numerous deaths of newly born female infants are not recorded with regularity. In urban areas congestion renders the task of the registrar and vaccinator more difficult, but funeral processions can be easily checked by the Municipal authorities, as they pass through the city gates on their way to the burial grounds or burning

ghats which are always located at some distance from the inhabited quarters. "On the other hand the births recorded in rural areas are disproportionate because of the general practice of the settlers in a city to despatch their women to their village homes for child birth."¹

"Even in regard to mortality, statistics of causes of death, particularly in villages and outlying areas are not correctly recorded and people are generally recorded as dying of 'fever', which accompanies a disease in most cases. In urban areas some kind of health service is provided, but in rural areas, where more than 80 percent of the people live, most primitive conditions prevail."²

Throughout its history the lulls and spurts in Rajasthan's population growth have been governed not by fluctuations in the birth rate but by wide variations in the death rate. In those years in which the population remained constant or even declined, the reasons lay in some great catastrophe—a famine, an epidemic, or a combination of both—which took thousands of lives. In the so called normal years when numbers increased, the reason lay in the relative absence of such catastrophes. In such ordinary years the death rate was still high, as a result of poor diet and endemic disease, but since it was surpassed by an ever higher birth rate, the population grew moderately. Coming every few years, however, a calamity of one sort or another would suddenly increase the death rate and wipe out the population increase that had been accumulating.

1. Census of India 1951 Vol. X. Rajasthan & Ajmer Part I-A-Report p.74.

2. Population Problem in India by P.K. Wattal Chap.VII The Health of India p.63.

Since the birth rates of Rajasthan show no sharp fluctuation (as has been indicated in Chapter VI) it seems plain that the factor chiefly responsible for population changes in the State has been the mortality. An analysis of forces affecting mortality is, therefore, valuable not only for understanding the health and longevity of the people but also for understanding the past and future population trends.

Kingsley Davis in his book, "The population of India and Pakistan" has given five types of statistical evidences which throw some light on the trends in mortality. These five types are³ :-

"(i) the registered deaths which, though defective, may nevertheless reveal trends; (ii) the registered infant mortality; (iii) the expectation of life in successive life tables; (iv) the proportion of widows among females aged 40 and over; and (v) the estimated deaths on the basis of births less population growth."

In case of Rajasthan the first two are out of the question since no statistics of that nature are available. The third, that is the expectation of life in successive life tables has been discussed in Chapter IX, and the fourth in Chapter Vth. Here the trends of death rate in Rajasthan for the last five decades have been estimated with the help of census returns.

2. CALCULATION OF DEATH RATES:

Below is given a summary of the methods used to estimate the levels of death rates from the census data, in

3. "The Population of India and Pakistan" by Kingsley Davis Chapter 5. Evidence of the Declining Death rate p.33.

the various natural regions of Rajasthan and for the State as a whole during the five decades 1901 to 1950. The rate of growth is generally calculable from the Census. There is usually some uncertainty about the migration data; but it is particularly worse in India, because of the absence of relevant tabulated data for 1941, and due to the large scale migration following partition in 1947, as also because of the integration of States in 1956. Moreover migration Statistics have generally been ignored in Rajasthan censuses in the past. Hence no reliable calculations can be based on them.

By the method, which may be called the "differencing method", an indirect estimate of death rate can be obtained, and the corresponding birth rates deduced therefrom. In such deductions the problem has been to split up the available data, the observed growth rate into rate of natural increase based on excess of birth over deaths and rate of migration gain or loss. Hardy in his Actuarial Report for 1901⁴ seems to have made the first attempt to estimate the levels of birth and death rates in important States of India by this method which ignores the migration element. A similar estimate was made by Mr. Porter in respect of Bengal in 1931 Census Report for the province.

Porter's method of estimation of death rate has been adopted for the estimation of birth and death rate of Rajasthan for the five decades 1901 to 1950. The migration statistics for Rajasthan are firstly, not available for all the five decades; secondly the records for former Rajput States, where migration has been neglected, are very unreliable. This has affected the values of birth and death rates estimated. But in the circumstanc-

4. Census of India-Paper No.6, 1954. Estimation of Births & Deaths by S.P. Jain, Annexure-II Part I p.29.

-es, when the data is sketchy, the present estimates serve the purpose well and they represent the probable trend.

3. METHOD OF ESTIMATION:

In essentials, the problem is to break up an observed intercensal increase in the population into its various components. The deaths as required here should include (a) deaths in 1941 population, (b) deaths among the births during the intercensal period, and (c) deaths among fresh immigrants. But for the disturbing factor of migration, deaths under head (a) can be easily obtained. The survivors of 1941 population are enumerated as population aged 10 and over in 1951 census, and, therefore, the difference between 1941 total population and 1951 population aged 10 and over gives the deaths under (a). The effect of migration is that survivors in 1951 of fresh immigrants during the intercensal period reduce the difference and that survivors of fresh emigrants increase it. There is very little datum which can be helpful in finding fresh emigration or immigration and hence it is neglected. Thus, it has been tried here to estimate deaths in the population under heads (a) and (b) only, on the assumption of no disturbing effect due to emigration or immigration.

The difference between 1941 total population and 1951 population in the age sector 10 and above gives deaths under head (a). This difference is nearly equal to deaths at ages 5 and over in the population which is changing in composition due to births and deaths only. "The difference, referred to here, includes deaths below age 5 in those forming part of 1941 population. Such deaths took place

within the next 5 years of 1941, as persons below age 5 after this period were survivors of births after 1941, and not of 1941 population. Further, the difference excludes from the deaths above age 5 those among the births of the intercensal period. Such deaths were obviously between ages 5-10 and from amongst survivors of births during the next five years after 1941, but it had nothing to do with 1941 population. Subject to an adjustment for their inclusion and exclusion, the difference is equal to deaths at ages 5 and over. Mortality in the first five years of life is much heavier than in the following five years, and, therefore, the inclusion is more than the exclusion except in a possible though unusual case when the births during the next five years after 1941 may be abnormally high. Thus, generally speaking, the difference should be slightly in excess of the deaths at ages 5 and over."⁵

The estimate of this excess has been made by S.P.Jain. His calculations have shown that the excess is well within 5% only. For practical purposes the excess may be ignored, as the labour involved in making the necessary calculations for adjusting for the excess is not worth the result.

Actual registration data of deaths by age give the ratio of total deaths to the deaths in age 5 and over. This ratio may be applied to the difference estimated above, to arrive at the total deaths in the population of 1951. Vital statistics are defective but the ratio based on them may be good enough for practical purposes. Strictly speaking, percentage omission in the registration of deaths below age 5 is likely to be relatively more than that for deaths in the remaining span of

5. Census of India paper No.6, 1954 by S.P.Jain, Estimation of Births and Deaths. Article 324 p.34.

life and, for this reason, the ratio as obtained from the registration data is likely to be an under-estimate. This factor may go to minimise the effects of ignoring the excess referred to earlier. Thus, the total deaths under heads (a) and (b) calculated as above when divided by the mean population give the death rate during the period 1941-1950. This method has been made use of in the calculation given below.

(1) Working of the death and birth rates estimation formula.⁶

The computation of the estimated average annual death and birth rates has been made in the manner explained below:-

Let

- i) Population in 1941 be A.
- ii) Population in 1951 be B.
- iii) Population aged 10 and over in 1951 be C.

(Survivors in 1951 of population in 1941)

- iv) Registered deaths aged 5 and over in decade (1941-50) be D.

(Registered deaths in Ajmer State were taken)

- v) Registered total deaths in decade (1941-50) be...E.

Therefore

- vi) Mean Population for 1941 and 1951 (i + ii)
0.55 (A + B)
- vii) Increase in population of 1951 over 1941 ((ii) - (i))
..... (B - A)
- viii) Ratio of Total deaths in a population...
to deaths age five and over (v)
(iv) $\frac{E}{D}$
- ix) Estimated deaths at average age 5 and over
in the decade 1941-50 { (i)-(iii) } (A - C)

6. Census of India, 1931 Vol.V Bengal and Sikkim Part I
Report p. 127.

x) Estimated total deaths in the decade 1941-50

$$\left(\begin{array}{l} \text{(viii)} \times \text{(ix)} \\ \text{(x)} \end{array} \right) \dots \frac{E}{D} (A - C)$$

xi) Estimated average annual death rate per 1000
in decade 1941-50

$$\frac{1000 \text{(x)}}{\text{(vi)}} \dots \frac{1000 E(A-C)}{.5(A + B)D}$$

xii) Estimated Total birth
(vii) + (x)

$$\dots \dots (B-A) + \frac{E}{D} (A-C)$$

xiii) Estimated average annual birth rate
per 1000 in the decade 1941-50

$$\frac{\text{xii} \times 1000}{\text{vi}} \dots \dots \frac{1000 \left((B-A) + \frac{(A-C)}{D} \right)}{.5 (A + B) D}$$

The statistics of registered deaths by age were not available for Rajasthan as a whole or for any of its princely States. The registered deaths by age were only available for Ajmer State; hence the ratio of total deaths to the deaths at the age of five and over was obtained from them for all the decades. For the estimations of death rates for Rajasthan and for its natural regions the ratio, mentioned above, obtained from the registered deaths of Ajmer State has been used. It has been assumed that the deaths at ages five and over and the total deaths in Rajasthan and its natural regions bear the same proportions as in Ajmer State.⁷

7. S.P. Jain, the Census Actuary, 1951 Census, has used the ratio of total deaths to deaths at five & over of a neighbouring State for calculating death rates for 1941-50, for a State not having vital statistics. For the use of the ratio of one State for other State he writes: "For States for which data on registered deaths by age are not available the ratio for a State in the same zone for which data are available can be used". Census India, Paper No.6, 1954, p.33.

The data for the registered deaths by age in Ajmer State have been taken from the publications of "Statistical Abstract of India" and the "Health Commissioner's Reports." The Ratio of total deaths to deaths of age five and over was estimated for males and females separately for all the decades for Ajmer State. Death rate in each decade for males and females separately for Rajasthan and its natural regions has been estimated with the help of the ratio mentioned above. The death rate for both sexes combined has been derived by averaging the death rate for males and females for the decade. The average annual death rates are expressed per thousand of the average population of the decade for which the rates have been estimated.

For the estimation of death rate by regions and for whole of the State, the age data have been taken from Chapter IV. These data are for the reorganised State of Rajasthan and have been corrected for the changes in the boundaries in different decades.

4. DEATH RATES FOR RAJASTHAN:

In Tables VIII.1 and VIII.2 are given the estimated death rates for Rajasthan males and females respectively for the five decades from 1901 to 1950. Table VIII.1 and VIII.2, also give the method of calculation of birth and death rates for males and females in Rajasthan for the five decades.

TABLE VIII.I

Estimated death and birth rates for Rajasthan Males from 1901 to 1951 (Per Thousand)

S.No.	Decade	Persons	Increase or Decrease (Difference)	Population age 10 and over.	Mean popula- tion.	Death Ratio	Estimated Deaths Age 5 & over.	Estimated Total Deaths.	Estima- ted Death Rate.	Estima- ted Total Births.	Estimated Birth Rate.
1	2	3	4	5	6	7	8	9	10	11	
<u>RAJASTHAN MALES</u>											
1.	1891	6455608	-	-	-	-	-	-	-	-	-
2.	1901	5403871	-1051737	4286214	5929739	1.6409	2169394	3559759	60.03	2508022	42.30
3.	1911	5756206	352335	4268003	5580038	1.6842	1135863	1913020	34.28	2265355	40.60
4.	1921	5429373	- 326833	3968242	5592789	1.7534	1737964	3135016	56.05	2808183	50.21
5.	1931	6160610	731237	4439682	5794991	1.9810	989691	1960578	33.83	2691815	46.45
6.	1941	7274679	1114069	5173836	6717644	2.0988	986724	2070936	30.83	3185005	47.41
7.	1951	8313883	1039204	6074005	7734261	1.8794	1200674	2256547	28.95	3235751	42.28

Note :- 1. Population data have been corrected for the changes in the boundaries due to reorganisation of States.

2. Ratio of total registered deaths to deaths age five and over for Ajmer State has been used for Rajasthan for the calculation of total deaths.

TABLE VIII. 2.

Estimated death and birth rates for Rajasthan Females from 1901 to 1951 (Per Thousand).

S.No.	Decade	Persons	Increase or Decrease (difference)	Population, Age 10 and over.	Mean population	Death Ratio	Estimated Death age '5 and over'	Estimated Total Death	Estimated Death Rate.	Estimated Total Births.	Estimated Birth Rate.
1	2	3	4	5	6	7	8	9	10	11	
<u>RAJASTHAN FEMALES</u>											
1.	1891	5764735	-	-	-	-	-	-	-	-	-
2.	1901	4890025	- 874710	3831915	5327375	1.6409	1932820	3171564	59.53	2290859	43.11
3.	1911	5227302	337277	3812818	5058663	1.6113	1077207	1736242	34.32	2073519	40.99
4.	1921	4863276	364026	3459534	5045289	1.7373	1767763	3071143	61.87	2707117	53.66
5.	1931	5587364	724088	3955312	5225320	1.9766	907964	1794682	34.35	2518770	48.20
6.	1941	6589176	1001812	4624141	6083270	2.0589	963223	1983180	32.57	2984992	49.03
7.	1951	7656893	1067717	5507169	7123034	1.8462	1082007	1997601	23.04	3065318	43.03

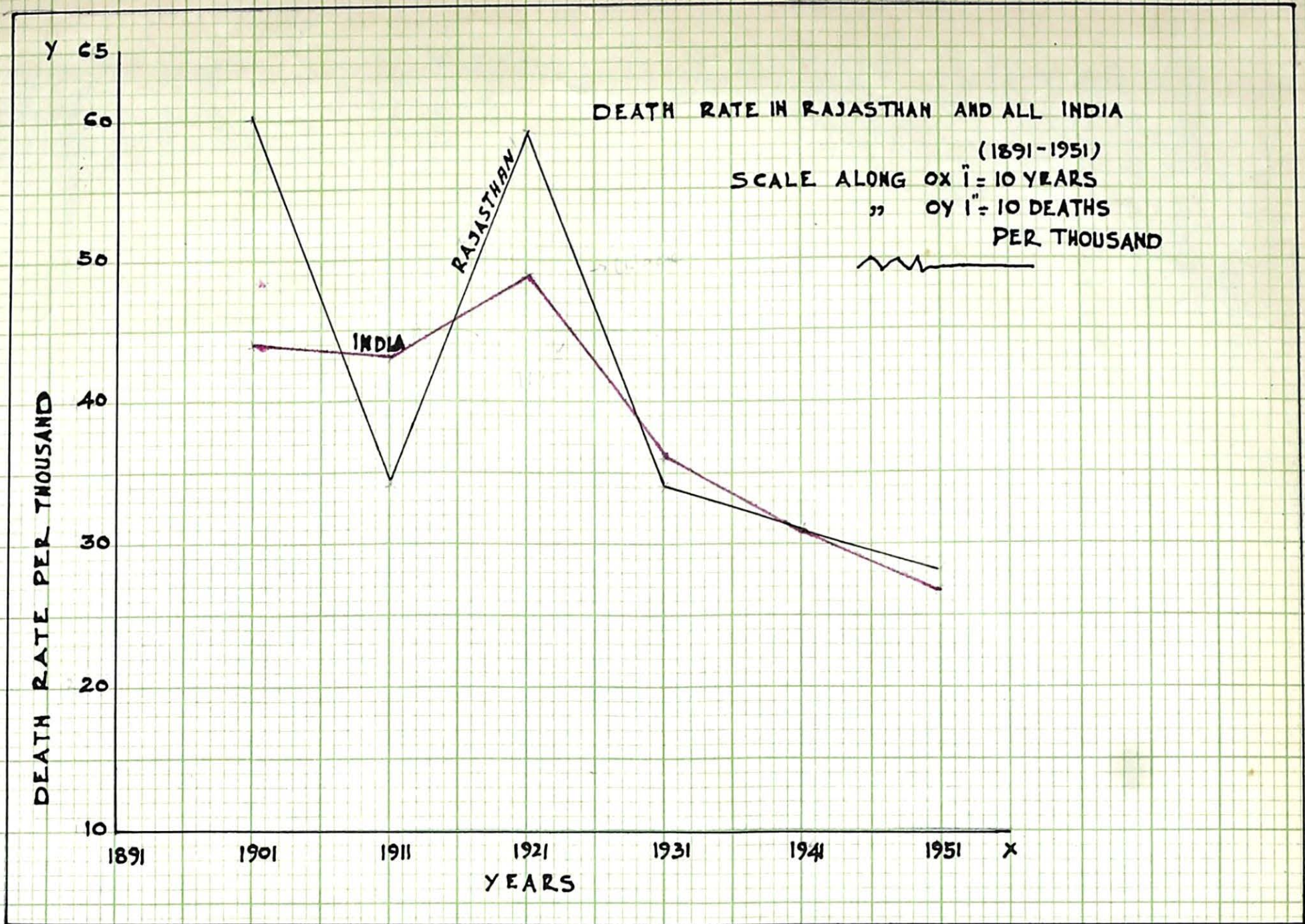
- Note:-
1. Population data have been corrected for the changes in the boundaries due to reorganisation of States.
 2. Ratio of total registered deaths to deaths age five and over for Ajmer State has been used for Rajasthan for the calculation of total deaths.

