# CENSUS OF INDIA, 1921. 

## VOLUME XV:

## PUNJAB AND DELHI.

## PART I.

## REPORT

BY:
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## INTRODUCTION.

1. Previous census reports of the Punjab have dealt in great detail with matters connected with religion, marriage customs, caste structure, languages and other subjects not necessarily directly connected with the statistics which it has been the object of the census to collect.

In view of the mass of information on these subjects which has been collected in census reports, gazetteers and reports of ethnographic and linguistic survey, it was considered unnecessary to deal with them again in great detail and in their place enquiry has been directed towards the economic and industrial conditions of the two provinces.

The census operations have taken place at a time when Deputy Commissioners and other local officers, already overburdened by the elaboration of their routine duties during the last decade, were concentrating all their energies in guiding the country through a critical period of change. At former censuses such local officers had responded nobly to calls upon them for the provision of masses of facts and information on subjects which were dealt with in the census reports: I have felt that it would be impossible for them to respond to any such call at this time, and have endeavoured to cast as little additional work as possible upon them in connection with the actual census and to refrain from calling upon them to send in reports on subjects of general interest. I find that I have issued only thirty-nine general circulars throughout the operations, and that of these only three asked for general information, the rest being entirely concerned with administrative details of the enumeration and preparation of statistics.

The inevitable result is that this report, following the lines of those prepared for European countries, will be confined in the main to an explanation of the figures which have been tabulated.

I have spared no endeavour to render these as accurate as possible, and where there are any reasons for suspecting inaccuracies II have no hesitation in pointing them out, so that as far as is possible the statistics may form a solid basis on which statisticians may base arguments and test theories. Not being a trained statistician myself I have tried to resist the fascinating temptation of building up theories from the statistics, though I have suggested lines of enquiry that might be taken up by those qualified for such work.
2. The dates of previous censuses are given in the margin, a short account previous

Int Jenuary 1865.
10th Jnumary 1868.
17th February 1881.
20 ch Fobruary 1891
Int Maroh 1001.
loth March 1011. of them will be found in paragraphs 20 to 22 . Some Cansuses. of the Tables published in Part II of this report repeat figures for previous censuses back to that of 1881 : the two which had been taken before that dealt with such totally different administrative divisions that comparison with them is practically useless; where figures for previous censuses have been reproduced in this report they have been adjusted so as to refer to existing divisions and not to the divisions which were in being at the time they were originally prepared; they are thus already in a form suitable for comparisonwith the newly recorded statistics.
3. Changes in the boundaries of administrative units that have taken place since the census of 1911 are detailed in paragraphs 2 and 3 -of this report, the ouly two important changes are the creation of the Delhi Province from portions of the old Delhi District of the Punjab and the Meerut District of the United Provinces, and the oreation of the new district of Sheikhupura from portions of the surrounding districts of Lahore, Gujranwala and Lyallpur.
4. A full description of the census operations is published in the Adminis- operallons trative Volume, Part IV, of this report ; that volume being intended only for cot the Present departmental and local use, a very brief note on each stage of the operations is given below. Very little change was made in the procedure gradually evolved and improved at previous censuses.
5. I took over charge of my duties on the 31st March 1920, and took the organisa'ion in hand immediately. A preliminary circular together with the first three chapters of the Provincial Census Code was issued on the 27th April ; Distrist Census Officers in every district and Census Superintendents in every

Changes in Boundaries and Areas.

State were appointed forthwith, and general village and town registers were prepared on which to base the formation of census divisions.

Consus Division and Asoocy.

RonseNumberling enumeration could be carried out by one enumerator ; these blocks were in circles under supervisors, and the circles again grouped in charges under grouped superintendents. The existing revenue divisions were very generally followed in fixing the boundaries of charges and circles, and the revenue agency was largely employed as Superintendents and Supervisors. These divisions were first fixed roughly and then revised after the completion of house-numbering showed where mistakes had been made in estimating the suitable boundaries for blocks; ultimately at the time of the final census there were 172,044 blocks, 13,943 circles and 1,017 charges, and the enumeration was carried out by 164,425 enumerators under the direction of 13,913 supervisors and 999 charge superintendents. Most of the supervising staff was recruited from amongst officials, whilst the enumerators were in the main voluntary non-official workers; all were appointed individually under the Census Act and thus all gained the status of public servants.
7. The Census Divisions having been tentatively fixed the next step was the numbering of all houses, this work was commenced on $15 t h$ September and completed within two months. Each house which might be occupied on the census night was clearly marked with a number, a separate series of numbers being kept for each circle. This work was carried out by the supervisors. As a result just over eight million houses were numbered, but to ensure that no person should escape enumeration many buildings were numbered which were not inhabited on the census night, and on that night it was found that only a little over five and a half million were inhabited. This numbering formed a reliable basis for the supply of forms, and after it was completed the census divisions were revised and fixed finally. ollowed in August by a pamphlet of instructions for Charge Superintendents of the actual enumeration books.

During the progress of house-numbering the whole staff received training in their duties; starting from the top each census officer instructed the officers immediately subordinate to him so that the instructions drifted down from the Provincial Superintendent to the enumerators. Test enumerations formed the main part of the training.

The preliminary enumeration took place between the 1st February till the 1st March in rural tracts, in towns it was both commenced and finished a fortnight later. At this enumeration all persons likely to be in residence on the 18th March were entered up in the enumeration books; this procedure allowed ample time for the careful recording and checking of all entries and reduced the work at the final census to a minimum. The enumeration book consisted of a cover, containing instructions and forms of summaries to be filled up and detached after the census; a block list, which was a detailed list of the houses in the block and served to prevent any buildings being overlooked either at the preliminary or final enumeration ; and a sufficient number of general schedules on which the actual particulars concerning each person were recorded.
The Final Consus.
9. The final census took place between 7 and 12 o'clock on the night of the 18th March, every enumerator visited all the houses in his block and corrected his enumeration book by striking out entries referring to people who were found to have left since the preliminary record had been prepared and by adding entries for all new-comers. This having been completed every entry in the book was given a serial number-the number of occupied houses, persons, males and females was totalled for the block, then for the circle and then for the charge. The charge summaries were totalled for the district or town at district headquarters and then telegraphed to Lahore and Simla.
Use of with a line for each person enumerated and a column for the record of each particular regarding him. In a few places, where Europeans were numerous and it was possible to obtain the services of an English-speaking enumerator, these forms were used in English for the recording of Europeans; but in general Europeans are found in small numbers in blocks containing many Indians and in suc̣h oases the enumerator could not be expected to fill up entries concerning them in a
general schedule; to meet this difficulty Europeans were supplied a few days before the census with an English form termed a" househald schedule" on which to fill in for themselves the entries regarding themselves and other members of their households. In spite of very detailed instructions for filling them up, these household schedules were often carelessly completed and their collection and correction was accompanied by much difficulty.
11. A few outlying portions of the Province are cut off by snow-covered passes which render them completely inaccessible in March; in these a census was held in the autumn of 1920 and the results of it treated as part of the March

R angre District-
Kothis Kodh and Sowar .. 20.9-20 Lahul and Spiti .. .. 29-8-20 Chamba Slato Lahul or .. 18-9-20
Bashuhr stale-
Chini and Dodra Kina .. 15-12-20

Consus. The dates of such non-synchronous

Hon-Syaehronous ${ }_{\text {chrson }}$ Tracess
other tracts the presence of wild the final census at the normal - time. In yet census was held at daybreak weasts rendered night-work unsafe, and the final
12. Special arrangemen the 19th March instead of the previous night.
ling on the census night and as each were made to enumerate the persons travelwhich prevented his being enumerated a enumerated he was provided with a pass greatest magnitude was the census on the railways. All railway stations were made into separate block: or circles in the district in which situated, a special enumerating staff was posted to each at 7 p.m. on the night of the 18 th March and remained on duty till 6 a.m. next morning or until the last train had passed through and the station was closed for the night ; this staff enumerated everyone found on the station at 7 p.m. and thereafter enumerated everyone arriving at the station either by road or rail who could not produce a pass showing that he had already been enumerated. In this way everyone entering or leaving a train during the night was accounted for; there remained a few people on trains running long distances who had entrained before the station enumeration started and had not left the train next morning ; to ensure that these people were also counted it was arranged that all trains running throughout the night should carry an enumeration staff ; this staff spent the night enumerating the passengers and at 6 a.m. all such trains were stopped and a final enumeration carried out of all those who had not got passes.

The District consus authorities were responsible for the station enumeration which was however usually carried out through the agency of the station staff; the running train enumeration was conducted entirely by the railway authorities themselves.

The instructions issued provided for all contingencies, and it is unlikely that more than a very few railway travellers escaped enumeration; the above description ouly indicates the broad lines on which arrangements were made. Enumerating staffs were appointed to 762 stations in the two-provinces and 69 running trains.

Especial arrangements for fairs and other large concourses of people were put in train beforehand and were necessitated in thirty places.

All main roads were patrolled by enumerators, staffis were posted to ferries, especial arrangements for troops on the march were made with officers in charge of such units. There remained such persons as were temporarily absent from their houses, guarding their fields or doing other casual work in the immediate vicinity; the orders contemplated that these should be recorded as though present in their liouses, and it is probable that very few escaped enumeration.
13. As explained in paragraph 9 , the totals for each district, State and town were added up as soon as possible after the census; these totals included all persons whether enumerated at their houses or whilst travelling; their collection from outlying tracts was one of considerable difficulty and motor-cars, horse-men, camel-riders, and runners were employed in bringing them in.

The Kapurthala, Pataudi and Nabha States were all able to telegraph their provisional totals on the 19th March; in British Territory the Delhi Province was the first unit to report its totals which it did on the 20 th ; the great majori:y of totals had been got in by the evening of the 22nd March but the last district, in which work had been delayed owing to a mistake in a cantonment, was not able to wire its total till the 27th. The figures as reported by telegram
are compared with those finally tabulated below, and show a high standard of accuracy for so hurried an operation.

|  |  |  | Occapiod houses. | Persons. | Malce. | Females. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PUNJAB. <br> Provisional Total <br> Final Totals <br> DELHI. <br> Provisional Totala <br> Final Totals |  |  |  |  |  |  |
|  | $\cdots$ | $\cdots$ | -6,623,073 | 25,003,794 | 13,726,146 | 11,367,648 |
|  | . | - | 5,632,305 | 25,101,060 | 13,732,048 | 11,360,012 |
|  |  |  |  |  |  |  |
|  | $\because$ | ' | 112,835 | 486,741 | 280,709 | 200,032 |
|  | . | $\ldots$ | 114,683 | 488,188 | 281,633 | 200,655 |

splip copyjog.
14. The next stage in the operations was to copy the entries concerning each person enumerated on to a separate slip. These slips were issued in five different colours, one for each of the main religions and one for all other religions; a distinctive symbol was printed on each to distinguish between males and females, and between unmarried, married and widowed persons ; there were thus five different colours and six different symbols giving a total of thirty easily dis tinguished slips; in addition special slips were issued for the recording of infirmities; the other particulars recorded about each person were recorded by hand on the slips, a previously arranged system of abbreviations being adopted.

This work was done as in 1911 by the supervisors who were collected at tahsil headquarters for the work immediately after the census; as the period available was very short owing to the majority of supervisors being patwaris who were required in their circles for crop-inspection, an option was given to local authorities to have slips prepared from the preliminary record before the final census. The intention of this option was that slips should be prepared according to the provisional entries in the enumeration books so that the only copying work to be done after the census would be to destroy slips for cancelled entries and prepare new ones for the entries made on the actual census night. 21 districts and 10 states adopted the option and prepared slips beforehand, in only a few of these was the experiment justifiedby the result; slip-copying after the census was carried on by a staff collected together and constantly under supervision, that done before the census was done by supervisors in their circles and was only the subject of supervision by charge superintendents when they visited the circles; it was very generally found that the slips prepared before the census had to be corrected or prepared afresh after the census and the experiment did not result in the saving of time and led to a considerable additional wastage of slips. Although very careful estimates of the numbers of slips required in each tahsil had been made beforehand and a supply sent allowing a liberal excess for wastage, yet in many centres slips of particular varieties ran short and a break-down in printing arrangements occurring at the critical time much delay resulted; in many districts it was found impossible to complete the copying before letting the patwaris return to their urgent revenue duties and in such districts the copying had to be finished after the crop-inspection was over. It was hoped to complete the slip-copying by the 27 th March and this could have been done in most centres had not the supply of slips broken down; actually the slips came in very slowly and a considerable number of units had not sent in slips by the middle of May whilst the last to be received arrived at the beginning of July.
Sorting.
15. Central sorting offices were opened at Karnal, Ludhiana, Lahore and Lyallpur; and the completed slips were sent to these offices where large stafis sorted them according to the various heads required for each table of the report.

The maximun staff employed and the dates of commencing and completing

10. The results of the sorting were set forth on sorters' tickets 'which were complation sent to the compilation office in Lahore where they were compiled into District or. other units totals, and then finally arranged in the form in which they appear in the Tables Volume of this report. This office was in charge of my Personal Assistant who had a large staff of Inspectors and Compilers working under himThe office opened on 1st May 1921, the first table was sent to the press on 17th September 1921 and the last table was finally printed. off on 17th January 1923. The process of tabulation is a long and complicated one; any errors in the previous operations, which have escaped detection, come to light at this stage when their correction involves long and careful investigation which is extremely difficult to carry out.
17. The results of the census are published in four parts, the months in which these were issued or in which it is expected that they will issue are as follows:-

| Part I. The Report | .. during | une | 1923. |
| :---: | :---: | :---: | :---: |
| Part II. The Imperial Tables |  | May | 1923. |
| Part III. Appendices to the Imperial Tables |  | May | 1923. |
| Part IV. The Administrative Volume |  | .Juns | 1923. |

18. The census of the two provinces has cost Government Rs. $3,59,224$ cost of the which works out at Rs. 14-0-8 for every 1,000 persons enumerated; this compares with Rs. 1,23,807 or Rs. 5-1-11 per 1,000 in 1911. In addition to this sum of Rs. 3,59,224, the total cost of the census includes Rs. 23,112-1-3 recovered from Municipalities on account of cost of tabulation, Rs. 11,550-7-7 recovered from Indian States on account of the cost of forms, sorting and compilation; whilst Indian States have reported a cost of Rs. 50,977-12-10 for the enumeration that they themselves carried out. The Phulkian States have been omitted altogether in reckoning these figures as they carried out the whole of the operations themselves.
19. First and foremost a very grateful acknowledgment is due to the official and non-official census staff that carried out the enumeration and slipcopying. With few exceptions this enormous body of workers gave its services freely and without expectation of payment of reward; "the non-officials were honorary volunteer workers, whilst the officials undertook the heavy extra duties without additional payment. All are deserving of the sincerest thanks and of congratulations on the public spirit they exhibited, especial praise is due to the patwari staff. Patwaris are hard-worked officials and many miscellaneous duties beyond those directly connected with the revenue administration fall to their lot; they undertook the severe strain of census duty with very little grumbling and carried it through as efficiently as they were able to do; in addition to forming the backbone of the enumeration staff they carried through the slip-copying, which is a monotonous and uninteresting work which has to be carried through at high pressure. Some small acknowledgment of the services of the enumerating staff has been made by the presentation of sanads (certificates) for good work, these were issued in three classes, and the numbers issued were 1st Class 242, 2nd Class 1,218 and 3rd Class 7,641; in addition at the close of the financial year 1921-22 I devoted all funds available for the purpose towards giving rewards for slipcopying, but I only had Rs. 16,000 available and only Rs. 15,047 were actually distributed, which only allowed small rewards being given to the best of the mon.

Deputy Commissioners and District Census Officers, throughout the provinces, directed the operations in their respective districts; their work has increased during the last decade and it could not be expected that they would find ruch time aivailable for personal superintendence, but so far as their time permitted they all contributed to the success of the operations; amongst Deputy Commissicners I would especially wish to mention Mr. Harcourt in Gurdaspur and Mr. Gordon Walker in Rohtak who took much personal interest in the work in their districts. The work of Mr. Lane Roberts, who was in charge in the Delhi Municipality, and of Mr. Blacker, who conducted operations in the trans-frontier tract of Dera Ghazi Khan, deserves particular notice; both these officera had exceptional difficultios which they surmounted with enthusiasm.