Table VIII.1, indicates a very high death rate of 60.03 for males and 59.53 for females for the decade 1891-1900 in Rajasthan. This may be partly due to the fact that the decade as a whole was badly hit by epidemics and famines. The great famine of 1899-1900, locally known as "Chappnia Kal" had its worst effects in Rajasthan. Besides this, the State suffered from the epidemics of Cholera of 1897, and Small pox of 1896. Both the epidemics were grave.

The decade 1901 -1910 shows a considerable decline in the death rate, probably due to the fact that the State was comparatively free from famines and epidemics. The year 1910 saw famine for the Western region and the year 1908 saw Plague for the Southern region. In 1905 small-pox broke out in Rajasthan and in 1906 Cholera was severe in Tonk. These adverse conditions, however, did not have their evil influence on the total population.

The period 1911-20 was another one of disaster and hardship for Rajasthan. Here for the first time the influenza epidemic spread in 1917-18, which took a heavy toll of life in the State. Famine was also not absent in this decade. Dholpur and Karauli were hit by it in 1913-14 and Kishangarh in 1918-19. The western region had alternate years of famine, crop-failure and scarcity of water. Death rate is higher for females than for males in the decade, indicating that the females had suffered more than males due to influenza.

The decades of 1931, 1941 and 1951 saw a constant decline in the death rate for males as well as for females. The decade 1941-50 shows a considerable fall in the death rate in the State. It may also be pointed out here that the



State had very little medical facilities in the past.

5. DEATH RATE IN RAJASTHAN AND
ALL INDIA AND CEYLON :

In Table VIII.3, is given the estimated death rates for the total population of Rajasthan, all India and Ceylon, for the six decades from 1891 to 1950.

It may also be pointed out that the estimates for three regions are made by entirely different methods. They have been given in the table to give a general idea of the change in the rate of death in different decades. They serve to indicate the trend in the three regions.

TABLE VIII.3.

Estimated death rates in Rajasthan, All India and Ceylon .

S.No.	Period	Estimated Death Rate per 1000 of Population		
		Rajasthan	All India	Ceylon
	1	2	3	4
1.	1891-1900	60	44	27
2.	1901-1910	34	43	29
3.	1911-1920	59	49	31
4.	1921-1930	34	36	26
5.	1931-1940	31	31	23
6.	1941-1950	28	27	20

- Note:- 1. The estimates of death rate for all India for five decades upto 1940 have been taken from "The population of India and Pakistan" by Kingsley Davis p.36.
2. The estimates of death rate for All India for the decade 1941-50 have been taken from "Census of India

Paper No.6" -1954 Table 3. p.10 by S.P. Jain.

3. The estimates of death rate for Ceylon have been taken from " The Demography of Ceylon " by N.K. Sarkar. p.117.

Table VIII.3, indicates that the mortality trends in Rajasthan are quite akin to those of All India. In two decades 1899-1900 and 1911-20, Rajasthan has suffered more than All India; in the former it was due to the famine of 1899-1900, and in the latter, due to influenza which spread in 1918. Rajasthan showed a lower death rate of 34% per 1000 for the decade 1901-11 whereas India as a whole showed a high rate of 43. In all other decades of normal conditions the death rates in Rajasthan are similar to those of All India. The rates for All India and Rajasthan are showing a declining trend since 1921. The rates in Ceylon are lower than the other two regions for all the decades.

6. REGIONAL DEATH RATES:

Death rates in the Natural regions of Rajasthan have also been estimated in the same manner as for the entire State. No vital statistics of deaths were available for any of the regions.

The four natural regions of Rajasthan differ from each other in respect of density, rainfall, topography, sex ratio, etc. The condition of work and the economic development of the regions are also different, as mentioned in Chapter II. Therefore, the death rates of the regions are calculated separately for all the decades from 1901 to find out the differences, if any.

(1) Ajmer Region:

This region though small lies in the heart of Rajasthan. The vital statistics of the region are available, hence the death rate as obtained from the registration data and as estimated by the method explained above can be compared. It has already been pointed out that the registration data are defective because of the large number of non-enumeration of deaths. Hence the death rate obtained from the registration data is generally low.

In Table VIII.4, is given the estimated and registered death rates for Ajmer region for the six decades from 1891 to 1950.

TABLE VIII.4.

Estimated and registered death rates for Ajmer region
1891 to 1951.

S.No.	Period	Deaths Rate per 1000 of Population:			Death Rate
		Males	Females	Both sexes	
	1	2	3	4	5
1.	1891-1900	66.0	64.1	65	-
2.	1901-1910	33.2	37.5	35	-
3.	1911-1920	38.1	52.4	45	48
4.	1921-1930	36.7	28.2	32	27
5.	1931-1940	29.8	29.8	30	30
6.	1941-1950	24.3	22.0	23	22

Note:- 1. The registered death rates have been taken from the Census of Rajasthan and Ajmer State 1951, Table 83.p.92.
2. Population data have been corrected for the changes in the boundaries due to reorganisation of States

Table VIII.4, points to the striking differences in the rates for males and females upto 1930. In the decade 1891-1900, i.e. the decade of famine, the death rate is higher in males

than in females ,though the difference is not significant. The decade 1901 to 1910 saw Plague and small pox in the region from 1906 to 1910. In this decade the death rate among females is higher than that in males. The decade 1911-20, saw the great epidemic of influenza of 1918. Also the region was not free from Plague which broke out in 1916 and Malaria in 1917. Here again the death rate is higher in females than in males, though latter is considerably high in this decade. On the other hand the decade 1921-30 saw famine of 1924 and 1927. This decade was comparatively free from epidemics. Here again the death rate is higher in males than in females. One may conclude from the above analysis that famine affects more males and epidemics more females. Since no further evidence can be produced to prove the above statement, it is recorded as observed likely effect. In this connection it may be pointed out that purdah was strictly observed in the region and the women in the region remained confined to home in unhygienic conditions. If any epidemic broke out, they readily fall a prey to it.

The Census Superintendent also supports the above view . He further points out that since medical facilities in this region were comparatively better than in the surrounding States of Rajasthan, people from the surrounding States migrate to this region to take the advantage of better facilities. The deaths in the migrants were also registered for the Ajmer region. This is one of the causes that inflate the death rate of the region. All this needs further research with the registered data of deaths by region and by sex.

(ii) Eastern Region:

In Table VIII.5, are given the estimated death rates for the Eastern region of Rajasthan, for the five decades from 1901 to 1950. The estimate of death rate for the decade 1891-1900 is not available since the age returns for the population of the region are not available.

This region of the State is most thickly populated showing a high density and high sex ratio. Registered death rates for the region are not available because no vital statistics were recorded in the region.

TABLE VIII.5

Estimated death rates for the Eastern region of Rajasthan:

S.No.	Estimated death rate per 1000 of population		
	Period	Males	Females
	1	2	3
1.	1901-10	44.7	44.9
2.	1911-20	61.1	67.7
3.	1921-30	39.5	39.3
4.	1931-40	35.9	37.7
5.	1941-50	26.9	26.8

Notes:- 1. Population data of the region have been corrected for the changes in the boundaries due to reorganisation of States.

2. Ratio of total registered deaths to deaths age five and over for Ajmer State has been used for the calculation of total deaths.

The region shows a high death rate for the three

decades from 1901 to 1930. During this period the region was affected by one epidemic or the other: Small pox in 1905, Plague in 1908 and 1911, Cholera in 1906 and 1910 and Influenza in 1918. Famine was not absent in the region in these decades and was hit by it in the years 1900, 1910, 1913-14 and 1918-19. Besides all these the Bharatpur State which is in this region, suffered heavily from Floods in 1924.

(iii) Southern Region:

In Table VIII.6, are given the estimated death rates for the southern region of Rajasthan for the decades 1901 to 1950 for males and females. These estimates are also made in the same manner as are made for the whole of Rajasthan using the census age return. This region is a hilly tract of Rajasthan and the population, except in some villages, is not congested at one place. The region is mostly inhabited by the Bhil tribes of Rajasthan, who are a backward tribe living in jungles and depending on their own cultivation and herds.

TABLE VIII.6

Estimated death rates for Southern Region of Rajasthan per 1000 for the five decades from 1901 -1951.

S.No.	Period	Male	Female
	1	2	3
1.	1901- 10	20.5	20.4
2.	1911-20	45.9	43.8
3.	1921-30	35.0	36.6
4.	1931-40	33.8	35.3
5.	1941-50	33.8	34.0

- Note:-
1. Population data of the region have been corrected for the changes in the boundaries due to reorganisation of the State.
 2. Ratio of total registered death to deaths age : five and over for Ajmer State has been used for the calculation of total deaths.

The low estimate for the period 1901-10 is due to the fact that the enumeration of Bhil population in this region for the first time was made in 1901. This enumeration too was not perfect. Some of the areas were not at all enumerated. They were later enumerated in 1911 for the first time. The enumeration of 1901 for this region was, therefore, not perfect and it gives lower figures than what they actually were. The death rate for the period in question must have been about double of what the estimates have shown. One striking feature as represented by this table is the comparatively low death rate of the region for the period 1911-20. This goes to prove the statement made earlier that "Mewar was comparatively free from plague and suffered less from influenza in 1918"⁸. The villages in the region are far smaller and a larger portion of this division consists of mountainous and uncultivated land in the occupation of Bhils and other forest tribes who are averse to populous settlements and live in hamlets scattered over a wide area of the country. Due to numerous far-flung villages of the region it suffered less from influenza. Other striking features of the region are its high growth rate (Chapter III), high birth rate (Chapter VI), and the high death rate. (shown in this chapter). This shows that Bhils though prolific, do not live long. This fact was also proved by the lower percentage of population of this region in the higher age groups, Chapter III. The female death rate, in general, is higher than the male.

8. Census of Rajputana 1931, p.26.

(iv) Western Region:

In Table VIII.7, are given the estimated death rates for the western region of Rajasthan for males and females for five decades from 1901 to 1950. The estimate is made in the same manner as for total States from the corrected census population for changes in boundaries. The region in question coincides with the great desert region of India. The living conditions of the region are comparatively harder, because of the scanty rainfall, extreme climate, sandy soil and lack of industrial development. Famine is a regular feature of the region and it is found every alternate year. The striking feature of the region is the low percentage of females as pointed out in chapter IV.

Table VIII.7.

Estimated death rates for the western region of Rajasthan for males and females for five decades from 1901 to 1951.

S.N.	Estimated Death rate per 1000 of Population.		
	Period.	Males	Females
	1	2	3
1.	1901-10	30.3	30.6
2.	1911-20	62.5	65.7
3.	1921-30	23.4	25.3
4.	1931-40	23.2	23.1
5.	1941-50	27.2	24.0

- Notes:-
1. Population data of the region have been corrected for the changes in the boundaries due to reorganisation of State.
 2. Ratio of total registered deaths to deaths age five and over for Ajmer State has been used for the calculation of total deaths.

The estimates of death rate for the region appear to be low. They are lowest as compared to the other regions of Rajasthan. There can be two reasons for these low estimates. Firstly very few people live in the region, specially the females, because of the bad conditions of living and hence the death rates are also low. Secondly this region of Rajasthan contributes most to the emigrant population hence reducing the number of people still more .

(v) Death rate in different regions of Rajasthan:

In Table VIII.8, is given a comparative estimate of the death rates in the different natural regions of Rajasthan for both sexes for the five decades from 1901 to 1950.

TABLE VIII.8.

Estimated death rate in the natural region of Rajasthan
From 1901 to 1950

S.No.	Period	Estimated Death rate per 1000 of population				
		Rajasthan	Ajmer region	Eastern region.	Southern region.	Western region
	1	1	3	4	5	6
1.	1901-10	34	35	45	21	31
2.	1911-20	59	45	64	47	64
3.	1921-30	34	32	39	36	24
4.	1931-40	31	30	37	35	23
5.	1941-50	28	23	27	34	26

The table VIII.8 shows that the death rate, in general , is higher in the Eastern region, which is the most thickly populated region of Rajasthan, and it is low in the western region which is thinly populated . The death rate is showing a declining trend in 1951 in all the regions of Rajasthan except Southern region, which has shown a constant high death rate from 1911 to 1951. The lower value of 21 for the Southern region in 1901-10, is due to wrong reporting of population and age groups

in 1901 census. Western region is showing a remarkably low rate since 1921, and Ajmer region has shown a low rate for 1951 due to the influx of refugees in 1947. No suitable explanation can be given for the low rates in the western region. Perhaps because lot of emigration takes place in this region, which has not been taken into account in making the calculations. The Eastern and the Western regions have suffered most on account of the influenza epidemic of 1918. One fact is clear from the above table that the population of Rajasthan has shown a great response to the epidemics and bad conditions whenever they occurred, the death rate doubled.

What stands out as beyond question is the fact that beyond 1920, Rajasthan had a very high death rate, and that it underwent a remarkable decline after that. There has been a sharper and steadier decline since 1920 than at any previous time.

MORTALITY AND LIFE TABLES

CHAPTER IX

MORTALITY AND LIFE TABLES

1. INTRODUCTION:

In this chapter an attempt is made to investigate and correct the age distribution, and to estimate the rate of mortality for Rajasthan. Out of the six censuses, 1901 to 1951, included in this thesis, the figures of age distribution of both 1901 and 1921 are found to be abnormal. The figures of 1901 reflects the condition of a population weakened and thinned out by the havoc of an unprecedented famine of 1899-1900. As the census was taken within twelve months of the famine year, the population had hardly any time to recoup its losses. Next, the census of 1921 was taken within two years of the influenza epidemic of 1918, which had affected a large percentage of the adult population specially females. These epidemics had shown their effects in the selected age groups, thereby considerably reducing the numbers in some of the age groups. Both these censuses therefore, do not reflect the normal condition and the age distribution of the population is severely distorted. The decade 1911 was also not wholly free from epidemics in the State as plague and famines occurred in some parts of the State in this decade.

The other decades, specially from 1931 onwards, were comparatively normal, as they were generally free from untoward occurrences affecting the age distribution of the population of the State.

In view of the above facts it has been decided to confine the study of mortality to two decades 1931-1940 and

1941-1950. The mortality investigations for Rajasthan for the decade 1921-1931 have been made by the census Actuary of 1931 and the life tables prepared for the decade have been presented in the Actuarial Report of the 1931 census.

In Indian censuses, the Life Tables based on the mortality investigations have been prepared mainly for all India and British provinces from 1871 to 1951. The two exceptions were the decades 1911-20 and 1931-40 when the census Actuaries dismissed the task because of the defective age data. All the life-tables were constructed solely with censuses, because of the insufficiency of the death registration in India which precluded the more usual method of using the vital statistics. Prior to 1921, life tables were constructed for most of the British Provinces but not for the native States. For the first time in 1921-30 decade, the actuary included the adjoining Feudatory States along with each British province, and for the first time a life table was prepared for Rajasthan.

In 1951, the census actuary grouped the country into six zones and prepared life tables for five zones for which the age distribution was not badly affected due to partition. Rajasthan in the zonal grouping has been included in the "North-west India zone" along with Punjab. The age-distribution data for this zone have been heavily distorted due to migration of muslims from Punjab in 1947 and after, and hence no life table has been prepared for

the zone were not tabulated. In this zone the age-distribution -for 1941 were available only for Rajasthan. The reasons ascribed by the census actuary of 1951, for not taking this zone for mortality investigation are: "The population of Punjab was badly disturbed by migration on a large scale and hence was not amenable to treatment adopted for the mortality investigation. For the remaining areas the data on age distribution in 1941 was available for a population of 14,808 thousands as against the zone population of 31,967 thousand. This coverage is not considered to be sufficiently complete to justify the assumption that the available age distribution reflects the distribution in the zone as a whole, particularly when the areas for which the age data are available were themselves considerably disturbed by migratory movement following partition."¹

In this thesis , therefore, two additional Life Tables for the decades 1931-1940, and 1941-1950, have been prepared for Rajasthan, males and females, in order to have a continuous series of Life Tables from 1921-31 to 1941-51. The two additional Life Tables have been prepared exclusively from the age-distribution data of the censuses, using the technique adopted by S.P. Jain, the Census Actuary for 1951 census, for the preparation of Life Tables for India and its zones for the decade 1941-51, with slight modifications to suit the data available.