The darbars of the Punjab States appointed Census Superintendents to take charge of census operations, in many cases these officers were able to devote their whole time to the census, and all had more time to give to it than the busy
officials who had to undertake the work in British districts without any diminution in their other duties. Amongst a group of very capable and helpful officials I would single out Sardar Bachittar Singh in Patiala, Syed Abdul Majid in Kapurthala and Syed Altaf Hussain in Jind, but with one exception the work of all was so good that I feel considerable diffidence in specially mentioning any by name.

Five Extra Assistant Commissioners worked under me in the Census Department ; Lala Arjan Das worked as my Personal Assistant between 21st January 1921 and 31st August 1921 and was succeeded by Sheikh Abdul Majid who had already been in charge of the Lahore Sorting Office. The Personal Assistant was in general charge of the tabulation work; and both incumbents of the office worked well, Lala Arjan Das giving me material assistance in the preliminary stages and Sheikh Abdul Majid preparing and checking the tables; the whole work was new to Sheikh Abdul Majid, but he organised beth the sorting and tabulating work on sound lines and justified his selection. The other three sorting offices were also under men new to the work; they were Syed Abdul Haq at Ludhiana, Lala Bishamber Dayal Singh at Karnal, and Malik Chiragh-ud-din at Lyallpur; the newness of the work led to several mistakes being made which caused much trouble to rectify but on the whole the work was satisfactory, that of S . Abdul Haq being rather more dependable than that of the others.
20. Owing to ill-health I was obliged to take leave from the 21st September 1922; previous to that date ill-health had delayed my work, and on relinquishing my charge I had only written so much of the Introduction to the Report which precedes this paragraph and Chapter I, but Parts II and III of the Report had been completed and were with the Press. I relinquish charge without information as to the identity of my successor who will write the major portion of the Report and complete this introduction.

## L. MIDDLETON.

20-9-22.

- Introductory note continued.

21. I took over as Superintendent, Census Operations, on the 3rd October 1922, Sheikh Abdul Majid, B.A., LL. B., having remained in charge of the Office after Mr. Middleton's departure. As he has noted Mr. Middleton had completed Chapter I of the Report, and this chapter alone contains a comprehensive survey of nearly all the subjects dealt with in the census. Mr. Middleton also took to England and completed there the whole of the Administrative Volume, Part IV.
22. My own task has been to see a great portion of Parts II, III and IV through the press and to write the eleven remaining chapters of Part I. Two months were spent in gaining familiarity with all the phases of census work, and in the remaining five months the chapters have been written rather faster than at the rate of one a fortnight, so as to complete the report by the end of April. Under these circamstances I have had strictly to limit the time devoted to the investigation of those fundamental principles without which it is impossible to understand the problems of migration, birth and death-rates, and age-distribution.
23. Throughout the chapters for which I am responsible I have sought, wherever possible, to express results in a precise statistical form with due regard to the probable errors of enumeration: Neglect of this consideration has led to the formulation of many utterly unproven and-even demonstrably false propositions. Every census report in fact bristles with dogmatic statements and I should hesitate to estimate how many are contained in the chapters written by myself. I am fully aware that that to make much unqualified statements is contrary to the spirit of scientific progress, and would ask the reader to believe that the linitations to which most of the statements are subject were in many cases present to my mind even when they are not explicitly set forth.

Nothing, in fact, is more conducive to dogmatic statement than the masses of statistics contained in a census report, yet no where is dogmatic statement less justified or the critical spirit of present-day statistical doctrine more necessary. Indeed modern statistical methods probsbly indicate more often what conclusions are false than what conclusions are true and even this seemingly negative result may be reached only. after patient and abstruse enquiries.
24. In addition to the gentlemen whose services have been acknowledged by Mr. Middleton, I wish to express my thanks to those who have specislly assisted me, in particular, to Colonel W. H. C. Forster, I.M.S., Director of Public Health, Punjab, whose constant advice and criticism has been of the utmost value in all matters relating to vital statistics and deaths from disease ; to Mr. G. Anderson, C.I.E., I.E.S., Director of Public Instruction, who kindly devoted many hours together with several departmental officers to the discussion of the problem of education and its bearing on the generalditeracy of the province; to Colonel Ward, I.M.S., Inspector-General of Prisons, who furnished me with some special jail mortality statistics ; to Mr. Calvert, I.C.S., Registrar, Co-operative Credit Societies, whose unrivalled knowledge of the industrial and rural economics of the Punjab has been freely placed at my disposal in the form of notes on mydraft chapter on occupation ; to Mr. R. Sanderson, M. A., I. E. S., Inspector of Schools, Lahore Division, who has kindly supplied me with certain data regarding Albinos; to Mr. H. L. O. Garrett, M.A., I.E.S., for a note on recruitment-in the Ludhiana district ; to Rai Bahadur Sir Ganga Ram, Kt., C.I.E., C.V.O., for information regarding the Vidhva.Vivah Sahaik Sabha, Lahore ; to Mr. Faqir Chand, Auditor of Statistics, North-Western Railway, for information supplied regarding the number of passengers and density of traffic on the North-Western Railway; to Mr. Labhia Mall; Assistant Librarian of the Punjab University Library, for bringing to my notice several interesting books on population statistics; to the authorities of the "Civil and Military Gazette" Press, and in particular, to Mr. Gilbert, whose unfailing courtesy and energy has smoothed the task of getting so much material into print ; to Mr. K. C. Vidyarthi, Manager of the Bharat Insurance Company, for his kind treatment of the Consus Department which rented offices in the Bharat Buildings. Finally, $I$-must acknowledge the great services rendered by my Personal Assistant, Sheikh Abdul Majid, B.A., LL.B., but for whom the task of completing the report within the short time allotted would have been well-nigh impossible. The Chapters IV and IX on religion and language are almost entirely his own, and I did little more than edit them. Both my computers, Mr. Abdul Majid, M.A., and Mr. Balwant Singh, B.Sc., gave great assistance in many laborious computations and both of them put up many valuable notes. Good work was done by all members of the staff of whom Mr. Barkat Ali, Head Clerk; Sheikh Mohammad Abdul Wahid, Recordkeeper ; Inspectors Ata-ur-Rahman and Fazal Din, and my Stenographer Bawa Jagat Singh may be specially mentioned.

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1-5-23
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# CENSUS OF THE PUNJAB AND DELHI, 1921: 

## CHAPTER!

## Distribution and Movemine of the Population.

2.     - : A. Coographical position and boundaries of the provinces. 2. External changes in boundaries sinoe 1911.
. Intion Admistrative divisions. 8. Natural.divisions. 6. Land tenure. 7. Cultivation.
3. Irrigation. 8. Commanications. 10. Rural eoonomy. 11. Industrial and economio.

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$\because$ GEOTION III.-VARIATION IN POPULATION AT PREVIOUS CENSUSES.
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SECTION VK_MOVEMENT OF THE POPULATION 1011-21.
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*) BEOTION VI.-HOUSES "AND FAMILIES. - is - ${ }^{\circ}$
44. Dearription of Punjab honses. 45. Definition of "house" for census pturposes. 46. . Number of housen, 47. sNumber of recidents in a house. 48. The family.
Sěction 1-Descriptive.
$\therefore \because$ 1. The Punjab lies the north-west of India and is a Tegion of vast plains Geographicai at the foot of the Fimalaya mquntains which. run along its northern-borderi; the poantion and gmall province of Delhi forms an entrant intortho southorm portipn gita eastern tho Provincet; boundiry and until recontly formed a portion of the larger province. Tite Punjab lies raughly between the Jumna River on the east and the Indus? River on the west and takes its name, कwhich means the " Ft fe Waters,* from fiverivers-which. oraverse it from north-east to south-yest and unite to pour their waters into the Indus towards the extreme south-west corner of the grovince. - Thesesseven rivers aro the most important physicarfeatures of the country and have been sdetermining faotors in her history and forming her, external and internal administra-tive-boundaries: The Sutlej enters in the'north-east and. Iuns in w. west-southwesterly direction to join the Indus at Mithankot in the south-west and thus traverses the exframe length of the province ; this river and the Jumna are close together whererthey issue from the hills, butsthe latter then flowe south and fallows the whole eastern border of the province before turning east throughe. the United Provinces to join the Ganges; the swatershed between them gradualiy widens until it rnerges into the plains of Rajputana with their own separate system of rivers: This watershed forms the south-easterm parteof the province. which adjoins the Rojputana Stater on the south-west, the boundary with. these States being an arbitrary and irregular line not based on any partiaular .physical feature. This south-easterm pert of the province forms the Cis-Sutlej tract of early Anglo-Indian homenclature gnd was the first part to be occupied by the British. The remainder of the province, the Trans-Sutlejregion, forms a
yashtriangle bounded by the Himalayas" the Sutlej and the Indus; this triangle is divided into five smaller triangles by the other four rivers, each triangle being known as a "Doab" or land of two waters; the present districts of the province are in general sub-divisions of these doabs and rarely lie on both sides of a river. The Dera Ghazi Khan District or the right bank of the Indus and the Bahawalpur State on the left bank of the Sutlej, which do not fall into-the description given above, form outlying portions of the Punjab which are in many. ways distinct from it.

In the north-east the Punjab runs with. Tibet for a short distance, on the east it adjoins the United Provinces, to the south tie the States of Bikanir and Jaisalmir and the Sind tract of the Bombay Presidency ; Baluchistan and the North-West Frontier Province lie across its western boundary, whilst Kashmir State lies to the north.

External

## 2. Apart from a few unimportant transfers due to riverain action between

 the United Provinces and the Karnal and Gurgaon Districts of the Punjab' there has been only one change since the last census, but that a most important one, in the boundaries of-the Province. At that time the Delhi District was part of the Punjab, but in 1911 it was decided to move the Imperial Capital to Delhi and the district was remodelled and placed under a separate local government as a separate province in the following year. The present province of Delhi bears little relation to the old Punjab district of that name ; that district consisted of three tahsils-Delhi, Sonepat and Ballabgarh; at the time of separation the tahsil of Sonepat with an area of 448 square miles was transferred bodily.to the Rohtak District, whilst an area of 280 square miles from Ballabgarh Tahsil was transferred to the Gurgaon District. The major portion of the old district therefore remained in the Punjab and only the Delhi Tahsil and a small portion of the - Ballabgarh tahsil went to the new province ; later on the Delhi Province was enlarged by the addition of some 46 square miles from the Meprnt district of the - United Provinces, and was thus brought to its present size of 593 square miles.- This being so care must be taken never to compare any statistics compiled. - for the Delhi Province with those of the old Delhi District ; in the Imperial Tables - Wherever previous census figures are given for Delhi they have been carefully - corrected so as to refer to the area which now forms the province and therefore form a basis for comparison. It was not found possible to make similar adjustments in the majority of figures in the Subsidiary Tables and miscellaneous statements given in this report; in these, where comparison with previous figures is required, they must be made between them and the combined figures for the Punjab and Delhi in 1921. In order to provide a basis for comparison in future the 1921 figures have been shown both in the combined form and separately for each province.
have: 3. Numerous trifling adjustments of boundaries of internal divisions end taken place since 1911; a complete list of these is given at the áries: this paragraple and it will be seen that twenty-four affect district - bounddistricts. Necessary censuses have been made wherever these appear in this report, so that the figures now published refer to the internal divisions as existing after all these transfers had been effected. At the time of the census the Sheikhupura: District was in the course of formation, it was created in 1919 from parts of the Lahore and Gujranwala Districts, some subsidiary transfers from Sialkot to Gujranwala taking place at the same time! It was intended to add to it on the lst April 1921. by the addition of 159 villages from Jaranwala and this date, being so close to the census I was directed to treat it as though it had already been effected. The proposed transfer was much delayed and on the 1st April 1922 a general reconstitution of the new district took place; the major portion of the Raya Talsil of Sialkot was added to Sharakpur, "the remainder being merged in the Zafarwal Tahsil; the previously proposed transfer took place at' the same time and the enlarged Sharakpur Tahsil was split into two new tahsils of Nankana Sahib and Shahdara. By this time it was too late to amend the census statistics, either by including all the changes which occurred on 1st April 1922 or by omitting that which had been prematurely recognised, the result is that the figures in. this report do not deal with the Lyallpur and Sheikhupura Districts exactly as they stood at the time of the census. .-

The transfers connected with the formation of the Sheikhupura District were the most important. which accurred in the decade; others affecting considerable areas were those from the Bhera Tahsil of Shahpurto the Phalia Tahsil of Gujrat in 1911; and from the Okara Tahsil of Montgomery to the Samundri Tahsil of Lyaltpur in 1912:-

Of the twenty-five changes which occurred between tahsils within the same district, and thus did not affect district boundaries, the most important are those in connection with the creation of two new tahsils,-Jaranwala in the Lyallpur District and Khanewarin the Multan District; whilst a third of somemagnitude was the transfer of thirty-seven villages from the Moga to the Feroze-: pore Tahsil in the Ferozepore District.

The Bhera Tahsil of Shahpur District and the Gugera Tahsil of the Montgomery District have gone through a process of remodelling during the decade and have had their names changed to Bhalwal and Okara respectively; *

Some of the Punjab States have altered the boundaries of their internal administrative divisions. In Patiala State the four tahsils of Payal, Ghanaur, Banur and Mohindargarh have been absorbed in the tahsils of Sirhind and Dhuri,. Patiala, Rajpura and Narnaul respectively, whilst the old tahsils of Pinjaur and ${ }^{\text {- }}$ Bhiki have been named Kandaghat and Mansa. In Nabha State the old tahsil * of Phul has been split up into three new tahsils, Phul, Jaitu and Dhanaula, ,whilst part of the old tahsil of Amloh has been constituted a separate tahsil under the name of Nabha.

All the changes to which reference has been made in this and the preceding paragraph are noted in the following statement:-



Raministrative Divistons
4. At the time the last Census Report was written the Punjab was divided into twenty-nine districts, each administered by a Deputy Commissioner, and these were grouped in five divisions, each in charge of a Commissioner. The separation of Delhi and the creation of the Sheikhupura District leave the number of districts unaltered ; the composition of divisions is however slightly altered as the old Delhi Division; now known as the Ambala Division, has lost one district; whilst the Lahore Division, though scarcely altered in area, now includes six instead of five districts. These administrative divisions of the British Territory in the Punjab are shown below in the order in which they appear in the tables of this report and in all official documents:-

| Ambala Division | Vullnmiur Divinion. | Lahare Dirioion. | Pawalpindi Divisio | ullan Dieisio |
| :---: | :---: | :---: | :---: | :---: |
| 1. Hisame. | 7. Kangra. | 12. Lehore. | 18. Gujrat. | 24. Montgomery. |
| 2. Rohtal. | 8. Hoshiarpur. | 13. Amritaar | 19. Shahpur. | 25. Lyallpur. |
| 8. Gurgion. | 9. Jullandur. | 14. Gardaspar. | 20. Jhelum. | 26. Jhang. |
| 4. Karnsl. | 10. Ludhian | 15. Sialkot. | 21. Rawalpindi. | 27. Multar. |
| 5. Ambals. | 11. Ferozepore. | 17. Gujrsnmala. | 22. Attock. | 28. Muzaffargarh. |
| 6. Siml |  | 17. Sheikhapora. | 23 Mianwali. | 29. D. G. Khan. |

The Indian States which are dealt with in this report were at the time of the census all in direct political relationship with the Punjab Government, but since then thirteen of them have been placed in direct connection with the Government of India and an Agent to the Governor-General has been appointed who is not responsible to the Punjab Government. In the tables of the 1911 Census Report the forty-three States concerned were arranged in geographical order with reference to their proximity to-administrative divisions; of these twenty-eight were grouped together as the Simla. Hill States. Owing to the change in political relationship these States have been re-arranged in the tables 'of the present report as follows:-
4.-Having Political Relations with the

Punjab Government.

1. Dujana.
2. Pataudi.
3. Kalsia.
4. Eimla Hill States. (27 States).
B. Having Political Belations wilh the Government of India.

| 5. | Loharn. |  | 12. | Faridirot." |
| :---: | :---: | :---: | :---: | :---: |
| 6. | Nahan. | - | 18. | Chamba. |
| 7. | Bilaspur. | - | 14. | Patisla. |
| 8. | Mandi. |  | 15. | Jind. |
| 9. | Suket. |  | 16. | Nabhs. |
| 10. | Kapurthala. Mnierkotle. |  | 17. | Bahamaipur. |

It should be noted that the arrangement depends firstly on the closeness of their relations with the province, and secondly, on the geographical position they occupy; considerations of seniority, size or importance have nat entered. into the arrangement.