Rajasthan had the advantage of having complete age - distribution for 1941 census. This was not so with some other

1. Census of India Paper No.2, 1954 Life Tables-1951
Census p. 1-2.

States in India. Still the age reporting that was done had the faults discussed quite at length in Chapter IV. This naturally did not leave us on a firm footing to construct a Life Table for the State. Nevertheless Life Tables have been constructed more or less as an exercise in the methods of construction of Life Tables. The difficulties in handling the available age distribution have been discussed in detail in the following lines.

There are certain peculiar difficulties in the 1941 and 1951 census data. In the first place, the emigration data for Rajasthan for the 1941 census are not available, since, the birth-place statistics, which supply data on immigration and emigration for a State were not tabulated for many States of India in 1941. Therefore, the emigration from Rajasthan in the decade 1931-1941 could not be estimated. The other difficulty was presented by the unprecedented movement of population following the partition in 1947. The estimates of emigrants from Rajasthan to Pakistan for the decade 1941-1951 are not available.

Since, no reliable data of the emigrants from Rajasthan for the decades in question, are available, it is, therefore, decided to neglect the migration changes in the State for the purpose of estimating the mortality tables. Though Rajasthan is a heavy emigrating State, yet due to the limitations of data such assumption had to be made. The two Life Tables prepared are therefore, not very accurate but the loss in accuracy is probably not great enough to influence the results seriously for our purpose. These estimates provide some idea of the mortality trends in the State in the absence

of any estimates.²

In what follows, have been described the data available for the investigation and the treatment applied to it for the preparation of Life Tables for Rajasthan for two decades.

2. DATA AVAILABLE:

Basically the data available for the present investigation of mortality rates are:-

- (a) the census returns of 1931, for each sex, the number living at the ages 0,1,2,3,4 and thereafter, in quinquennial age-group of 5-9, 10-14 etc., with one large group at the end, of 70 and over. This data before publication have been smoothed.³
- (b) The census return for 1941, for each sex, in the quinquennial age-group of 0-4, 5-9 etc. The single year age data for Rajasthan for the 1941 census as computed by census actury for 1951 and presented in the "Census of India paper No.3, Age Tables 1954", are also available.
- (c) The single year age-distribution, returns, for both sexes, on the basis of 10 percent samples for the 1951 census of Rajasthan. The sample age-distribution of 1951 census includes the refugee

2. Note:-

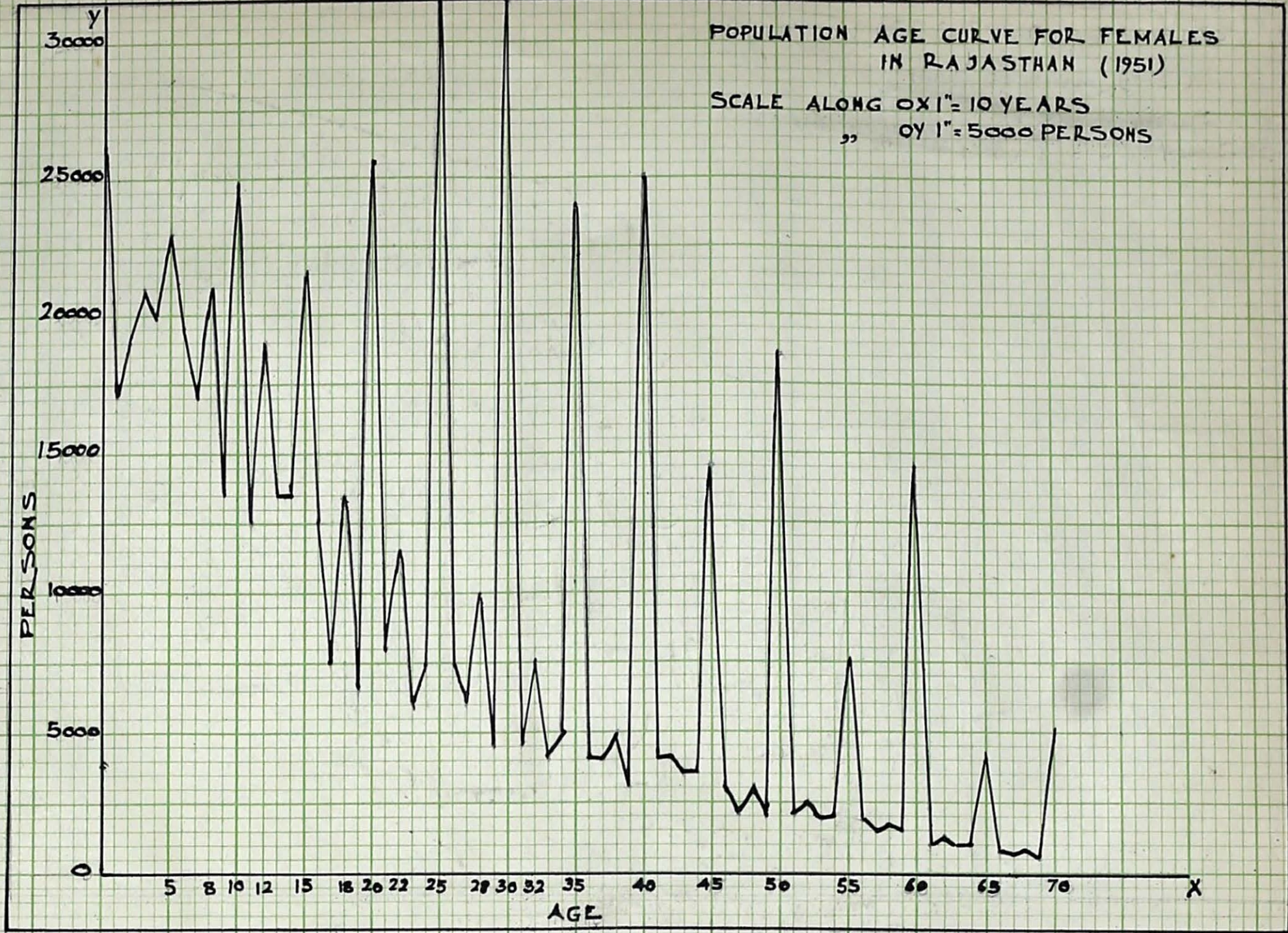
Knowing full well, that the estimation of expectation of life at birth for a region in a country, can be seldom estimated correctly because of the internal migration, whose estimates are not available. The task of preparing life tables for Rajasthan have been taken up with an academic interest, and is an exercise in the methods of Life Table Construction.

3. For method of smoothing see Chapter I.

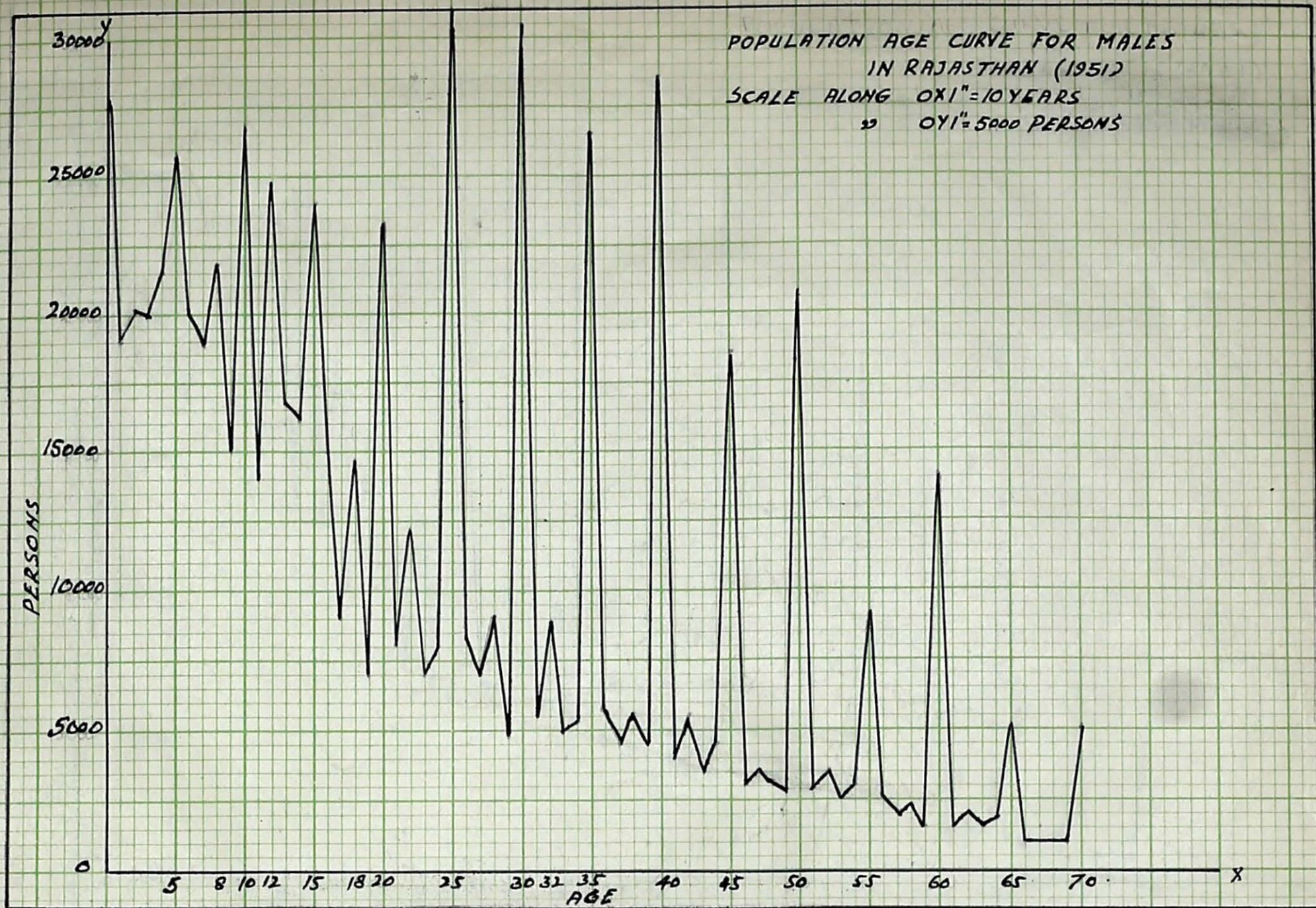
POPULATION AGE CURVE FOR FEMALES
IN RAJASTHAN (1951)

SCALE ALONG OX1" = 10 YEARS

" OY 1" = 5000 PERSONS



POPULATION AGE CURVE FOR MALES
IN RAJASTHAN (1951)
SCALE ALONG OX1"=10 YEARS
OY1"=5000 PERSONS



population of Rajasthan. The refugee population has been distributed in different age groups as in sample and then added in total population.

3. CHARACTERISTICS OF AGE STATISTICS:

Age returns as discussed in Chapter IV, are marked by sharp lumps at preferred ages, and this fact makes it necessary to have some idea of the nature and extent of these lumps, so that the group population may be corrected to reflect the true population as truly as possible.

In 1951 census single year age distribution for each sex on a 10% sample for Rajasthan are given. The single year age distributions for 1951 for each sex, are studied by drawing the population-age curves. The curves showed prominently the following characteristics.

- (i) A striking deficit at age 1 in comparison to numbers at ages 0 or 2.
- (ii) A pronounced tendency to return ages ending in the digits 0 and 5. This tendency has been observed to be more pronounced in age 30 and over.
- (iii) The digits 2 and 8 are the two other centres of attraction. Age 12 and 18 show a fairly significant lump.
- (iv) Due to the preferences of certain digits the digits like 1, 3, 4, 6, 7 and 9 are in marked deficit.

The factors which are responsible for this type of

error in reporting of age have already been discussed in Chapter IV.

4. GROUPING :

It is clear that the age data by single year of age being seriously distorted, such data can have some value only when considered in age groups. The correct course for a proper grouping would be to associate age returned in excess with those which have contributed largely to this excess, so that the local errors largely cancel out within the group. Expressing the central idea underlying all methods of grouping, Vaidhyana- than the Census Actuary for 1931 Census writes: " The central idea underlying all methods of grouping is these groups should be formed as far as possible, containing the popular age along with the adjoining ages from which the former has drawn numbers so that, though returns at individual ages may be incorrect, the total of the group may be considered reasonably correct and the group totals are used as the basic data for any subsequent investigations."⁴

There is a complete liberty to form any age groupings for the 1951 ages as single year ages are available, whereas in the censuses of 1931 and 1941 for good or bad we are tied down to a predetermined age grouping of 0-4, 5-9 etc. Hence for the sake of uniformity grouping in each of the censuses, groups of 0-4, 5-9 etc., have been formed for the 1951 census, as well. " The grouping 0-4 implies that there is a tendency for 1's, 2's, 3's and 4's to understate their ages to the lower preferred age ending in 0 or 5"⁵

4. Actuarial Report 1931 p.20.

5. Census of India Paper No.3, 1954. p.12.

5. GRADUATION:

Group totals, based on 0-4, 5-9 etc., groupings when plotted on graphs, separately for each sex and for each year, showed a systematic stair-like appearance. This gives a clear evidence of systematic bias in the group totals. These group totals are, therefore, graduated for the systematic bias in order to have a smooth running curve for the determination of survival rates.

In the Actuarial Reports for Indian Censuses, adjustments for known systematic bias, in group totals, have been made either by fitting a mathematical curve or by estimating the correct population of a group with the help of single year sample population. But here the main considerations against these methods are firstly, there is difficulty in finding a suitable curve, which will retain the distinctive features of the State and will be able to remove all the irregularities of the census data. Secondly, the non-availability of a representative single year of age sample figures for Rajasthan for the 1941 and 1931 censuses.

In view of the above difficulties the simpler method for the graduation of the data, has been adapted. The age data for Rajasthan for all the three decades in consideration showed fluctuations of a wavy nature which suggested that some sort of moving average may be suitable for smoothing them. Hence a weighted average of the three successive groups as equal to the middle term was taken. The weighting was given in the ratio of 1 : 2 : 1, for the middle group. Group 0-4 and the last group have been taken as they are. It suited well in cutting out the wavy fluctuations, while

keeping close to the original totals of the groups.

After cutting the wave like curve and plotting the adjusted groups, two important points were noticed. First, the deficiency of population in the age group 0-4 which may have been due to under-enumeration of children below age 5 and secondly the pronounced drooping at the ages between 15 to 24 and a peak at ages 25-34. These features persisted even after smoothing. There seems to be no way to correct these features due to omissions in enumeration except by a free hand smoothing of the group population curves. A similar treatment of free hand smoothing has been made by Kingsley Davis in preparing abridged Indian Life Tables for the decades 1911-1921 and 1931-1941.

The free hand smoothing removed all the discrepancies of the age grouping and gave a smooth curve. The free hand curve has been extrapolated for the age group 0-4 to give true values in the group, for all the three censuses.

The population figures for each group are noted from the smoothed curves for the three censuses and are then used for determining $10 p_x$, the probability of surviving for ten years in a life table. The differencing method of preparing life tables, have been used for preparing life tables for Rajasthan for the two decades 1931-1940 and 1941-1950. The method has been discussed below.

6. THE METHOD:

The method, in principle, is based on the tracing of cohorts living at one point of time to their survivors at

6. "The population of India and Pakistan" by Kingsley Davis" p.238.

another point of time. From these a life table is then computed to show " what would be the number of survivors from birth to successive ages, and what the average length of life would be on the basis of the mortality at each age,... in the period for which it was constructed." ⁷

(1)

" If p_x persons are recorded as having attained age x on their birth-day preceding the census data, their average age taking one with another can be assumed to be $x + \frac{1}{2}$. If at the census taking 10 years later there are returned $p_{x+10}^{(10)}$ persons of age $x + 10$ last birthday, the latter will be the survivors from amongst the group of $p_x^{(1)}$ persons of age x last birthday recorded at the preceding census and will be of average age $x + \frac{1}{2} + 10$, provided that the chief desiderata of a stationary population as to the constancy of birth and death rates as also immunity from migration disturbances are actually realized, the ratio $p_{x+10}^{(10)} / p_x^{(1)}$ may be taken as very nearly equivalent to ${}^{10}p_{x+\frac{1}{2}}$ which is the probability of surviving 10 years at exact age $x + \frac{1}{2}$. From the values of ${}^{10}p_{x+\frac{1}{2}}$ at quinquennial interval, the values of p_x , the probability of surviving one year for individual ages are interpolated." ⁸

7. "Length of Life " by Dublin-Lotka p.11.