Total 'tigures forr a'll forty thrie States have been shơwn for 'comparison With previous Census Reports, and 'separate totals have been shown for the two groups of States to permit'of comparison should a separafe report be préparéa For Stafes in the Punjab Agency at futlire censuses.

To a a oid a very possible source of éror ín making comparative researchèes If thust "be remembered that the term "Simla Hill States" in all Census Reports previous to this has included tweety tetight States whitst it tow omf includes twenty-seven; this chárige is due to the fact that Bilasjour State, which p'previously looked to the Sudépintendent of the Sinla Hill States as its Pölitical Offcer, now deals with the Ágent to the Gbverfllor-Geteral did can to oliger 'be included in the term.

The Delhi Province, consisting of one district of a single tahsil, thas no administrative divisions.
5. For many comparative statistical "puyóoses 'the 'division of the cout'try ,hy ádministrative divisions tis uhisuŕtable, and fođia has been divided up into natural divisions distinguished mainly by their phytical featires, cliniate and cainfall. Four of these cover the Pamfab and are known as the Indö-Gangefic Plain West, the Hinalayan, the Suth-Himalayan and the North-West Dry A'rea. The "whole of the Delhi Provirce lies in the first of thëse. It will be troted that the pames given to these divisions were chosen with refereme to Thdia asia white, and that the North-West Dry Aread does not Hie the thorth-west of the Puttad.


Tho District's and States 'which lie in each of these iatural divisions are

moted in the'margin; no change beyond the separation of 'Delhi 'has been made since the last census and statistics'for the natural divisions are comparable with those recorded then without adjustment.

The-second and third of these divisions are very well marked, but it is difficult to fix a satisfactory boundary between the first and fourth which gradually merge into each other.
-In the horth-west the Punjab extends beyond the outer'range of the Himalayas and the Himalayan Division includes country on both dides of this 'range; Toltivation is limited to the lower slopes,

## IV.-North.Weat Dry Area.

38. Shahpur.
39. Miansvali.
40. Montgonnery.
41. Lyallpur.
42. Jhang.
43. Maltan.
44. Bahawalpur State.
45. Mazaffargarb.
46. Dera Ghazi Khan (including the Biloch Trans-Frontiet tract).
valleys and foot hills, but amongst these is often very rich. Irrigation is derived from the numerous mountain streams, the waters of which are spread over the valleys and lower slopes by small artificial watercourses; grazing is plentiful and forests provide fuel and wood far in excess of local requirements. The climate is temperate in summer and rigorous in winter, the highest hills are covered with perpetual snows and in winter many of the tracts beyond the outer range are cut off from communication with the outside world by an impassable barrier of snow. The rainfall for this division averages 57 inches as compared with 26 inches in the province as a whole.

To the north-west of this area the Himalayas run into the Kashmir State, but throughout the length of the province, separating the hill country from the unbroken plains, runs a strip of fairly level land broken by foot-hills in which the proximity of the mountains affects the climate and rainfall. In summer the temperature rises to much the same height as in the plains to the south, but the winter is cooler, and throughout the year there is much more moisture in the atmosphere. The water level is close to the surface and there is much irrigation from wells; there is also some irrigation from intermittent torrents which descend from the hills behind Gujrat; and parts of Hoshiarpur, Gurdaspur and Sialkot are also irrigated by perennial canals which however give their main irrigation after passing through them into the lower plains. The rainfall for this portion averages 29 inches in the year.

The southern and major portion of the province lies in the plains, relieved here and there on the west by an outcrop of bare waterless hills; the eastern part of these plains lies in the Indo-Gangetic Plain and the Western in the NorthWest Dry Area. The two are mainly distinguished by the difference in rainfall and in water-level ; the former has an annual rainfall of 21 inches as opposed to only 9 in the latter: previous to the days of extensive canal irrigation the two were very markedly different in fertility, and the western area consisted largely of bare expanses of desert. The spread of canal irrigation has modified the contrast and at the last census it was suggested that the districts of Shahpur, Jhang, Lyallpur and Montgomery, which lie on the dividing line and all of which receive much canal irrigation, might advantageously be grouped in the Indo-Gangetic Division. By nature they are more akin to the North-West Dry Area, and it is doubtful whether an artificial change in their irrigation justifies their exclusion from this division; such exclusion would render comparison with former statistics extremely difficult; it has therefore been decided to retain the former system of grouping in its entirety.

## Lanna tenure.

」 peasant 6. The Punjab is essentially an agricultural country farmed by as village proprietors; the whole area is divided up into blocks of land known revenues-; for each of these blocks the governmen "Raintains a collection of taining listords, the principal be the village together with detail of th lands owned or cultivated by each. The distinguishing mark of a village is that it has a separate record of rights, and the term is applicable to the whole tract of land dealt with in that record and not to the collection of houses in which the villagers live. The most usual forms of tenure can be indicated best by a description of the way in which a typical village has come into being; it must be understood that, whilst the process of evolution may be true of a large number of villages, it must not be taken to be of universal application. In its simplest form the village may be regarded as having been founded by one man, who, by merely taking possession or by receiving a grant from a local ruler, obtained the ownership of all the lands included within its boundaries ; he cultivated some of these and regarded the remainder as his property, to be grazed upon or to be broken up at his pleasure. On his death the members of, his family inherited his rights jointly, and each member probably cultivated separate plots and added to them by breaking up further areas in the waste, each however recognising that his rights were bounded by his share by inheritance. In the course of time family dissensions, or mere convenience, led some members of the family to regard the lands in their cultivating possession as their individual property but they had no grounds on which to base an exclusive claim to any portion of the unbroken
waste. In early days this separate ownership probably grew up without special agreement; hence in some cases it remained in the proportion of the shares by inheritance whilst in others the separate properties varied in size by reason of particular members of the family being more energetic in breaking up the waste or being stronger than their fellows and being able to exercise their acquisitiveness in excess of their theoretical right. In the course of time the custom arose, and has been given the sanction of law, that separation of joint lands should be by agreement or by application to the courts; such partition is usually made with reference to ancestral shares, modified by the facts of existing possession.

The tenure of the village lands depends mainly on the extent and nature of the partition that had taken place before accurate land records came into existence. If when these were first compiled the separate rights were found to be in direct relation to the theoretical rights by inheritance, then the rights in the undivided waste were held to be in the same proportion, and subsequent partitions were made on the basis of the family tree. If existing rights were found to be irreconcilable with the theory of proportional inheritance, the rights in the waste might be held to be in the ratio of the extent of existing rights of ownership in the cultivated land, or perhaps in the ratio of the revenue payable by each member of the village.

The original simplicity is complicated by the fact that original owners may have sold or gifted portions of their separate holdings; in some cases such gifts and sales have been understood to include the dependent share in the undivided lands, in others not. In cases where a share in the waste has followed the transfer of separated lands the effect is merely to introduce an outsider into the group of owners and to modify the shares in the joint property; in the reverse case the outsider becomes an owner of a specific plot of land only, whilst the original group of owners continue to have all the rights in the waste.

Each owner may cultivate his holdings or have it cultivated for him by servants or tenants, the most usual form of rent being a specified portion of the produce raised by the tenant.

Sometimes an owner may have had difficulty in securing tenants and has had to offer unusual attractions to obtain them ; he may have guaranteed a fixity of tenure extending for their lives or even to their descendants ; or he may have gone away and neglected his land, and the tenants may have gradually acquired prescriptive rights in his absence, which on his return he has found necessary to recognise. In these and in many other ways has arisen a class of tenant, known as an "occupancy tenant," who has an hereditary right to cultivate the land on payment of a rent to the owner which may or may not be an economic rent ; in some cases such rent is merely nominal or is no more than the government revenue

Very similar to the case of an owner whose land is in the possesson of occupancy tenants paying a nominal rent, is that of the superior and inferior owner ; in this case the inferior owner exercises practically all rights of ownership except that he pays certain dues to a superior owner. Both occupancy tenants and inferior owners may or may not have the power to transfer their rights to persons other than their heirs, and in cases where they have not this power an attempt to do so may result in the land reverting to the full ownership of the owner or superior owner.