8. "Census of India 1931, Actuarial Report by L.S. Vidyanathan p.6-7.

In practice, however, such methods are likely to be subject to numerous limitations. In the first place, they presuppose that the population has been "closed" in the period between the censuses. Any later group has to include all the survivors, and only the survivors, of the corresponding earlier group. Otherwise the rates would represent a mixture of mortality and migration, the distortions varying directly with the size of the latter. In the second place, errors should arise if the two censuses differed in degree of completeness or had varying patterns of age mis-statement. The inaccuracies resulting from these causes tend to increase the interval between censuses.

The details of the method have been described in almost all the Actuarial Reports of the Indian Censuses in minute details. A summary of the method used for the construction of Life Table for Rajasthan has been given in the Appendix to this Chapter.

7. LIFE TABLES:

The Life Tables obtained from the application of the method, given in the Appendix to this Chapter, for Rajasthan have been given below for males and females separately for the decades 1931-1941 and 1941-1951.

The age specific mortality rates and the Mean expectation of Life in a Life Table at birth and at various ages have been further discussed in the Chapter.

TABLE II. I
LIFE TABLES FOR MALES IN RAJASTHAN 1931-1941.

Age	Probability of dying at Age x.	Living at Age x	Dying Between Age x & x+1	Living Between Ages x & x+1	Living above Age x	Expectation of Life
	q_x	l_x	d_x	L_x	T_x	e_x^o
1	2	3	4	5	6	7
0	.249993	143032	35757	125153	4823661	33.7243
1	.023901	107275	2564	105993	4698508	43.7987
2	.016149	104711	1691	103866	4592515	43.8590
3	.013589	103020	1400	102320	4488649	43.5707
4	.015942	101620	1620	100810	4386329	43.1640
5	.011580	100000	1158	99421	4285519	42.8552
6	.011570	98342	1144	98270	4186098	42.3514
7	.011479	97698	1121	97138	4087828	41.8415
8	.011314	96577	1093	96031	3990690	41.3213
9	.011091	95484	1059	94955	3894659	40.7886
10	.010820	94425	1022	93914	3799704	40.2404
11	.010513	93403	982	92912	3705790	39.6753
12	.010184	92421	941	91951	3612878	39.0915
13	.009844	91480	900	91030	3520927	38.4885
14	.009505	90580	861	90150	3429897	37.8658
15	.009183	89719	824	89307	3339747	37.2245
16	.008893	88895	790	88500	3250440	36.5649
17	.008566	88105	756	87727	3161940	35.8893
18	.008403	87349	734	86982	3074213	35.1946
19	.008220	86615	712	86257	2987231	34.4886
20	.008088	85903	695	85556	2900972	33.7703
21	.007976	85208	680	84868	2815416	33.0417
22	.008097	84528	684	84186	2730548	32.3035
23	.008537	83344	720	83484	2646362	31.5629
24	.009100	83124	756	82746	2562878	30.8320
25	.010044	82368	827	81956	2480132	30.1104
26	.010845	81541	884	81039	2398176	29.4107
27	.011579	80657	934	80190	2317077	28.7275
28	.012156	79723	969	79233	2236887	28.0582
29	.012659	78754	997	78256	2157648	27.3973
30	.013226	77757	1028	77243	2079392	26.7422
31	.013857	76729	1063	76198	2002149	26.0934
32	.014697	75666	1112	75110	1925951	25.4533
33	.014872	74554	1109	74000	1850841	24.8255
34	.015350	73445	1127	72882	1776841	24.1928
35	.015725	72313	1137	71750	1703959	23.5620
36	.016156	71181	1150	70606	1632203	22.9304
37	.016787	70031	1176	69443	1561603	22.2987
38	.017774	68855	1224	68243	1492160	21.6710
39	.018973	67631	1283	66990	1423917	21.0542
40	.020165	66348	1338	65679	1356927	20.4517

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Age	q_x	l_x	d_x	L_x	T_x	e_x
1	2	3	4	5	6	7
41	.021418	65010	1392	64314	1291243	19.8623
42	.022530	63618	1433	62902	1226934	19.2860
43	.023371	62185	1453	61453	1164032	18.7189
44	.024081	60732	1462	60001	1102573	18.1547
45	.024956	59270	1479	58531	1042572	17.5902
46	.026047	57791	1505	57039	984041	17.0276
47	.026945	56286	1519	55526	927002	16.4695
48	.027493	54767	1506	54014	871476	15.9124
49	.027976	53261	1490	52516	817462	15.3482
50	.028624	51771	1482	51030	764946	14.7756
51	.029268	50289	1472	49553	713916	14.1963
52	.033110	48817	1616	48009	664363	13.6093
53	.034290	47201	1619	46392	616354	13.0581
54	.038673	45582	1763	44701	569962	12.5041
55	.042857	43819	1878	42880	525261	11.9871
56	.046939	41941	1969	40957	482381	11.5014
57	.051010	39972	2039	38953	441424	11.0433
58	.054949	37933	2084	36891	402471	10.6100
59	.058629	35849	2102	34798	365580	10.1978
60	.061928	33747	2090	32702	330782	9.8018
61	.063100	31657	1998	30658	298080	9.4159
62	.067122	29659	1991	28664	267422	9.0166
63	.071389	27688	1975	26681	238758	8.6294
64	.075916	25693	1950	24718	212077	8.2543
65	.080718	23743	1916	22785	187359	7.8911
66	.085810	21827	1873	20891	164574	7.5399
67	.091205	19954	1820	19044	143683	7.2007
68	.096923	18134	1758	17255	124639	6.8732
69	.102978	16376	1686	15533	107384	6.5574
70	.109387	14690	1607	13887	91851	6.2526
71	.116169	13083	1520	12323	77964	5.9592
72	.123342	11563	1426	10850	65641	5.6768
73	.130925	10137	1327	9474	54791	5.4051
74	.138935	8810	1224	8198	45317	5.1438
75	.147392	7586	1118	7027	37119	4.8931
76	.156316	6468	1011	5963	30092	4.6524
77	.165726	5457	904	5005	24129	4.4217
78	.175642	4553	800	4153	19124	4.2003
79	.186083	3753	698	3404	14971	3.9891
80	.197066	3055	602	2754	11567	3.7863
81	.208611	2453	512	2197	8813	3.5927
82	.220735	1941	428	1727	6616	3.4086
83	.233454	1513	353	1337	4889	3.2313
84	.246787	1160	286	1017	3552	3.0621
85	.260740	874	228	760	2535	2.9005
86	.275332	646	178	557	1775	2.7477
87	.290569	468	136	400	1218	2.6026
88	.306459	332	102	281	818	2.4639
89	.323007	230	74	193	537	2.3348
90	.340211	156	53	129	344	2.2051
92	.358070	103	37	85	215	2.0874
92	.376574	66	25	54	130	1.9697
93	.395713	41	16	33	76	1.8537
94	.415468	25	10	20	43	1.7200

TABLE IX.2.

Life Table for Females in Rajasthan 1931-1941.

Age	q_x	l_x	d_x	L_x	T_x	e_x^0
1	2	3	4	5	6	7
0	.225070	145008	32637	128690	4833327	33.33
1	.047877	112371	5380	109681	4704637	41.87
2	.023769	106991	3078	105452	4594956	42.95
3	.019901	103913	2068	102031	4489504	43.20
4	.018116	101845	1845	100923	4387473	43.08
5	.015159	100000	1516	99242	4286550	42.87
6	.014406	98484	1419	97775	4187308	42.52
7	.013700	97065	1330	96400	4089533	42.13
8	.013168	95735	1261	95105	3993133	41.71
9	.012481	94474	1179	93835	3898028	41.26
10	.011949	93295	1115	92738	3804143	40.78
11	.011470	92180	1057	91652	3711405	40.26
12	.011043	91123	1006	90620	3619753	39.72
13	.010669	90117	961	89637	3529133	39.16
14	.010344	89156	922	88695	3439496	38.58
15	.010092	88234	890	87789	3350801	37.98
16	.009940	87344	868	86910	3263012	37.36
17	.009759	86476	844	86054	3176102	36.73
18	.009511	85632	814	85225	3090048	36.09
19	.009265	84818	786	84425	3004823	35.43
20	.009100	84032	765	83650	2920398	34.75
21	.009010	83267	750	82892	2836748	34.70
22	.009100	82517	751	82142	2753856	33.37
23	.009707	81766	794	81369	2671714	32.68
24	.010511	80972	851	80547	2590345	31.99
25	.011377	80121	912	79665	2509798	31.33
26	.012208	79209	967	78719	2430133	30.68
27	.013140	78242	1028	77728	2351414	30.05
28	.014130	77214	1091	76669	2273686	29.45
29	.015172	76123	1155	75546	2197017	28.86
30	.016209	74968	1215	74361	2121471	28.30
31	.017293	73753	1275	73116	2047110	27.76
32	.018200	72478	1319	71819	1973994	27.24
33	.018875	71159	1343	70488	1902175	26.73
34	.019378	69816	1353	69140	1831687	26.24
35	.019879	68463	1361	67783	1762547	25.74
36	.020360	67102	1366	66419	1694764	25.26
37	.020800	65736	1367	65053	1628345	24.77
38	.021213	64369	1368	63687	1563292	24.29
39	.021607	63004	1361	62324	1499605	23.80
40	.021985	61643	1355	60966	1437281	23.32
41	.022363	60288	1343	59614	1376315	22.83
42	.022700	58940	1338	58271	1316701	22.34
43	.023058	57602	1328	56938	1258430	21.85
44	.023395	56274	1317	55616	1201492	21.35
45	.023767	54957	1306	54304	1145876	20.85
46	.024166	53651	1297	53003	1091572	20.35

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Age	q_x	l_x	d_x	L_x	T_x	e_x^0
1	2	3	4	5	6	7
47	.024659	52354	1291	51709	1038569	19.84
48	.025302	51063	1292	50417	986860	19.33
49	.026061	49771	1297	49123	936443	18.82
50	.027024	48474	1310	47819	887320	18.31
51	.028346	47164	1337	46496	839501	17.80
52	.029318	45827	1344	45155	793005	17.30
53	.029507	44483	1313	43827	747850	16.81
54	.029835	43170	1288	42526	704023	16.31
55	.030162	41882	1263	41251	661491	15.79
56	.031542	40619	1281	39979	620246	15.27
57	.033620	39338	1323	38677	580267	14.75
58	.036552	38015	1390	37320	541590	14.25
59	.040432	36625	1483	35884	504270	13.77
60	.045555	35142	1601	34342	468386	13.33
61	.051907	33541	1741	32671	434044	12.94
62	.059664	31800	1897	30852	401373	12.62
63	.068941	29903	2062	28872	370521	12.39
64	.079847	27841	2223	26730	341649	12.27
65	.091350	25618	2315	24361	314919	12.29
66	.093364	24303	2297	23655	289958	11.93
67	.095586	23006	2279	22367	266303	11.58
68	.097919	21727	2258	21098	243936	11.23
69	.060324	20469	2235	19852	222838	10.89
70	.062825	19234	2208	18630	202986	10.55
71	.065404	18026	2179	17437	184356	10.23
72	.068130	16847	2148	16273	166919	9.91
73	.070942	15699	2114	15142	150646	9.60
74	.073866	14585	2077	14047	135504	9.29
75	.076904	13508	2039	12989	121457	8.99
76	.080063	12469	998	11970	108468	8.70
77	.083345	11471	956	10993	96498	8.41
78	.086755	10515	912	10059	85505	8.13
79	.090298	9603	867	9170	75446	7.85
80	.093978	8736	821	8326	66276	7.59
81	.097800	7915	774	7523	57950	7.32
82	.101768	7141	727	6778	50422	7.06
83	.105888	6414	679	6075	43644	6.80
84	.110163	5735	632	5419	37569	6.55
85	.114600	5103	585	4811	32150	6.30
86	.119205	4518	539	4249	27339	6.05
87	.123960	3979	493	3733	23090	5.80
88	.129333	3486	453	3260	19357	5.55
89	.134067	3033	407	2830	16097	5.31
90	.139390	2626	366	2443	13267	5.05
91	.144386	2260	327	2097	10824	4.79
92	.150619	1933	291	1788	8727	4.51
93	.156538	1642	257	1514	6939	4.23
94	.162666	1385	225	1273	5425	3.92
95	.169008	1160	196	1062	4152	3.58
96	.174388	964	169	880	3090	3.21
97	.182361	795	145	723	2210	2.78
98	.189381	650	123	589	1487	2.29
99	.196638	527	104	475	898	1.70
100	.204137	423	86	423	423	1.00

TABLE 11.3

LIFE TABLE FOR MALES IN RAJASTHAN 1941-1951.

Age	q _x	l _x	d _x	L _x	T _x	e _x
1	2	3	4	5	6	7
0	.250000	149422	37355	130755	4023006	26.9256
1	.036606	112053	4102	110003	3822271	34.7341
2	.026344	107357	2898	106503	3782263	35.0343
3	.023337	105059	2457	103931	3675755	34.9875
4	.025360	102602	2602	101301	3571924	34.8134
5	.021180	100000	2118	98741	3470623	34.7062
6	.021353	97882	2090	96837	3371682	34.4464
7	.021457	95792	2055	94765	3274845	34.1870
8	.021436	93737	2014	92730	3180080	33.9256
9	.021455	91723	1968	90733	3087350	33.6595
10	.021374	89755	1918	88796	2996611	33.3866
11	.021251	87837	1867	86904	2907815	33.1047
12	.021097	85970	1814	85063	2820911	32.8127
13	.020920	84156	1761	83276	2735848	32.5092
14	.020689	82395	1705	81543	2652572	32.1934
15	.020533	80690	1657	79862	2571029	31.8630
16	.020333	79033	1607	78230	2491167	31.5206
17	.020162	77426	1561	76646	2412937	31.1644
18	.020040	75865	1520	75105	2336291	30.7954
19	.019956	74345	1484	73603	2261186	30.4142
20	.019989	72861	1443	72137	2187583	30.0241
21	.019838	71412	1417	70704	2115446	29.6231
22	.019863	69995	1390	69300	2044742	29.2127
23	.020001	68605	1372	67919	1975442	28.7944
24	.020216	67233	1359	66554	1907523	28.3719
25	.020443	65874	1347	65201	1840969	27.9468
26	.020705	64527	1336	63859	1775768	27.5198
27	.020981	63191	1326	62528	1711909	27.0910
28	.021278	61865	1316	61207	1649381	26.6610
29	.021590	60543	1307	59896	1588174	26.2296
30	.021916	59242	1298	58593	1528278	25.7972
31	.022254	57944	1289	57300	1469685	25.3639
32	.022577	56655	1279	56016	1412385	24.9296
33	.022874	55376	1267	54743	1356369	24.4938
34	.023157	54109	1253	53483	1301626	24.0556
35	.023454	52856	1240	52236	1248143	23.6140
36	.023733	51616	1228	51002	1195907	23.1693
37	.024039	50388	1211	49783	1144905	22.7218
38	.024167	49177	1188	48583	1095122	22.2699
39	.024240	47989	1163	47403	1046539	21.8079
40	.024367	46826	1141	46256	999131	21.3371
41	.024541	45685	1121	45125	952875	20.8575
42	.024734	44564	1105	44012	907750	20.3696
43	.025026	43459	1083	42915	863738	19.8749
44	.025647	42371	1087	41823	820823	19.3723
45	.026222	41284	1083	40743	778995	18.8692
46	.026919	40201	1082	39660	738252	18.3640
47	.027710	39119	1084	38577	698592	17.8581
48	.028590	38035	1087	37492	660015	17.3528
49	.029605	36943	1094	36401	622523	16.8436