It is probable that in early days the local ruler was recognised as the ultimate owner of all land within his territory, and that individual land owners were regarded as holding from him; this view was gradually modified till it was merely recognised that the ruler had a right to a certain share of the produce of all lands, and this share was the original form of land revenue. In the present day, though the land revenue is collected in cash, it is based on the theory that government has a right to one-half of the net produce of the land after deduction of the cost of cultivation from the gross produce, the cost of cultivation including that portion of the produce which is retained by a tenant; in other words government is entitled to one-half of the rent received by a non-working landlord. In practice the cash land revenue nowhere approaches this theoretical right; but the important point is that land revenue is not a tax, but is closely relaued to a rent.

Land revenue is payable to government, but there is a class of people known as "jagirdars" who are entitled to the land revenue of particular tracts
 grants from government, or as a recognition of their former quasi-soveregign rights $\rho$ ver, the area.
N We have now encounterect, the mam features of the land tënures of the Punjab plans ; the commonest type is that in which a landowner owns individual fands with full rights qf afiengtion and dispogal, together with a joint right in an undiyided waste this, jont right usuadly being capable of realisation as an individual right by partition with the other, shanere ; such an owner may let his land from year to year to tengints who pay tim a portion of the harvest as rent, and he is responsible to government for the revenue assessed on his tidividual land, together with a share of that assessed on the joint village lands
It The theoretica, Account given above of the origin of this, sysfem explatip the fact that it is psual to find the findividual lands of one owner scattered about in small pilots fhroughout the village; repeated partition leads to niore and motre scattered holdongs, and it is guite usual to find an owier of no móre than three Acres with. thirty or more separate fields scattered about over an area of 'two or thereg, square miles, Repeated sub-division, and wide distribution of, scattered holdings are the bane of the indigenous system of land tenure ; it requires little imagination, to, picture, the waste of effort, and the difficulties as to trespassing and rights-of-way, with which it must necessarily pe coninected.

The description given above applies, almost universally, throughout the central and , squth-eastern, parts of the province; and it shoula be ioted that these werg the first,payts to come under British rule, and also that the teniures in ther, resemble, those in the Uníted Provinces which had long been familiar 'to British adiuinistrators before, the Punjab came under their sway, In the Bandy stretches of the south-west, the hilly country to the noth-west, and more than, all in the Himalayan tracts, the digtribution of rights was originally very diffeepent and the type of village described was unlonown; but the early British administrators with pre-conceived ideas on these subjects managed to gratt the ,types of land tenure with which they were familiar on to a countryside to "which they were totally alien.

In the south-west the population was still 'argety "nomadic and pastoral whem it first came under British sway dotted over the country were smail hampletts poçp ped by a few persons who thad built a well and cuiltivated a èmall patch of land round it ; these people regarded the surrounding country as subject to their .grazing rights, but had no sense of any joint ownership in the waste, and ascribed their ormership to the , rruits of breaking up the soil and not to inheritance. Such small hamiets were artificially grouped io villages, and the theory of joint ownership of the waste within the boundaries of such villages was artifcially introduced, ; atu the same time vast areas of waste which had never been subject fo the plough were found to be absolutely whappropriated and were, in accordance with local sentimeent declared tọ be governnient property.

In the north-west, strong warlike tribes had collected to 'fairly large villagose for the sake of mutual protection, these willages, being strongholds rather than ,agricultural settlements, Scattered. round these strongholds were the smalh hamlets of the non-waribe population, who existed under the, protection or subject to the tyranny of the leading tribes ; their settlements were too inimportant, to attack and usually consisted of a few houses built in the immediate vicinity of the lands cultivated, by their owners.

In , the Himalays the dense forests and the precipitou's nature of the country rendered cultivation possible only in isisolated patches. Anyone "who cleared and broke up a small area of land built his house in the clearing, and except in the more continuous and fertile palléys man was not able to satisfy, his ,gregarious instincts. Each settiler would collect his frewood and graze his cattle in the surrounding forests, and thus gradually create a tight over the waste in the vicinity of bis clearing; where clearings were close together convenience led to neighbouring settlers establishing joint rights in the "waste, and as population increased and interests legan to conffict specified areas of waste would become ris egnised as subject to the exclusive rights of user of severail settlers.

Thus a whole valley, the whole of one side of a hill, or any other niatural division of the country, might. become subject to the rights of user of jeveral
 settlers with common rights would not necessarily be related and "might'belong to
entirely different tribes or castes. A small tract of country, subject to the common rights of user of persons residing in scattered residences over its surface, is the natural unit of these hills; such units are known by different names in different localities, and in many of the hill states they form the administrative unit and are known in English as villages; in others they are so small as to be useless as administrative units and have been grouped together in blocks to suit the local form of administration. Throughout the Himalayas the village unit as demarcated for census purposes, is an artificial one; and no statistice: concerning the number, size or proximity of villages within the Himalayan tract are of any utility whatsoever.

A comparatively modern innovation in land tenure and in types of villages - has been introduced during the process of colonisation of government waste lands in the west which have been rendered fit for cultivation by the introduction of canal irrigation. On being irrigated these wastes were divided up'into villages of convenient size and the lands of each village which were fit for cultivation were granted to settlers from, the old districts. The grants took various forms; some whole villages were let out to capitalists on payment, others were granted to persons who deserved well of government; more usually however separate plots in each village were granted and the grantees were required to take up residence and build houses on a site set apart for the purpose. In the first instance the grantees were usually given rights of occupancy tenants holding under government, various conditions being attached to the tenancies; these always included the duties of taking up permanent residence and cultivating the land allotted; other conditions such as the keeping of brood mares for horsebreeding, the breeding of, camels, the introduction of scientific methods of agriculture, the cultivation of superior varieties of particular crops, and so on, were sometimes enforced in addition. In all villages a certain area was not allotted and was retained by government to be utilised as grazing grounds or for some other common purposes.

After the settlers hadbeen some years inoccupationandhad demonstrated their intention of taking up permanent residence and, had made satisfactory progress in breaking up and cultivating the lands allotted to them the majority of those who did not hold on special conditions were allowed to purchase proprietary rights in their tenancies. After they had done so the type of village evolved closely resembled that in the south-eastern plains, the main difference being that instead of the waste land being common property it was unallotted and remained the property of government though devoted to the common use of the villagers. Such villagers can, of course, trace no descent from a common ancestor, and do not form such a corporate body as the inhabitants of old villages; but at the time of colonisation efforts were made to group together members of one or two associated castes coming from the same part of the province, and though the villagers are not necessarily connected by family ties, they are far from being chance collections of miscellaneous origin.
7. Of the twenty-five million inhabitants of the Punjab noless than fourteen and three quarter millions are of agricultural occupation, whilst many more follow agricultural pursuits in addition to some other occupation. Subsidiary Table I at the end of this chapter presents a few agricultural statistics, and it is necessary to explain the terms used therein. "Cultivable area" includes land actually under cultivation, fallows, and waste available for cultivation; such waste does not include areas in which cultivation is forbidden by law or custom, such as reserved forests or common lands set apart for a specific purpose. It does however include common lands which can be made available for cultivation by partition even though such partition has not been effected. "Gross cultivated area" means the area actually sown in any one year with no deduction for failure of crops, any land sown at both seasons of the year (i. e., double-cropped) being counted twice. "Net cultivated area" means the area sown in any one year, the double-cropped area not being counted twice. In other words net cultivated area refers to the area of land sown, whilst gross cultivated area refers to the area of crops sown ; to avoid confusion I shall generally refer to gross-cultivated area as the sown area.

It will be noticed that both gross and net cultivated areas refer to areas of a particular year and will fluctuate annually according to the nature of the
conditions at the time of sowing; neither of them include land which lies fallow for the whole year, though such land may be regularly though infrequently cultivated.

According to the subsidiary table, 65 per cent. of the total area of the province is fit and available for cultivation, whilst the net and gross cultivated areas amount to 59 and 67 per cent. respectively of the cultivable area; in other words the net and gross cultivated areas amount to 39 and 44 per.cent. of the total area of the province. The table also shows that 40 percent. of the gross cultivated area, or nearly 18 per cent. of the total area, is irrigated. The figures in the table however include many for States which, owing to an incomplete system of land and crop survey, are of doubtful accuracy. The conditions of agriculture within the States of the Punjab closely resemble those in adjacent British Territory, and the figures which will be discussed in this and the two following paragraphs are those for British Territory only which rest on an unassailable basis owing to the completeness of the land revenue records.

In the records-of-rights, which are revised every four years, the term cultivated area includes fallows which have been under crops sufficiently recently to warrant the belief that their cultivation has not been permanently abandoned, and this cultivated area is described as irrigated from wells or canals if it can be, and has recently been, so irrigated, notwithstanding the fact that it was not so irrigated in the year when the record was prepared.

According to the records-of-rights prepared in the four years 1914 to 1917, which are representative of the last decade, the cultivated area amounted to 29,140 thousand acres in British Territory excluding the tribal area across the border of Dera Ghazi Khan. The total area of this tract is 27,280 square miles, so that the cultivated area amounts to 47 per cent. of the total. Of this twenty-nine odd million acres of cultivated land, exactly one half was entirely dependent on rain for its moisture, 17 per cent. could receive irrigation from wells, 27 per cent. from canals and about 1 per cent. from other sources of irrigation; whilst the remaining 5 per cent. was liable to inundation from rivers.

Turning now to records of the area sown each year, the average for the decade since the last census amounts to 27,887 thousand acres, or 45 per cent. of the total area, a very slight difference from the gross cultivated area shown in the subsidiary table which includes Punjab States and was worked out from the figures for 1921 and not for an average of ten years. Of this sown area, 13 per cent. was actually irrigated from wells, 30 per cent. from canals, and rather less than 1 per cent. from other sources; this shows that 44 per cent. of the sown area was irrigated as compared with 40 per cent. shown in the subsidiary table.

Irrigated crops are less liable to failure than those which depend entirely on

|  |  | Irrigated. | Unirrigated. |
| :--- | ---: | ---: | ---: |
| Sown | $\ldots$ | 12,130 | 15.757 |
| Finad | $\ldots$ | 869 | 4,027 |
| Matured | $\ldots$ | 11,261 | 11,730 | rain or natural inundation for their moisture; the figures (averages of the ten years since last census) for crops grown with and without irrigation are shown in the margin, the units being thousands of acres ; it will be seen that whilst rather less than 44 per cent. of the crops sown are irrigated, yet, owing to the smaller proportion of failure amongst these, no less than 49 per cent. of the matured crops are irrigated; remembering that the yield of all crops is materially increased by irrigation it is clear that considerably more than half the produce of the province is. grown on irrigated lands.


| Crop. | Sown ares in thousands of aores. | Prodnce in thousands of tons. | Value in lakhs of rupees. |
| :---: | :---: | :---: | :---: |
| Autamn orope- |  |  |  |
| Sugar oado | 412 | 315 | 258 |
| - Rico | 829 | 401 | 171 |
| Maize. - | 1,123 | 379. | 147 |
| Bajra $\quad \therefore$ | 2,365 | 279 . | 127 |
| Cotton : | 1,540. | 373(bales) | 123 53 |
| Jowat -* | 1,021 | 110 | 63 |
| Spring orops- |  |  |  |
| Gram $\therefore$ | 3,878 | 2,840 | 1,020 |
| Ollseeds .. | 1,172 | 161 | 130 |
| Barley :- | 1,n99 | 308 | 126 |

mpiing statistics of area actually sown and matured each year, prepares an estimate of considerable accuracy of the total produce of the principal crops ; the marginal table has been prepared from these statistics and estimates in order to show the relative importance of the principal crops produced. It is of course impossible to value grain produced over a term of years in different places, and the last column of figures is inserted merely as an indication of comparative values
and must not be given any meaning beyond this. It is calculated from averages of normal prices at harvest time in the largest producing districts; these normal prices are fixed independently for each district by the revenue department, and were last revised in 1916-17.

The ten crops given in this table account for eighty per cent. of the total area shown, and on them the agricultural welfare of the province principally depends; amongst them it will be seen that the spring crop far outweighs the autumn crop in importance, and that the value of wheat alone equals that of all the others put together.
8. The importance of irrigation in provincial agriculture has been demon- Irrigaticn
 strated in the last paragraph; the sources from which irrigation is derived are shown in the margin where the source of supply for every unit of one thousand acres is shown. Canals irrigating 688 out of every thousand acres head the list in importance, and of these the majority are owned and worked by Government. Next come wells which irrigate 299 out of every 1,000 acres; these are in general private property owned by the landowners or by groups of landowners. The irrigation shown as from "other sources" is mostly by lift from ponds, rivers and marshes, though it includes a variety of other methods. of little importance.

It may be noted that low-lying lands in the neighbourhood of rivers are often inundated at flood time and that this fact assists their cultivation; such inundated lands are usually regarded as unirrigated. The fertilising floods are often spread over a larger surface by short cuts and dams than they would reach if left to themselves, whilst sometimes inundation canals of considerable magnitude carry the waters far beyond their natural limits; there is then no definite border line between lands inundated directly from rivers and termed unirrigated, and those which are irrigated by inundation canals.

The marginal figures show the percentage of the average matured area which was irrigated from canals and

| Pbiozutaoz oy maturbd orops fiat abe mbantrd. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Total. | From | From |
| Lyallpur .. |  | 98 |  |  |
| Montamery . | $\because$ | ${ }_{88}^{87}$ | ${ }_{64}^{97}$ |  |
| Jhang | $\because$ | ${ }_{85}^{81}$ |  | -14 |
|  | $\because$ | ${ }_{77}^{78}$ | ${ }_{58}^{68}$ | ${ }_{22}$ |
| Gupranwola .. | $\because$ | ${ }_{78}$ | 63 | ${ }^{24}$ |
| stabpur : | $\because$ | 75 | ${ }_{94}$ | 11 |
| Ampritar | $\cdots$ | 70 | 40 | ${ }_{30}$ |
| Slalkot $\because \because$ | $\because$ | ${ }_{63}{ }_{6}^{48}$ | $\cdot_{5}$ | ${ }_{48} 8$ |
| ${ }_{\text {For }}^{\text {Forzoporo }}$.. | . | ${ }_{48}^{48}$ | 5 | 14 |
| Luahinak ... | $\because$ | ${ }_{87}$ | ${ }_{9}^{32}$ | ${ }_{28}^{12}$ |
| Karnal | . | ${ }^{88}$ | 22 | 14 |
| Gurdatpar $\because$ |  | -38 | ${ }^{21}$ | 15 |
| Rohtak .. | $\because$ | \% | 19 | 7 |
| Gurgani $\because \because$ | $\cdots$ | - | ${ }_{6}^{26}$ | is |
| Hisaser : | $\because$ | 18 | 18 | 1 |
| Hotabiarpur $\ddot{-}$ | :. | ${ }_{12}$ | ${ }_{8}^{6}$ | ? |
|  | $\because$ | 9 | 1 | 8 |
| Thotum : |  | 8 |  | ${ }_{5}^{6}$ |
| Ramupladi : | $\cdots$ | 8 |  | ${ }_{2}^{6}$ |
|  |  |  |  |  |
| Britah Territory |  | 48 | 35 |  | wells in the decade before the census; the districts have been arranged in order to. show in which irrigation plays the most important part ; the new district of Sheikhupura is included with Gujranwala as separate figures for it were not available. It will be seen that in eleven out of the twenty-eight districts named more than half the matured crops had received the benefits of irrigation.

Lands irrigated from wells are the most fertile in the province, for the expense and labour of this type of irrigation prevents its adoption except with the prospect of a commensurate return, and leads to an intensive. system of cultivation, whilst the continual presence of the cattle required to work the well provides manure in excess of that available for other types of cultivation. During the last decade the number of masonry wells in use increased from 245,239 in 1911 to 265,879 in 1920 ; but it cannot be assumed that the total number of wells increased proportionately as irrigation from wells is extended in seasons of light rainfall and contracted in other seasons; considerable areas of land can be irrigated from both wells and canals, and temporary conditions decide which system is adopted. During the decade the largest area sown with well irrigation was 3,875 thousand acres in 1920-21 whilst the smallest was 2,951 thousand acres in 1917-18; the latter year was one in which unirrigated cultivation was more extensive than in any other of the decade.
ponjab oengus report, 1921. Ghap. l.-Dietribution \& moveyient of population.