Contd:-

Age	q_x	l_x	d_x	L_x	T_x	$e_x^0 = T_x/l_x$
50	.030724	35854	1102	35305	586122	16.3475
51	.031898	34752	1109	34198	550819	15.8591
52	.033476	33643	1126	33080	516621	15.3560
53	.035707	32517	1161	31937	483541	14.8704
54	.038300	31356	1201	30756	451604	14.4025
55	.040312	30155	1216	29547	420848	13.9562
56	.043444	28939	1257	28311	391301	13.5216
57	.045955	27682	1272	27046	362990	13.1129
58	.048390	26410	1278	25771	335944	12.7203
59	.050688	25132	1274	24495	310173	12.3418
60	.052790	23858	1259	23229	285678	11.9741
61	.053092	22599	1200	21999	262449	11.6133
62	.055597	21399	1190	20804	240450	11.2365
63	.058216	20209	1176	19621	219646	10.8687
64	.060954	19033	1160	18453	200025	10.5094
65	.063817	17873	1141	17303	181572	10.1590
66	.066809	16732	1118	16173	164269	9.8177
67	.069937	15614	1092	15068	148096	9.4848
68	.073204	14522	1063	13991	133028	9.1604
69	.076619	13459	1031	12944	119037	8.8444
70	.080185	12428	997	11929	106093	8.5366
71	.083910	11431	959	10952	94164	8.2376
72	.087800	10472	919	10013	83212	7.9461
73	.091860	9553	878	9114	73199	7.6624
74	.096099	8675	834	8258	64085	7.3873
75	.100521	7841	788	7447	55827	7.1199
76	.105136	7053	742	6682	48380	6.8595
77	.109950	6311	694	5964	41698	6.6072
78	.114968	5617	646	5294	35734	6.3618
79	.120200	4971	598	4672	30440	6.1235
80	.125652	4373	549	4093	25768	5.8925
81	.131334	3824	502	3573	21675	5.6681
82	.137251	3322	456	3094	18102	5.4491
83	.143413	2866	411	2661	15008	5.2366
84	.149826	2455	368	2271	12347	5.0293
85	.156499	2087	327	1924	10076	4.8280
86	.163440	1760	288	1616	8152	4.6318
87	.170656	1472	251	1347	6536	4.4402
88	.178156	1221	213	1112	5189	4.2498
89	.185947	1003	187	910	4077	4.0648
90	.194038	816	158	737	3167	3.8811
91	.202434	658	133	592	2430	3.6930
92	.211145	525	111	479	1838	3.5010
93	.220175	414	91	369	1368	3.3043
94	.229533	323	74	286	999	3.0929
95	.239225	249	60	219	713	2.8635
96	.249258	189	47	166	494	2.6138
97	.257592	142	37	124	328	2.3099
98	.270361	105	28	91	204	1.9429
99	.281442	77	22	66	113	1.4675
100	.292879	55	16	47	47	0.8545

TABLE IX.4

LIFE TABLE FOR FEMALES IN RAJASTHAN 1941-1951.

Age	q_x	l_x	d_x	L_x	T_x	e_x^0
1	2	3	4	5	6	7
0	.224997	145922	32532	129506	3947076	27.0492
1	.043200	113090	5564	110508	3817570	33.7569
2	.030346	107526	3263	105895	3707262	34.4778
3	.021618	104263	2254	103136	3601367	34.5412
4	.019634	102009	2213	101005	3498231	34.2934
5	.021715	100000	2172	98914	3397226	33.9723
6	.021701	97828	2123	96767	3298312	33.7154
7	.021633	95705	2070	94670	3201545	33.4522
8	.021520	93635	2015	92628	3106875	33.1807
9	.021370	91620	1953	90641	3014247	33.8818
10	.021195	89662	1900	88712	2923606	32.6070
11	.021000	87762	1843	86841	2834894	32.3021
12	.020798	85919	1787	85026	2748053	31.9842
13	.020594	84132	1733	83266	2663027	31.6530
14	.020399	82399	1681	81559	2579761	31.3082
15	.020207	80718	1631	79903	2498202	30.9498
16	.020013	79087	1583	78296	2418299	30.5777
17	.019896	77504	1542	76733	2340003	30.1920
18	.019900	75962	1512	75206	2263270	29.7948
19	.019982	74450	1488	73706	2188064	29.3897
20	.020067	72962	1464	72230	2114358	28.9789
21	.020162	71498	1442	70777	2042128	28.5620
22	.020285	70056	1421	69346	1971351	28.1396
23	.020438	68635	1403	67934	1902005	27.7119
24	.020611	67232	1386	66539	1834071	27.2797
25	.020792	65846	1369	65162	1767532	26.8434
26	.020986	64477	1353	63812	1702370	26.4027
27	.021136	63124	1334	62457	1637208	25.9364
28	.021190	61790	1309	61136	1574751	25.4855
29	.021154	60481	1282	59840	1513615	25.0263
30	.021220	59199	1256	57943	1453775	24.5574
31	.021274	56687	1206	56084	1395832	24.6235
32	.021295	55481	1181	54691	1339748	24.1479
33	.021253	54300	1154	53723	1284857	23.6622
34	.021196	53146	1126	52883	1231134	23.1651
35	.021188	52020	1102	51469	1178551	22.6557
36	.021225	50918	1081	50378	1127082	22.1352
37	.021353	49837	1064	49305	1076704	21.6045
38	.021632	48773	1055	48246	1027399	21.0649
39	.022015	47713	1051	47193	979153	20.5196
40	.022473	46667	1043	46143	931960	19.9704
41	.023000	45618	1043	45094	885817	19.4181
42	.023673	44569	1055	44042	840723	18.8634
43	.024561	43514	1063	42980	796681	18.3086
44	.025614	42445	1087	41902	753701	17.7571
45	.026787	41358	1103	40803	711739	17.2107
46	.028032	39648	1111	39693	671296	16.6314
47	.029400	38537	1133	37971	632203	16.4051

Contd.-

Age	q_x	l_x	d_x	L_{xx}	T_x	o_x
1	2	3	4	5	6	7
43	.030277	37404	1132	36338	594232	15.8869
43	.031332	36272	1136	35704	557394	15.3671
50	.032434	35136	1140	34566	521690	14.8477
51	.033600	33996	1142	33425	487124	14.3289
52	.035330	32854	1161	32274	453699	13.8096
53	.037996	31693	1204	31091	421425	13.2971
54	.041246	30489	1253	29860	390334	12.8025
55	.044440	29231	1299	28582	360474	12.3319
56	.047632	27932	1330	27267	331892	11.8821
57	.050873	26602	1353	25926	304625	11.4512
58	.054097	25249	1366	24566	278699	11.0380
59	.057243	23883	1367	23199	254133	10.6407
60	.060200	22516	1355	21839	230934	10.2564
61	.062184	21161	1316	20503	209095	9.8811
62	.065643	19845	1303	19194	188592	9.5033
63	.069299	18542	1285	17900	169398	9.1359
64	.073144	17257	1262	16626	151498	8.7789
65	.077134	15995	1235	15378	134872	8.4321
66	.081458	14760	1202	14159	119494	8.0958
67	.085946	13558	1165	12976	105335	7.7692
68	.090669	12393	1124	11831	92539	7.4670
69	.095638	11269	1073	10730	80708	7.1619
70	.100864	10191	1026	9678	69973	6.8666
71	.106353	9165	975	8678	60300	6.5794
72	.112133	8190	913	7731	51622	6.3031
73	.118200	7272	860	6842	43891	6.0356
74	.124571	6412	793	6013	37049	5.7781
75	.131260	5613	737	5245	31036	5.5293
76	.138278	4876	674	4539	25791	5.2894
77	.145640	4202	612	3896	21252	5.0576
78	.153359	3590	551	3315	17356	4.8345
79	.161444	3039	491	2794	14041	4.6203
80	.159913	2548	433	2332	11247	4.4141
81	.178777	2115	378	1926	8915	4.2151
82	.188049	1737	327	1574	6989	4.0236
83	.197735	1410	273	1270	5415	3.8404
84	.207867	1131	235	1014	4145	3.6649
85	.218438	896	196	798	3131	3.4944
86	.229462	700	161	620	2333	3.3329
87	.240956	539	130	474	1713	3.1781
88	.252924	409	103	358	1239	3.0293
89	.265373	306	81	265	881	2.8791
90	.278323	225	63	193	616	2.7378
91	.291766	162	47	139	423	2.6111
92	.305713	115	35	98	284	2.4696
93	.320164	80	26	67	186	2.3250
94	.335120	54	18	45	119	2.2037
95	.350582	36	13	30	74	2.0556
96	.366545	23	8	19	44	1.9130
97	.383000	15	6	12	25	1.6667
98	.399940	9	4	7	13	1.4444

Comparing the Tables IX.1 to IX.4, it is observed that the mortality rate for the decade 1931-1941 is lower for all ages compared to that of the decade 1941-1951. Also the expectation of life at birth in the decade 1931-1941 is maximum for Rajasthan.

In Table IX.5, the age specific mortality rate for different ages in Rajasthan have been compared for the three decades from 1921 to 1951. Comparison of the age - specific mortality rates in Rajasthan have also been made with those of all India for two decades 1921-1931 and 1941-1951 for which the all India Life Tables are available.

8. MORTALITY RATES:

In Table IX.5, is given the age specific mortality rates for the given ages, in Rajasthan for the three decades 1921-1931, 1931-1941, 1941-1951. The age specific mortality rates in all India for the decades 1921 -31, 1941 - 1951, are also given in the table for the sake of comparison.

The mortality rates for Rajasthan and all India, 1921-31, have been taken from the Acturial report of 1931 Census of India. The mortality rates for all India for 1941-1951 are taken from the Census of India paper No.2-1954, Life Tables.

Table IX.5

Age specific mortality rates for the given ages in Rajasthan and All India from 1921 to 1951.

TABLE IX.5.

S.N.	Age	RAJASTHAN						ALL INDIA			
		1921 Males	1931 -1931 Female	1931 Males	1941 -1941 F.M.	1941 Males	1951 -1951 F.M.	1921 Male	1931 -1931 F.M.	1941	1951
	1	2	3	4	5	6					
		Vidyanathan		S.N. Mathur		Vidyanathan		S.P. Jain			
1.	0	.2739	.2426	.2500	.2251	.2500	.2250	.2487	.2323	.1900	.1750
2.	5	.0247	.0181	.0116	.0152	.0212	.0217	.0193	.0165	.0171	.0206
3.	10	.0130	.0082	.0108	.0119	.0214	.0212	.0079	.0081	.0131	.0131
4.	20	.0129	.0166	.0081	.0091	.0199	.0201	.0127	.0176	.0105	.0078
5.	30	.0233	.0251	.0132	.0162	.0219	.0212	.0193	.0251	.0141	.0167
6.	40	.0351	.0343	.0202	.0220	.0244	.0225	.0294	.0345	.0202	.0243
7.	50	.0471	.0453	.0286	.0270	.0307	.0324	.0410	.0431	.0323	.0313
8.	60	.0665	.0626	.0619	.0456	.0528	.0602	.0579	.0543	.0573	.0500
9.	70	.1122	.1033	.1094	.0628	.0802	.1008	.0976	.0888	.1044	.0882
10.	80	.2415	.2235	.1971	.0940	.1256	.1699	.2180	.2066	.1863	.1531

- Note:-**
1. The values of 1921-31 for Rajasthan and all India have been taken from Actuarial report of 1931 Census of India.
 2. The values for 1941-1951 for all India have been taken from Census of India Paper No.2-1954, Life Tables.
 3. No such figures for All India were available for the decade 1931-1941.
 4. The area of Rajasthan in 1921-31 and in two Life Tables for 1931-1941 and 1941-1951 were different.
 5. Life Tables for Rajasthan and All India for 1921-31 and for All India 1941-1951 have been prepared by different methods than used for Rajasthan Life Tables for 1931-1941 and 1941-1951.

Table IX.5, shows that the mortality rates in Rajasthan, in general, are higher than those of all India in all the decades excepting 1931-1940. The mortality rates are high at age 0 which gradually goes on decreasing at age 5, 10 etc. It then reaches the lowest value at age 20 and then again starts rising at a steep rate, becoming quite high at ages 70 and 80. The low mortality rate at age 20 shows that a person reaching age 20 expects to live longer and can easily stand the vicissitudes of life.

In Rajasthan, the age specific mortality rates for the decade 1931-1940, for males and females, are very low for the ages, 5, 10, 20. The age specific mortality rates for females in Rajasthan for this decade are exceptionally low in all ages, which is difficult to explain. The epidemics, famines, and migration in Rajasthan have effected the age distribution to such an extent that perhaps the application of the two census method of construction of life Tables may not be suited to the age distribution of Rajasthan. We have mentioned earlier that the application of the method is more of an exercise in the application of the procedure to be used in the construction of a Life Table.

9. MEAN EXPECTATION OF LIFE:

In Table IX.6, is given the mean expectation

of life in a Life Table for Rajasthan and All India at birth and at different ages for males and females for the three decades from 1921 - 1931, 1931 - 1941, and 1941 -1951.

It may be mentioned that the Life Tables for Rajasthan Males and Females for the decade 1921-31, were prepared by the Census Actuary for 1931 Census of India. The area covered in the 1921-31, Life Tables for Rajasthan and that covered in the 1931-41 and 1941-51 Life Tables for Rajasthan is different. The 1921-31 Life Tables of Rajasthan includes Central India Agencies and Gwalior State, whereas the Life Tables for 1931-41 and 1941-51 are only for the State of Rajasthan. The method employed in the construction of Life Tables for 1921-31 and for the construction of 1931-41 and 1941-1951 Life Tables is different.

The All India Life Tables for the decade 1921-1931, have been constructed by L.S. Vaidyanathan, the Census Actuary for 1931 Census of India. In this census for the first time the Life Tables for All India and its regions have been constructed exclusively from the two census method. Due account has been made for the preferences in ages and for

of life in a Life Table for Rajasthan and All India at birth and at different ages for males and females for the three decades from 1921 - 1931, 1931 - 1941, and 1941 -1951.

It may be mentioned that the Life Tables for Rajasthan Males and Females for the decade 1921-31, were prepared by the Census Actuary for 1931 Census of India. The area covered in the 1921-31, Life Tables for Rajasthan and that covered in the 1931-41 and 1941-51 Life Tables for Rajasthan is different. The 1921-31 Life Tables of Rajasthan includes Central India Agencies and Gwalior State, whereas the Life Tables for 1931-41 and 1941-51 are only for the State of Rajasthan. The method employed in the construction of Life Tables for 1921-31 and for the construction of 1931-41 and 1941-1951 Life Tables is different.

The All India Life Tables for the decade 1921-1931, have been constructed by L.S. Vaidyanathan, the Census Actuary for 1931 Census of India. In this census for the first time the Life Tables for All India and its regions have been constructed exclusively from the two census method. Due account has been made for the preferences in ages and for the grouping of ages. No official life table for 1931-41 for all India is available. An abridged life table for the decade has been prepared by Kingsley Davis. The All India Life Table for 1941-51 is prepared by S.P. Jain the Census Actuary for 1951.

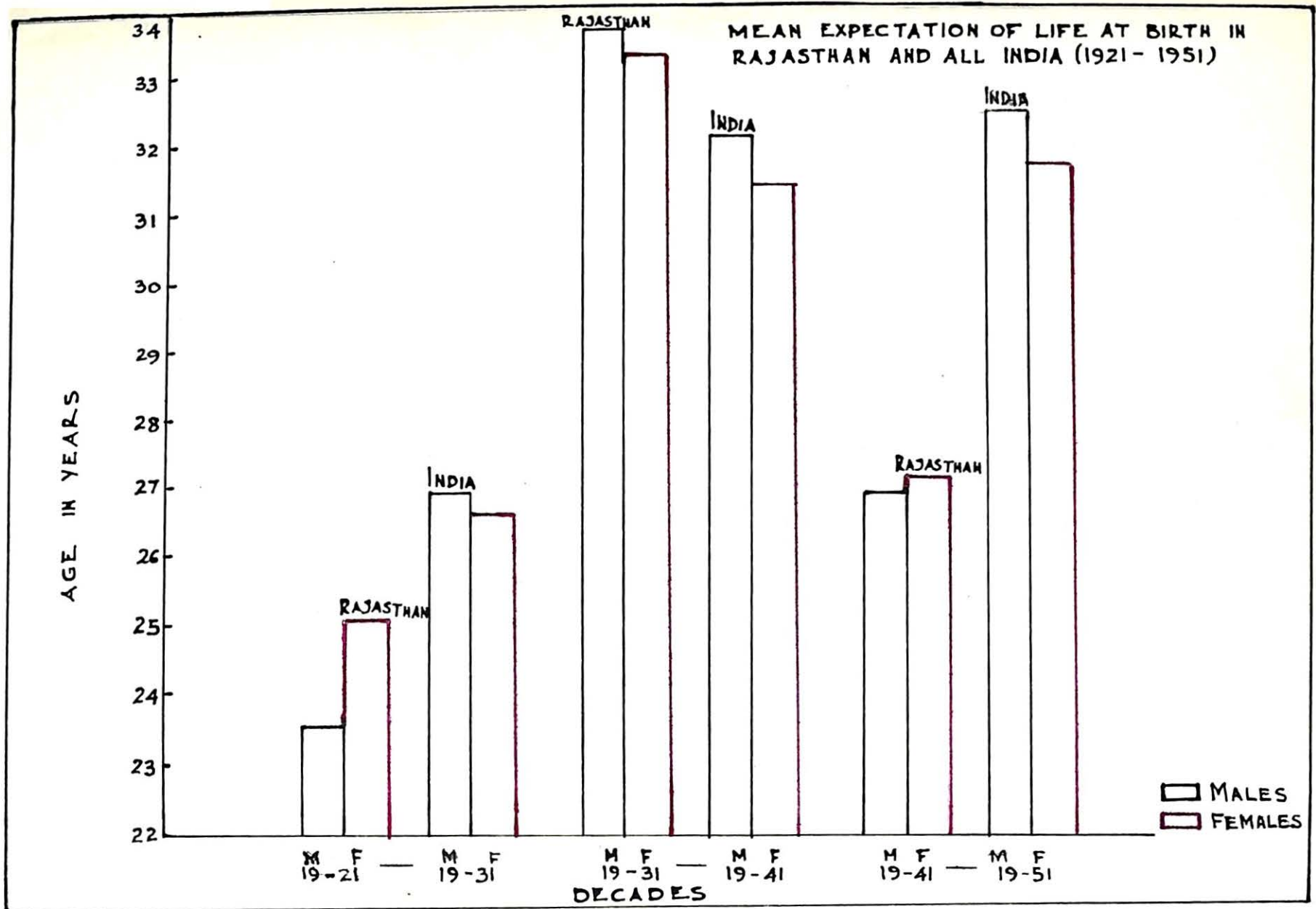


TABLE IX.6

Mean expectation of life at different ages in a Life Table for Males and Females, in Rajasthan and All India for three decades from 1921 to 1951.

S.N.	Age	RAJASTHAN						ALL INDIA					
		1921	1931	1931 - 1941		1941 - 1951		1921	1931	1931 - 1941		1941 - 1951	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	2	3	4	5	6	7	8	9	10	11	12	13	
1.	0	23.6	26.0	33.7	33.3	26.9	27.1	26.9	26.6	32.1	31.4	32.5	31.7
2.	10	33.6	33.5	40.2	40.8	33.4	32.6	36.4	33.6	41.2	38.6	39.0	39.5
3.	20	27.4	26.8	33.8	34.8	30.0	29.0	29.6	27.1	35.0	33.1	33.0	32.9
4.	30	21.5	21.7	26.7	28.3	25.8	24.6	23.6	22.3	29.0	27.9	26.6	26.2
5.	40	17.0	17.5	20.5	23.3	21.3	20.0	18.6	18.2	23.3	22.9	20.5	21.1
6.	50	13.1	13.6	14.8	18.3	16.3	14.8	14.3	14.7	17.8	18.2	14.9	16.2
7.	60	9.4	9.9	9.8	13.3	12.0	10.3	10.3	10.8	12.6	13.7	10.1	11.3
8.	70	5.8	6.2	6.3	10.6	8.5	6.9	6.4	6.7	7.8	9.5	6.5	7.5
9.	80	2.9	3.1	3.8	7.6	6.0	4.4	3.1	3.3	4.2	5.8	4.0	4.8

- Notes:- 1. The estimates of expectation of Life at different ages in Life Tables of Rajasthan for the decades 1931-1941 and 1941-1951, have been made for the uniform area of Rajasthan including Ajmer State as it stood in the 1951 census.
2. No adjustments have been made for the changes in the boundaries of Rajasthan due to the reorganisation of States in 1956.
3. The values of expectation of life for males and females in Rajasthan and All India for the decade 1921-1930 have been taken from the "Actuarial Report 1931, Table Q and R p.83 and 84 and Table A and B p. 67-68,
4. The estimates of expectation of life at different ages for All India for the decade 1931-1940, have been taken from "The Population of India and Pakistan" by Kingsley Davis, Table 90, p.42.
5. The estimates for the expectation of Life at different ages for All India for the decade 1941-1951, have been taken from the "Census of India, Paper No.2, 1954, Life Table-1951 Census" Table A. p. 35-38.
6. It may be pointed out here that all the tables mentioned above are prepared from different methods. It is also a known fact that life tables prepared by two persons for the same territory may not give same results.

(7) Kingsley Davis life tables for 1931-1941, applies to nine provinces only, embracing 41 percent of area and 46 percent of population of India proper.

Table IX.6, shows that the expectation of life at birth in a life table for Rajasthan is lower than that for All India in the decades 1921-30 and 1941-50 whereas it is higher in the decade 1931-40, both for males and females. The sudden rise in the expectation at birth in 1931-40 in Rajasthan and the sudden fall in the mortality in the decade does not seem plausible, because there seems no reason why the mortality conditions of Rajasthan in that decade should be better than these in other States of India. As it usually goes Rajasthan is one of the parts of India that do not come up high in rank as far as climatic conditions, socio-economic condition, social welfare facilities available, medical and maternity facilities are concerned. So as stated earlier it is difficult to explain the fall in the mortality and the rise in the expectation of life at birth in the decade as obtained by us. Could it be that the famines and the epidemics of the earlier decades had effected the age distribution in such a manner that we could get such a set of age specific mortality rates in the life table? But this does not seem to be possible. Could it be that the migration trends in the decade were changing and effecting the age distribution? Could it be that fewer people emigrated in the decade from the State due to world war II? The change in the age distribution in the decade was of great importance when one was using the two census methods for the construction of a life table. All these things, however, need delving deep into

the matter.

The values of the expectation of life at birth for all India for the decade 1931-40 pertain to only 41 percent of the area and 46 percent of the population of the country. The expectation of life at birth in India is showing a continuous rise since 1921.

The expectation of life at birth in Rajasthan for the decade 1941-50 does not seem to be altogether inconsistent with the conditions in Rajasthan and adjoining areas. The expectation of life at birth for Rajasthan for the decade is 26.9 for males and 27.1 for females as obtained by us, whereas the expectation of life at birth for the same decade in the central India zone is estimated to be 25.6 for males and 25.7 for females by Jain⁹ and 28.1 for males and 27.4 for females for the East India Zone.

As usually observed the expectation of life at age 10 is maximum in Rajasthan for all the three decades as in all India. It is even higher than that at birth, which is indicative of high infant mortality in Rajasthan and in all India.

In all the three decades the expectation of life at age 20 exceeds that at birth in Rajasthan as well as in all India. This means that a man of 20, on the average can expect a longer life than a child just born. This shows that the hazards of life come heavily in the first few years of life of a child.

Above table also shows that the expectation of life suddenly falls after age 40 and is very low at the age of 80,

9. Census of India paper No.2, 1954, Table in Appendix.

both for Rajasthan and for all India. It also shows that the expectation of life for females in Rajasthan is higher than that for all India in the decade 1931-40 at the early ages and that the expectation of males in Rajasthan is higher than that of all India males at later ages in the decade 1941-50.

APPENDIX TO CHAPTER IX

APPENDIX I TO CHAPTER IX.

1. METHOD:

The rationale of the method of construction of Life Tables given by the census Actuary for 1951, in the census of India Paper No.2, 1954¹, is given below. The modifications made in the method to suit the data available are also explained.

" In deriving mortality rates from the ratio of population p'_{x+10} aged $x+10$ at 1951 census to the population p_x aged x at 1941 census, it is assumed that there is a common mortality scale, which is applicable to all generations crossing the intercensal period. Persons, who may be living at age x at any time in the intercensal period, are subject to q_x , the rate of mortality at age x according to this common mortality scale. In this way, 1941 population moves on to 1951 population under the operation of this common scale. This scale fixes rates of mortality at different ages to which the community is subject. These rates of mortality determine the various functions of the relevant life table, such as L_x which represents the number living between ages x and $x+1$ at any time in the community subject to these rates of mortality.

p_x and p'_{x+10} should be taken as the observed values of L_x

¹The formulae has been discussed later.

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p_x and p'_{x+10} should be taken as the observed values of L_x and L_{x+10} at times of the censuses.

Thus, $p'_{x+10}/p_x = l_{x+10}/l_x$.

Adopting the well known approximation $l_x = \frac{1}{x + \frac{1}{2}}$, where l_x

¹ "Census of India Paper No.2, 1954, Life Tables-1951
Census p .5-6.

represents the usual life table number surviving to age x ,
we have :-

$$\frac{P'_{x+10}}{P_x} = \frac{l_{x+10+\frac{1}{2}}}{l_{x+\frac{1}{2}}} = {}^{10}P_{x+\frac{1}{2}}$$

which gives the probability that a person exactly aged $x+\frac{1}{2}$
will survive for the next 10 years.

In essentials, the common mortality scale determines
mortality rates which operating on 1941 population will
reproduce individual age population above age 10 as enumerated in
1951 census .

In this way, the probability of surviving for 10 years
at each of quinquennial intervals were obtained for the decade
1941-1951, from the 1941 and 1951 censuses. From the values
of ${}^{10}P_{x+\frac{1}{2}}$ at quinquennial interval, the values of p_x , the
probability of surviving one year for individual ages were
interpolated. As the primary object is to get smoothly running
rates of mortality, it seems preferable to obtain smooth rates
of p_x directly from ${}^{10}P_x$

" Log ${}^{10}P_x$ may be reduced to log $5p_x$ by the following
relationship :-

$$\begin{aligned} \frac{1}{2} (\log {}^{10}P_x + \log {}^{10}P_{x+5}) &= \\ &= \frac{1}{2} \left(E^4_{t=0} \log p_{x+t} + 2 E^9_{t=5} \log p_{x+t} + E^{14}_{t=10} \log p_{x+t} \right) \\ &= E^9_{t=5} \log p_{x+t} \text{ approximately} = \log 5p_x \end{aligned}$$

From the quinquennial group totals, individual values of

$\log p_x$ may be obtained by applying Dr Kozakiewicz's Osculatory interpolation formulae³ given in Appendix II. Antilegarithm of the interpolated values gives the probabilities of surviving one year for individual half-ages.'

2. Dr. Kozakiewicz's formulae:

To distribute the quinquennial group totals of $\log 5p_x$ into the individual years of age in the group, Osculatory interpolation formulae developed by Dr. Kozakiewicz in connection with the Canadian Census have been used. The modified form of the formula as modified by Jain has been given in the census of India Paper No.3 of 1954, and has been used for determining p_x from $5 p_x$. Discussing the merits of the formulae, Jain writes : "The formulae give population at an individual ages in terms of five quinquennial group totals, involving two groups on either side of the group containing the age in question. The formulae are designed to ensure smooth change in population from one age to another even when crossing groups. They also ensure that the interpolated single year of age population add up to the original group totals."

Jain further writes that the King's formula generally used for obtaining central value from three quinquennial group totals on the assumption that the fourth and higher differences of the grouped values are negligible and the well-known third degree curve Osculatory interpolation formula is generally applied to obtain the pivotal values. The formula

³The formulae has been discussed later.

used here i.e. the Kozakiewicz's formulae combines the two operations in one, ensure against distortion of group totals, and assume only fifth order differences of the group population to be negligible."⁴

The standard formulae (k) to (O), given in the annexure, and derived by Dr. Kozakiewicz as obtained by the method of Osculatory interpolation involving the preceding and the succeeding two group totals cannot be applied to obtain population for the first fifteen ages 0-15 as there are no groups below 0-4. Hence for the earlier ten ages 5 to 14 interpolation is made by formulae (a) to (J) derived by Kozakiewicz, based on the fourth order differences of the group population being negligible and for ages 0-4 separate curve has been fitted. Similarly the formulae (p) to (y) are derived for the last ages 55 to 64, and separate curve is fitted to obtain values of p_x above 64.

With the help of Kozakiewicz's Osculatory formulae the values of p_x for the individual ages 5 to 64 have been interpolated for males and females for the two decades 1931-41 and 1941-51.

As has been mentioned earlier Dr. Kozakiewicz's formula is not applicable in determining p_x for ages below 5 and above 64; special methods have been used to determine p_x for these values. The two curves "the Gompertz curve" and the "Mekhan's curve" used for obtaining the values of p_x in these ages have been explained below.

3. EXTENSION OF p_x TO AGES 65 AND OVER:

The main method described above gives firm estimates of p_x for the ages 5 to 64. Other methods have to be adopted to extend the rates to the extremities of span of life. Owing to well-known unreliability of age returns at very old ages, say above 75, the values of p_x beyond 65 have not been obtained by the main method. "To derive values of p_x for ages beyond 65, a "Gompertz curve"⁵ was fitted at ages 45, 50, 55 and 60 by the method of moments using the relation.

$$\text{colog}_e p_x = Bc^x.$$

Hence $\log (\text{colog } p_x) = \log B + x \log c$. Where B and c are constants to be determined from the values of $p_x = 50, 55, 60$.

Having determined the values of p_x , the probability of surviving from age x to x + 1 in a life table, for the ages 5 to 100 we then determined the other functions of life table for these ages, before determining p_x for ages below five. The method of determining and the reason for determining the other functions first will be clear from the discussions below.

4. RATE OF MORTALITY:

The mortality rate (denoted by q_x) is defined as " the probability, at age x, of dying within one year after attaining age x; that is, it is the ratio of the number dying between ages x and x + 1 to the number entering into age x".⁶ Being a probability, q_x should not exceed the value unit.

Having obtained the values of p_x for ages 5 and over, the probability of dying is calculated by subtracting p_x from 1

5. Ibid p.2 and 18. 6. Length of Life by Dublin Letkar p.11.

for each age. This gives us the age specific mortality rates which can be expressed per 1000.

5. LIVING AT AGE X AND LIFE TABLE DEATHS:

Living at age x or the life Table Survivors "exhibit the number of persons surviving to successive ages of life out of a cohort starting together at birth or some given age." For the initial cohort some convenient round number, called radix, is usually chosen. For our calculation the radix $l_x = 1,00,000$ has been chosen. The symbol d_x represents the number of life table deaths between ages x and $x + 1$.

The number living at age x in a life table and the Life table deaths are computed together. Thus, of the 1,00,000 to start with, in the fifth year of life, they experienced a certain mortality rate in the fifth year. Applying the mortality rate of the fifth year to the number surviving in that age, gives the number dying in the fifth year. The number of deaths between fifth and sixth year of life are written in the column of d_x for five. Subtracting these deaths in the fifth year to the total survival in that year gives the number living in the sixth year. They in their turn are subject to the mortality rate of sixth year. Multiplying the mortality rate of sixth year to the number living in that year gives the number of deaths in sixth year. Subtracting the number of deaths in sixth year from the number living in sixth year gives the number living in the seventh year. In this manner the life table survivors and the life table death in higher ages are

obtained by a continuation of this process.

Having determined the number living ages five and above the number living at ages 0 to 4 have been extrapolated from number living above four.

6. DETERMINATION OF l_x FOR AGES BELOW 5:

There are no data on which to base the mortality rates below age 5. The values of l_x are projected for values of x below age 5 by the equation,

$$l_x = A + Hx + Bc^x + \frac{M}{nx + 1}$$

from the life table value of the number living at age x , already obtained for ages 5 and above. This equation has been used by the census Actuaries of India in the past for compiling q_x for the very early ages, in the absence of any direct data which may yield reliable mortality rates at these ages. The recorded population at these ages are not reliable and cannot be used for deducing rates of mortality.

The values of constant c have been determined by S.P. Jain, Census Actuary 1951, for males and females by calculations based on the average ratio of mortality at ages 1, 2 and 3 shown by old foreign well-constructed life tables, which show a mortality level as heavy as is known to prevail in India.

The method adopted for the derivation of the values of c , by Jain is given below:

From the life tables given in the Demographic Year Book of the U.N.O. those, which show heavy mortality in the early years of life, such as is the characteristic of India

experience, were selected and the average rates of mortality at ages 1, 2 and 3 were obtained from them. The life tables included, related to Egypt (1936-38), Mauritius (1942-46) Guatemala (1939-41), Chile (1940), Japan (1921-25), Bulgaria (1899-1902), Thailand (1937-38), Finland (1901-10), Hungary (1920-21), Italy (1901-11) and U.S.S.R. (1896-97).

The average values of q_x thus obtained are reproduced below :-

<u>Age</u>	Values of q_x	
	<u>Male</u>	<u>Female.</u>
0	.2095	.1767
1	.0736	.0723
2	.0404	.0405
3	.0237	.0235

As c is not desired to be connected with infant mortality, q_0 was not taken into account and values of l_x for $x = 1, 2, 3$ & 4 were obtained with radix $l_0 = 10,000$. The equation $l_x = A + Hx + Bc^x$ was fitted to these values to determine the value of c . For males c comes out to be 0.450 and for females the value was 0.474ⁿ. Same values of c have also been adopted here for Rajasthan.⁷

The values of the constants A , H and B in the expression for l_x have been determined separately for males and females in each Life Table by fitting the equation $l_x = A + Hx + Bc^x$ to the values of l_5 , l_6 and l_7 already obtained. Based on this equation, values of l_x for $x = 0, 1, \dots, 4$ were calculated. To these values, the value of $\frac{m}{n_x + 1}$ has been

7. For further details see Census of India Paper No. 2, 1954 page. 19.

added , to get the number surviving, l_x for ages below 5.

"The term $\frac{m}{2x+1}$ is meant to provide for a heavy infant mortality which is characteristic of the Indian experience. The term should become insignificant when x reaches the age 5 and this object is served, if m be taken as 20. The equation is already satisfied by the values of l_5 , l_6 and l_7 and this ensures a smooth junction of l_x below age 5 with those already obtained for 5 and over. The constant m is so determined that the ratio of l_1 to l_0 gives the average infant mortality rate for the State during the intercensal period.⁸

The values of m to be adopted for the above purpose is determined by S.P.Jain in the manner explained below .

"Owing to omissions in the registration of births and deaths in India, the registered infant mortality rate is considered to be understated. From the fact that infant mortality rate is a ratio of births and infant deaths, which are both affected by omissions in registration, and considering the level of under-registration in the various parts of the country, it seems unlikely that the true infant mortality rate in the State is more than double the recorded rate.

The probable value has been adopted as the value of q , for the life table. From the value m can be calculated as follows:

Let a_0 and a_1 be the values of the expression $A + Bx + Cx^2$ for $x = 0$ and $x = 1$ as already obtained in the manner explained

$$\begin{aligned} \text{above } l_0 &= a_0 + m ; \\ l_1 &= a_1 + \frac{m}{2} ; \\ l_1 &= (1 - q_0) l_0 \end{aligned}$$

⁸ Ibid p.19.

These equations give :

$$m = \frac{a_1 - a_0(1 - q_0)}{\frac{20}{21} - q_0}$$

From the values of m thus obtained, the values of l_x are got, which enable the table below age 5 to be completed. As this portion of the life table is based on an estimate of the value of q_0 , it shows a tentative character." For q_0 the value of q_0 in the Rajasthan life table of 1931 has been taken.

Having determined the value l_x for ages below 5 in the manner explained above, we then determined the number of dying between ages x and $x + 1$ i.e. d_x and then the number surviving between x and $x + 1$ i.e. l_x . From the number surviving to exact age x and the number dying between age x and $x + 1$, the mortality rate q_x was determined. Subtracting q_x from one we got p_x , the probability of surviving at age x .

7. OTHER FUNCTIONS OF LIFE TABLE:

(i) Years of Life Lived by the Life Table Cohort within one year of Age.

The symbol L_x is used to denote the number of years lived by the life table cohort between the ages x and $x + 1$. This is determined by taking the mean of the values of l_x and l_{x+1} for l_x .

(ii) Total Years of Life Lived by the Life Table Cohort from Age x until all have died.

The symbol employed to denote the entry at age x

is T_x which is equal to

$$T_x = \sum_{t=x}^w L_x$$

" They are obtained by summing the entries in the column

L_x upward from the highest age i.e. 100, and noting the cumulation to each age."

8. Expectation of Life or Average future Life time:

"It shows the average number of years of life remaining to persons of each age on the assumption that they will experience, during their future life time, the mortality rates exhibited in the life table".

This average future life time for any age is commonly spoken of as the expectation of life at that age," denoted by e_x^0 .

To compute the expectation of life, use is made of column T_x and l_x , previously derived. Thus, to find the average number of years lived per person after reaching the particular age x , it is necessary to know the total number of years lived beyond age x by all the persons in the life table cohort who attain that age; this total is then divided by the number attaining age x .

$$\text{Thus } e_x^0 = \frac{T_x}{l_x}$$

In particular, the reciprocal of the expectation of life at birth is defined as the life table death rate for all ages.

$$\therefore \text{ death rate } = \frac{1}{e_x^0}$$

All columns, forming a complete Life Table, have been estimated in the manner explained above for the two decades 1931-1941 and 1941-1951 for males and females separately for Rajasthan.

(xii)

ANNEXURE - II TO CHAPTER IX.

Dr. Kozakeiwicz's Osculatory Interpolation Formulae :-

S.N.								
1	10,000 U ₀ =	3,616 W ₀	-2,768 W ₅	+1,488 W ₁₀	- 336 W ₁₅			(a)
2	10,000 U ₁ =	2,640 W ₀	- 960 W ₅	+ 400 W ₁₀	- 80 W ₁₅			(b)
3	10,000 U ₂ =	1,840 W ₀	+ 400 W ₅	- 320 W ₁₀	+ 80 W ₁₅			(c)
4	10,000 U ₃ =	1,200 W ₀	+1,360 W ₅	- 720 W ₁₀	+ 160 W ₁₅			(d)
5	10,000 U ₄ =	704 W ₀	+1,968 W ₅	- 848 W ₁₀	+ 176 W ₁₅			(e)

6	10,000 U ₅ =	336 W ₀	+2,272 W ₅	- 752 W ₁₀	+ 144 W ₁₅			(f)
7	10,000 U ₆ =	80 W ₀	+2,320 W ₅	- 480 W ₁₀	+ 80 W ₁₅			(g)
8	10,000 U ₇ =	- 80 W ₀	+2,160 W ₅	- 80 W ₁₀				(h)
9	10,000 U ₈ =	- 160 W ₀	+1,840 W ₅	+ 400 W ₁₀	- 80 W ₁₅			(i)
10.	10,000 U ₉ =	- 176 W ₀	+1,408 W ₅	+ 912 W ₁₀	- 144 W ₁₅			(j)

11.	10,000 U ₁₀ =	- 128 W ₀	+ 848 W ₅	+1,504 W ₁₀	- 240 W ₁₅	+ 16 W ₂₀		(k)
12.	10,000 U ₁₁ =	- 16 W ₀	+ 145 W ₅	+2,218 W ₁₀	- 409 W ₁₅	+ 62 W ₂₀		(l)
13.	10,000 U ₁₂ =	66 W ₀	- 344 W ₅	+2,556 W ₁₀	- 344 W ₁₅	+ 66 W ₂₀		(m)
14.	10,000 U ₁₃ =	62 W ₀	- 409 W ₅	+2,218 W ₁₀	+ 145 W ₁₅	- 16 W ₂₀		(n)
15.	10,000 U ₁₄ =	16 W ₀	- 240 W ₅	+1,504 W ₁₀	+ 848 W ₁₅	-128 W ₂₀		(o)

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Contd.-

(xiii)

S.No. 1

16.	10,000 U ₉₀	=	- 144 W ₈₀	+	912 W ₈₅	+	1,408 W ₉₀	-	176 W ₉₅	(p)
17.	10,000 U ₉₁	=	- 80 W ₈₀	+	400 W ₈₅	+	1,840 W ₉₀	-	160 W ₉₅	(q)
18.	10,000 U ₉₂	=		-	80 W ₈₅	+	2,160 W ₉₀	-	80 W ₉₅	(r)
19.	10,000 U ₉₃	=	80 W ₈₀	-	480 W ₈₅	+	2,320 W ₉₀	+	80 W ₉₅	(s)
20.	10,000 U ₉₄	=	144 W ₈₀	-	752 W ₈₅	+	2,272 W ₉₀	+	336 W ₉₅	(t)

21.	10,000 U ₉₅	=	176 W ₈₀	-	848 W ₈₅	+	1,968 W ₉₀	+	704 W ₉₅	(u)
22.	10,000 U ₉₆	=	160 W ₈₀	-	720 W ₈₅	+	1,360 W ₉₀	+	1,200 W ₉₅	(v)
23.	10,000 U ₉₇	=	80 W ₈₀	+	320 W ₈₅	+	400 W ₉₀	+	1,840 W ₉₅	(w)
24.	10,000 U ₉₈	=	- 80 W ₈₀	+	400 W ₈₅	-	960 W ₉₀	+	2,640 W ₉₅	(x)
25.	10,000 U ₉₉	=	- 336 W ₈₀	+	1,488 W ₈₅	-	2,768 W ₉₀	+	3,616 W ₉₅	(y)

Note:- The above Table has been reproduced from (Census of India Paper No.II,1954)

FUTURE GROWTH AND POPULATION POLICY

CHAPTER X

FUTURE GROWTH AND POPULATION POLICY

1. INTRODUCTION:

For an adequate understanding of the historical aspects of population composition and change, and in order to examine the demographic trends in the decades to come, we need to know about the number of people that lived in earlier decades. This alone will help us in the assessment of population at distant dates which is essential for long term social planning. The quality of the life of a community depends greatly upon its future size and if changes in the future population could be foreseen, the plans laid down for the future well-being of the nation would be more successful. The general policy of Government in respect of planning for food, shelter, clothing and employment, may be greatly influenced by the relative strength of the population. In another sphere, the adaptability of the State's productive power will depend inter-alia, on the flow of men to industry.

The calculations about future population generally involve considerable uncertainty. Our knowledge of the forces underlying changes in mortality, fertility, marriage, and migration is incomplete, and the precise effects of suspected causes cannot at present be ascertained. Even if our understanding of the past were more complete, the future would yet remain somewhat uncertain.

It is not and may never be possible, therefore, to predict the course of these elements in future with any great confidence. That is why any word such as 'estimate' or 'pro-

'forecast' has been avoided in this connection, in order not to give the impression that what lies ahead could be foreseen clearly. " Projection is a term intended to imply no more than an illustrative calculation based upon certain given assumptions."¹

As Kingsley Davis defines it, " the term 'Projection', as used in demography, means those statements of future trends which flow mathematically from certain explicitly stated quantitative assumptions."² Whether or not the statements will prove true in practice is another matter; they will do so only if the assumptions turn out to be in accordance with reality which may or may not be the case.

A population projection can be based only on current information about the speed of growth, the direction of the flow of population, and so on, and will have to be amended from time to time. Sir Charles Darwin³, while making projections for world population, compared himself to a weather forecaster. The weather forecast does usually give some prediction for future, similarly, the population projections give some idea of the future course of population growth.

2. PROJECTIONS FOR RAJASTHAN:

With the knowledge of fertility and mortality migrations and marriages in Rajasthan, some projections have been worked out for the future population of Rajasthan . As

1 " Demography" by P.R.Cox. Chap.12. Population Projection p. 233.

2 Population of India and Pakistan by K. Devis "Projection of future Population" p.88

3. "The Problem of world population" by Sir Charles Darwin, The Rede Lecture 1958.

explained in previous chapters, the information on fertility and mortality of Rajasthan cannot be considered very reliable, and hence, our estimates of projection would merely be indications of possible trend in future. D.V. Glass calls the set of estimates of projections as a "statistical exercise deriving from certain postulates"⁴. We attempt this exercise for Rajasthan on the assumptions of the pattern of fertility, mortality, and migrations of the State as were found in the past. One has to make assumptions that agree well with reality, and this requires judgement and intuition (resting on vague assumptions that go beyond the explicit quantitative assumptions of the projections). Since the projections rely heavily upon the knowledge of present births, deaths, migration and the age structure in the States unless these are accurately assessed it is difficult to have population projection. Projections also depend on assumptions regarding future trends about which we know very little.

When only the census data are to be used, the principle of interpolation is generally used unmodified for intercensal estimates, and the principle of extrapolation is used unmodified for postcensal estimates. "The problem becomes one of formulating algebraically or graphically the 'law' or description of population changes for a period on which we have information by fitting a curve to the observed sizes of a population at census dates."⁵

4 "Population policies and movements in Europe" by D.V.Glass. p.354.

5 "Statistics for Sociologists", by Margaret J.Hagood;chap. 26. Methods of Population Estimation using Censuses data only p.791.

A single projection taken by itself is of relatively small value . It shows only what happens if mortality and fertility, marriage and migration each adhere closely, in future, to the course postulated for it. In the present state of knowledge, however, there is a wide range of different assumptions that could plausibly be made in regard to these elements. The general practice is, therefore, to make a number of projections at the same time in order to show the effects of a variety of bases. Three projections have been made for Rajasthan, in this chapter, with three different assumptions to judge the effects of variety of bases. Before taking the method of projection, a summary of the important characteristics of the population of Rajasthan is made for a clear understanding of the projected populations. The future course of mortality and fertility of the State has also been assumed and the justifications for assumptions are given.

3. GENERAL CHARACTERISTICS OF THE POPULATION OF RAJASTHAN:

To summarize, the following are especially noteworthy characteristics of the population of Rajasthan. The number of persons in Rajasthan, about 1,5,970,776 in 1951, is the fourth among the States of India. The density of population 117 persons per sq. mile - is very much larger than in any other country with very extensive land areas like Russia, U.S.A., Canada, Australia, and Brazil. The growth rate for the thirty years prior to 1951 had averaged about 1½ percent per annum in contrast to the three decades preceding 1921, in which famines and epidemics kept the number of persons almost stationary. Birth-rate in Rajasthan, has, apparently, been subject only to

slight fluctuations and to almost a minor downward trend. According to our estimates, the birth rate just prior to 1951 was about 40 per thousand. The crude death rate in Rajasthan since 1921 has averaged in the low thirties. The expectation of life at birth in Rajasthan has remained very low -about 27 years in the decade 1941-51. The age distribution of the Rajasthan population has the general form that is the inevitable result of a continuing level of high fertility in a closed population. Something of the order of 40 percent of the population is under the age 15, a little less than 53 percent is between 15 and 64 years, and a small fraction - 2 to 3 percent - is 65 years and over. The proportions of this general magnitude have characterized the population since 1901.

4. THE EXPECTED COURSE OF MORTALITY:

There is every reason to expect a pronounced and rapid decline in mortality in Rajasthan in the next two or three decades. The basic rationale underlying this assumption is that upto 1951 Rajasthan was an area of very high death rates which resulted from a combination of primitive environmental sanitation, water scarcity, the widespread endemicity of a whole family of infectious diseases, and absence of facilities for any kind of adequate curative medicine. All these causes, however, are now under attack. In recent years, a drastic reduction in mortality rates has been brought about in Rajasthan through public health programmes, like antimalarial campaign, B.C.G. campaign, of antibiotics, etc.

Coale and Hoover have estimated the death rate for India for the period 1951-56, and have shown that the death rate has fallen by 5 points in this period. They wrote,⁶ "According to our estimates, the crude death rate has already declined from a level of about 31 per thousand in 1951 to about 25.5 per thousand in 1956, and will be as low as 21 by 1966 and 15 by about 1975we estimate that the expectation of life at birth, which was about 32 years in 1951, will rise to 52 years or more by 1986". They further wrote, "Two general guides were employed in estimating the extent and rate of mortality improvement in India. The first guide was the experience in Ceylon in implementing an anti-malarial campaign, the second guide was the improvement in mortality rates in the recent experience of other low-income areas where public health campaigns other than anti-malarial have been applied. This experience was taken as an indication of how rapidly Indian mortality rates might be expected to fall as a result of a gradual introduction of latrines, better sources of drinking water, the use of antibiotics, the campaign against tuberculosis, etc."

These guides are true for Rajasthan also, and it is expected that under the health campaign in the 1st and 2nd Five Year Plans and under the schemes of Community Development Programme and Labour Welfare the mortality in the State is bound to decline.

5. THE EXPECTED COURSE OF FERTILITY:

Of late, efforts are being made to develop the economy of each State and the country as a whole. Efforts are also being made to provide better medical facilities to men. This might bring down the death rate of the population. Moreover,

6. Population growth and Economic Development in Low-income countries by A.J.Coale and M.Hover p.34 and 62.

information regarding family planning devices is being disseminated to people at all levels. If these devices get popular, the size of a family can be checked and fertility habits changed. This, however, is wishful thinking and particularly so in the case of Rajasthan which is one of the backward States in this country. Nevertheless, it is likely that social conditions may change in Rajasthan as a consequence of changes in the marrying habits of the people. With better literacy levels and more effort at educating women, the social taboo of widow remarriage may get relaxed and add to the fertility rate obtained by relating the births to total population.

A similar view has been expressed by Coale and Hoover on Indian fertility. They write ⁷ " There is little justification for a belief that fertility in India is in the incipient stages of a more or less inevitable decline. There are even forces at work in India that tend to raise fertility rates. Improving health conditions will tend to raise the number of , live births in two ways. In the first place, the kind of health prevalent in India probably depresses marital fertility rates by increasing the incidence of stillbirths, miscarriages, and spontaneous abortions. Poor health (particularly chronic fevers such as malaria) may reduce cohabitation rates. Secondly, lower mortality rates among males will reduce the incidence of widowhood, (which is maximum for Rajasthan). If widows in India had fertility rates as high as married women of the same age, the number of births in India would be nearly 10 percent higher than it is."

7 Ibid p. 59.60.

In other words, if marital fertility rates were to remain unchanged, and if there were no widows in the reproductive period, there would have been about 4-5 percent rise in the fertility of the population of Rajasthan.

6. THE EXPECTED COURSE OF MIGRATION:

Migration is another important factor, after the factors of birth and death which affect the growth of population of a region within a country. It has been pointed out earlier that migration estimates for the future are very uncertain and cannot be easily estimated. Rajasthan is the first State of India which has the highest emigration rate for all the past decades. People from this State have been migrating in search of jobs, and it is expected that people from Rajasthan will emigrate in still greater numbers to take advantage of high wages and better employment opportunities provided by huge industrial projects in the country under the Five-Year Plans.

There is a possibility of similar projects in Rajasthan but compared to some very big projects like Bhakra dam and Bhilai Steel project, these would be minor ones.

On the whole migration is not an unimportant factor in making population forecasts for Rajasthan. But, in the absence of possibilities of estimating future migration trends, it has been assumed that migration conditions do not change.

The projections for Rajasthan are based on similar methods as have been adopted by Kingsley Davis for the future trends of India, in his book "The Population of India and Pakistan."

Here three projections have been made for the population of Rajasthan. First is a linear relation between population and the time interval of a decade, the equation for which is $y = a + bx$. The second is a quadratic function of the linear type $y = a + bx + cx^2$ and the third is a logistic curve

$$p = \frac{k}{1 + e^{a + bt}}$$

In the ultimate analysis, these are just models and their validity is wholly dependent on the soundness of the underlying assumptions.

7. PROJECTION NUMBER I.

The first projection rests on the assumption that in the next few decades, the State's population will grow at the average rate it exhibited during the last five decades. A linear relation between the population increase and the time interval of a decade of the form $y = a + bx$ has been used for the first projection. This assumption yields the following estimates for the future population of Rajasthan.

TABLE X.I.

Estimated population of Rajasthan for the decades 1961-2001 by fitting a Linear Curve.

<u>S.No.</u>	<u>Year.</u>	<u>Estimated Population:</u>
1	1951	15,970,776
2	1961	17,756,388
3	1971	19,671,418
4	1981	21,586,443
5	1991	23,5001,478
6	2001	25, 416,503

Note:- The estimates are made for the reorganised State of Greater Rajasthan.

Of course the trouble with such a projection, is that the assumption of a constant rate of growth giving a straight line is entirely unrealistic. But the figures serve a purpose; they represent the lower limits for the population which is 17,756,388 persons for the year 1961 and 25,416,508 persons for the year 2001.

This is likely to be the lower limit because the mortality rate may decline earlier and for sometime to come the fertility may remain at the higher level as it is now.

8. PROJECTION NUMBER II:

Fitting a polynomial of the second degree to the previous population figures, we can obtain the maximum population that could be supported with the present resources.

A quadratic function of the form $y = a + bf + cf^2$ has been fitted to the five census figures (1901 -1951). This equation helps us to obtain population estimates in the years 1961-2001, the figures are given in Table X.2.

TABLE X.II

Estimate Population of Rajasthan in the Years 1961-2001,
by fitting a polynomial of the second degree :

<u>S.N.</u>	<u>Year.</u>	<u>Estimated Population:</u>
1.	1951	15,970,776
2.	1961	18,570,838
3.	1971	21,463,313
4.	1981	24,681,548
5.	1991	28,225,578
6.	2001	32,095,408

Note:- The estimates are made for the reorganised State of Greater Rajasthan.

It gives a population of approximately 3,20,95,408 in the year 2001. In other words, if the population of Rajasthan increases during the five decades following 1951 as it increased during the preceding three decades, it would almost double its size by the year 2001. But in view of the past population growth and in view of the fact that population growth never proceeds for very long at a uniform rate, this projection cannot be regarded as an estimate of actual future trends for a longer period. It is merely a top limit which the actual growth might conceivably approximate.

9. PROJECTION NUMBER III:

The third projection, made by fitting a simple logistic curve, gets rid of the difficulties arising due to the assumption of the constant rate of increase. A logistic curve is fitted to the population of three censuses since 1931. This method, originating with Verhulest and independently developed by Pearl and Reed, has achieved some remarkable success.⁸ The type of curve used, called the logistic curve, denotes the mathematical assumptions, and has the following form as given by Yule.⁹

$$Y_c = \frac{k}{1 + e^{a + bx}}$$

where k represents the limiting population (as $x \rightarrow \infty$);
a represents the point of inflection and 'b' represents the internal "Standard" of population known.

8. The Population of India and Pakistan by K. Davis p.83.

9. "Statistics" by Yule & Candle p. 304.

This when plotted, shows a characteristic S- Shape curve.

"This curve has the double advantage from the mathematical point of view, that not only it gives a limiting value to the growth of population but it does not give a negative value for population extrapolated backwards. Besides...this equation is a type which represents more or less faithfully the natural evolution of a growing organism.¹⁰

In order to use this projection for purposes of estimating the actual future growth of a population one has to make the assumption that the social factors determining population growth in the area in question will remain constant in their effects. If the technological and economic situation radically changes, then, obviously, a change in population growth will result and will not fit the curve as extrapolated.

The logistic equation is fitted by a method referred to by Yule as the 'first method of fitting'¹¹, which makes use of three population figures to calculate the constants k, a, and b. When more population counts are available, the extension of the method for a group which is a multiple of three is described as the "Second method of fit" by Yule. In estimating population projection the second method was first tried, but in the course of calculation it was noticed that it would not fit. It may be because of the inadequate coverage of population of Rajasthan before 1931 census, as is found in general in All India, or it may be due to heavy

10. "Sankhya, Vol.5, 1940-41. "An estimate of the Population of India for the year 1941 by T.Krishnamurthy and R.S. Krishnamurthy p.279

11. Yule op. cit.

mortality during the decade 1911-20, on account of Influenza, plague and famine in Rajasthan putting any smooth curve depicting the change of population out of gauge. Therefore, it was finally decided to fit the logistic curve only on the basis of censuses for three decades 1931, 1941 and 1951. The method naturally detracted from accuracy of the results. After calculating the constants k, a and b the equation took the following form :

$$Y_c = \frac{27354543}{1 + e^{1.1866 - 0.3113x}}$$

From this equation the values of Y_c for the years 1961 to 2001 were estimated.

In Table X.3, the estimated population for the years 1961-2000 as obtained by fitting a logistic curve, is given.

TABLE X.3
Estimated Population for Rajasthan for the years 1961-2001
by fitting a Logistic curve.

<u>S.No.</u>	<u>Year.</u>	<u>Population.</u>
1	1951	15,970,776
2	1961	17,975,580
3	1971	19,790,220
4	1981	21,370,710
5	1991	22,698,330
6	2001	23,780,640

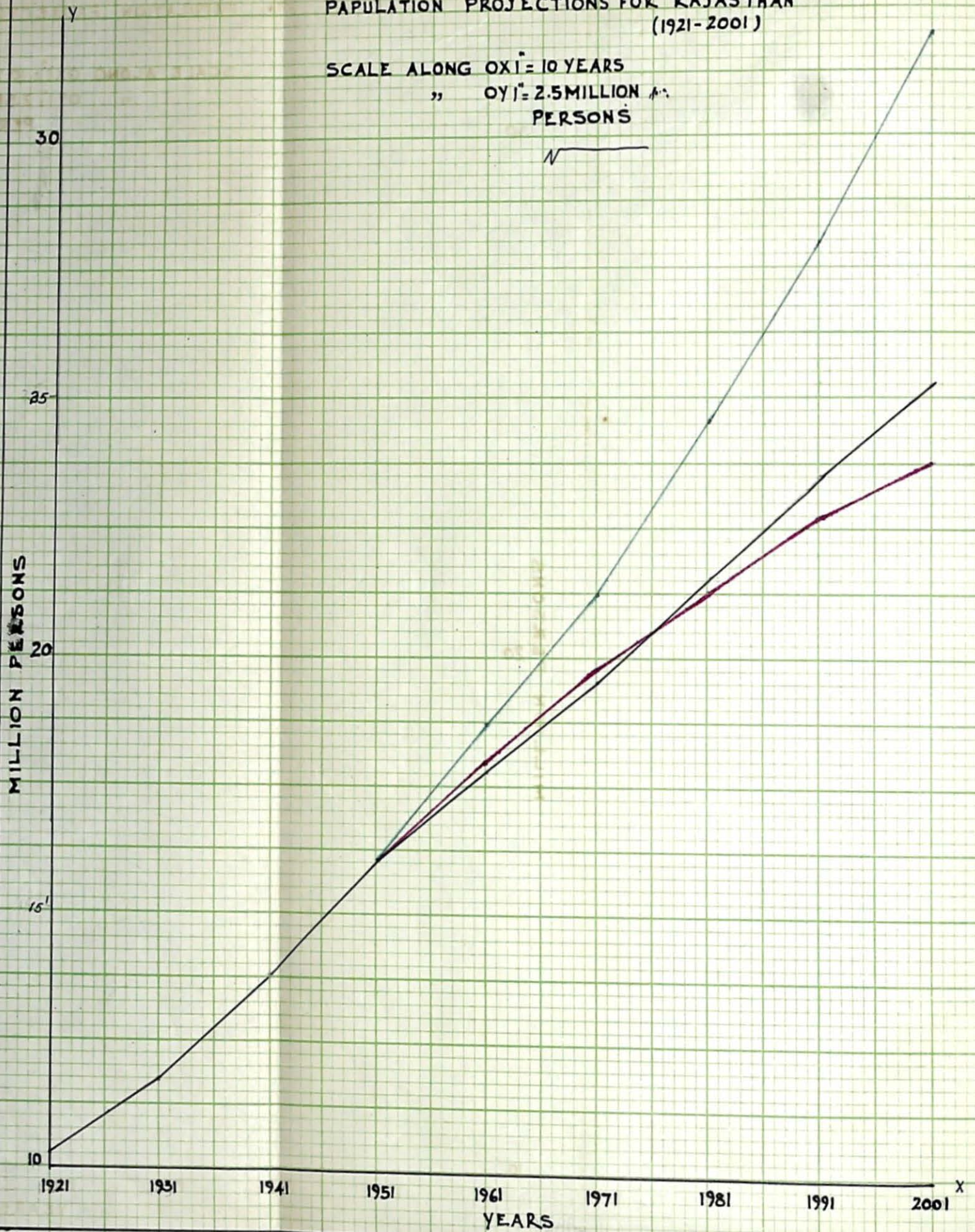
The projected values for future years depend on the validity of the assumptions made ¹² i.e. (1) the secular trend of growth of population will be of the form of a growth curve known as the 'logistic'; and (2) the non-secular fluctuations in the population in the past periods, were not important

12. "Statistics for Sociologists" by Margaret J. Hagood p.233.

PAPULATION PROJECTIONS FOR RAJASTHAN
(1921-2001)

SCALE ALONG OX1 = 10 YEARS
" OY1 = 2.5 MILLION PERSONS

N



enough to distort the major pattern of growth, so that our curves could be taken to describe the entire course of growth. The projection assumes that after the year 1971 the rate of growth will begin to taper off rapidly.

10. DIFFERENCES IN THE THREE PROJECTIONS:

In Table X.4, is given the projected population of Rajasthan for the next five decades 1961-2001, as estimated with the help of the three methods of projection.

TABLE X.4.

Estimated population of Rajasthan for 1961 to 2000,
by three projections:

S.No.	Years.	Linear	Polynomial	Logistic.
	1	2	3	4
1	1951	15,970,776	15,970,776	15,970,776
2	1961	17,756,388	18,570,899	17,975,580
3	1971	19,671,418	21,463,318	19,790,220
4	1981	21,586,448	24,681,549	21,370,710
5	1991	23,501,478	28,225,578	22,698,380
6	2001	25,416,508	32,095,408	24,645,110

The three projections are charted in one graph.

It will be seen that the logistic curve falls between the first one, which is low upto 1971, and the second, which is high. The logistic curve after 1971 falls showing that the same rate of growth will not hold good after 1971.

This shows that the population of Rajasthan will begin to taper off after 1971.

Three estimates as obtained by the application of three methods is given in Table G.4. But the conditions in Rajasthan and for the whole of the country are so unpredictable that these projections remain pure demographic exercise. It is certainly known that the assumptions made in the above calculations are not likely to hold good because migration factor has been taken to be unchanging, but it is quite unpredictable for Rajasthan.

11-FUTURE PROSPECTS:

A careful perusal of the types of forces that affect fertility and mortality in the State may reveal that Rajasthan's population at least for a generation to come, would tend to grow at a progressively increasing rate.

The so-called new Birth-retarding forces such as late marriage, use of contraceptive methods, high standard of living with fewer children, etc., have yet to gather momentum, in Rajasthan, and will have only a microscopic effect on the future growth, whereas the old factor leading to high birth-rate will continue to prevail. Industrialization and economic progress envisaged by the five-year plans are definitely factors contributory to population growth and would be operating in Rajasthan as well. Mortality rates, on the other hand, will progressively decline, in the subsequent decades. Thus the widening gap between the high birth-rate and low death-rate would only swell the numbers. It is almost impossible to have the present aspirations and ambitions for the all sided development of the State and the country as a whole unless strict measures are adopted at all

levels to check the size of population.

The promotion of birth control as an official population policy has been rare in human society. Many countries in the world tolerated it as a private practice and some have favoured it in one way or the other. But the official campaign to teach, encourage, and spread the use of contraception among the general public has been conspicuous by its absence. Governmental policy with reference to births has thus been generally the opposite of the policy with respect to death. A major decline in the mortality of the State and the rise in the standard of living of the masses may be assumed only if the Rajasthan Government undertakes an unprecedented, statewide programme designed to introduce family limitation in every village.

There are many formidable problems of finding the best methods and of discovering means of birth control that are at once acceptable to the Indian population. The justification for assuming that there can be major progress in fertility control if the government sponsors the programme, is based on fragmentary evidence in various other parts of India (including the rural areas) indicating a widespread interest on the part of married persons (both men and women) in the possibilities of birth control and family limitation. A study under the auspices of the world Health organization in India¹³ showed that in two areas; one primarily rural in Mysore State, and the other a housing unit near

13. World Health organization, Final Report on Pilot Studies in Family Planning. in Mysore State and a housing units near, Delhi.

New Delhi, more than 75 per cent of the couples expressed a desire to learn a method of family planning. Survey of Nasik, Kolaba and Satara¹⁴ district revealed nearly 50 per cent of the population interested in obtaining information about contraception. Another indication that Indian couples prove receptive to an effort to introduce family planning is the experience of some doctors in Rajasthan. These scattered indications can be taken to show, not that significant reductions in fertility will occur spontaneously, but that there may be popular acceptance of effective birth control devices if they are cheap, and if right methods of education, manufacture, distribution, storage, etc. are discovered.

The control of population as here conceived should first be advocated through the efforts of voluntary organizations. They should tell the people general laws of population, particularly with reference to the health of the mother and child, and the economic and social consequences of having big families. They should create a public opinion in favour of the smaller families and birth control.

Family planning advice, to be effective and acceptable, has to be carried to the village mothers in their homes and given by trained personnel that can inspire confidence. Eventually Government co-operation should be secured, both relating to legislative measures and financial assistance for the promotion of birth-control on a State wide scale. It is hoped that the Third Five Year Plan of Rajasthan will have ample provision for birth control and top priority will be given to the policy of family limitation.

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