Well irrigation demands a fairly high level of the sub-soil water. The districts which employ wells most largely are Jullundur, Sialkot, Amritsar, Ludhiana, Jhang, Muzaffargarh, Montgomery, Lahore and Gujranwala. Except for Jhang, Muzaffargarh and Montgomery, these are all grouped together on the Southern side of the Sub-Himalayan tract; to their North lie districts where there is sufficient moisture for unirngated cultivation, whilst to their South the water level sinks and renders well irrigation more difficult. In the former districts the lift is so small that the wells canbe worked by Persian Wheels which carry a continuous band of earthenware pots; further South though wells are in use they are more scarce and their depth is so great that the Persian Wheel has to be replaced by the less efficient rope and leather bucket.

The well has lost much of its importance since the introduction of extensive canal irrigation. Without its canals the Punjab would be unable to support its, population, and the main factor in the movement of the rural population for the last twenty years has been the extension of the canal system. Districts such as Jhang, Lyallpur and Montgomery which now support a dense agricultural population were practically desert country before the canals opened them up, and were then inhabited by a very sparse population of shepherds and graziers.

The inset map shows the areas commanded by the more important canal systems of the province and on the next page are reproduced a few leading figures concerning them.

IO. 18. CANAE IREIGATIOX IA. THE PUMTAB.
Verticaf shading. shows areas commanded by canals opened since 1911.
forizontal shading shows areas commanded by canals opened before 1911. forizontal shading shows areas comed by inundation canale.
potted shading ghons areas comanded


1. Shahpur. 2. Gujrat. S. ©ujfanwala. 4. Slalkot. 5. cardagpur. 8. Amy tsar. 7. Lahore. 8. Sheikhupura. 9. Lyallpur. 10. Jhang. 26. Faridkot. 17. Ludhiana. Khan. 13. Hultan. 24.Montgomery. 15.Ferozepore. 20. 2a.karnal. 23.Rontak. 18. Malerkot1a. 19.Habha. R4.Delni.

PRINOTPAL OANAL SYETEMS.

(a) As an inundation canal system.

Note.-Tho average area recorded in column No. 6 is that for the ton years 1911-12 to 1920-21 inolusive. But in the case of the threo canale of the Triple Projeot which have not beom in existence for ten years, the area which thoy aro doaigned to irrigate is shown instead.

The first eight of these are perennial canals with permanent headworks on the large rivers of the province, so designed that the canals run even when the rivers are at their lowest. The remainder are groups of small canals, few of which extend very far inland from the rivers from which they take their supply, and in general they only come into operation when the rivers are in flood.

The records of area actually irrigated are available back to the year 1887-88 when all the canals
 then in existence irrigated 2,341 thousand acres, since then the extension and improvement of existing canals and the construction of new ones has led to a steady increase in irrigation as is shown in the marginal diagram. In 1920-21 the total area irrigated amounted to 10,274 thousand acresandthe greatestarea everimigated in one year was 10,457 thousand acres in the previous year.
The Western Jumna Oanal, which was taken over in the early half of the19th century, irrigates portions of the Karnal, Rohtak and Hissar districts, and small areas in Patiala State and the Delhi Province. The Sirsa Branch, which irrigates portions of Patiala and Hissar, was first opened in 1891.

The Upper Bari Doab Canal has also been in existence so long that, as in the case of the Western Jumna, immigration to the areas it commands had already taken place before the first census and therefore cannot form the subject of statistical study. It is supplied from the Ravi river and irrigates very large areas in Lahore and Amritsar and a comparatively small area in Gurdaspur.

The Sirhind Canal was first opened to irrigation in 1883-84, it distributes the waters of the Sutlej in Ludhiana and Ferozepore Districts, and in the Patiala, Jind, Nabha and Faridkot States.

The Lower Chenab, with headworks at Khanki on the left bank of the Ohenab, was first opened in 1887-88 as an inundation canal and was opened as a perennial system in 1892, but was extended and improved constantly and scarcely reached its present scale of irrigation till 1911. It mrigates practically the whole of the Lyallpur District and parts of Gujranwala, Sheikhupura and Jhang; the area whioh it commands was mainly uncultivable waste before it received irrigation and the canalled to an enormous migration from the congested districts to the newly opened up country. As the greater part of the land was govermment property colonisation was carried out by government which granted land on various conditions to residents of thickly populated districts; most of these grantees have now become owners of the land which they were first granted as tenants. The result is that the whole tract is populated by persons who are connected by relationship and social ties with inhabitants of different districts all over the Punjab, and the colony is a focus of migration as the inhabitants and their relations are constantly passing backwards and forwards between it and the districts in which their ancestors lived and in which many of the inhabitants still have proprietary interests.

The Lower Jhelum Canal is of much more recent construction and was first opened to irrigation in 1901 ; it irrigates a large portion of the Shahpur District and a smaller area in Jhang; this too commands an area which was very thinly populated when in its natural condition, and of which much was government waste available for cultivation. Here too is now collected a population including 'persons keeping in constant touch with their relations in districts scattered throughout the province.

The other three large perennial canals that now contribute to the fertility and wealth of the province have all been opened to irrigation during the decade since the last census. They form collectively what has been known as the Triple Canal Project and are inter-related in a peculiar way. The districts of Montgomery and Multan included vast areas of waste, which, could they but be irrigated, would have formed yet another area in which to found a canal colony and still further relieve the pressure of the ever-growing population of the old districts. The difficulty was that the Ravi, the only river from which direct irrigation could be obtained, was already pouring practically the whole of its cold weather supply into the Upper Bari Doab Canal; the waste area available could have been irrigated from it in the flood season only, and that would not have rendered it suitable for colonisation on a large scale. On the other hand the Jhelum river carried a supply which at its.lowest was well in excess of the requirements of the Lower Jhelum Canal. The solution of the difficulty, which is now an accomplished fact, was to use the surplus water of the Jhelum for the ultimate irrigation of the tracts in Montgomery and Multan. The Upper Jhelum Canal takes water from the Jhelum and irrigates part of the Gujrat district, but carries a far bigger supply than is required for that irrigation alone; the surplus, after flowing right across the Gujrat District, is released into the Chenab river a little above the head-works of the Lower Chenab Canal. Thus reinforced the Chenab river carries a supply in excess of that required for the Lower Chenab Canal and this supply is now taken off higher up the river by the Upper Chenab Canal which irrigates large areas in Gujranwala and Sheikhupura Districts and still has a large flow left which it empties into the Ravi river. This supply is then taken out of the river on the opposite bank by the Lower. Bari Doab Canal which irrigates the Montgomery and Multan Districts and has thus opened up a new area for colonisation. Actually no water of the Jhelum gets on to the land in the Lower Bari Doab Colony, but it does cross the Chenab and by feeding the Lower Chenab enables the Upper Chenab to draw off some of the waters of the Chenab without prejudice to the Lyallpur colony and it is the waters from the

Chenab that cross the Ravi and find their way into the Montgomery and Multan Districts.

Work on the Upper Jhelum commenced in 1905 and it was opened to Yar. .. .. .. Ancere irrigation in 1915 and completed in 1917. It $\begin{array}{ccccc}1916-17 \\ 1917-18 & \because & \because & \because & 117,605 \\ 17,000 \\ 248,009\end{array}$ was designed to take in a supply of 8,500 $1918-19 \quad . . \quad . \quad . \quad \because \quad{ }_{298,857}^{246,609}$ cybic feet per second at the head and to deliver $\begin{array}{llllll}1910-20 & \because & \because & \because & 298,857 \\ 7,812 & 0 & \text { of these into the Chenab; it com- }\end{array}$ mands $571, \ddot{783}$ acres and is intended to irrigate about 348 thousand acres. The total area irrigated during the first few years after it was opened is shown in the margin. It irrigates a tract which is already inhabited and in the ownership of the residents; it is therefore onlikely to cause immigration to any great extent though it will add to the prosperity of the tract irrigated and enable it to support a larger population.

The Upper Chenab which was commenced in 1905 and completed in 1917 was first opened to irrigation in April 1912.

| Year. |  |  |  | Acrea irrigatod. |
| :---: | :---: | :---: | :---: | :---: |
| 1912-13 | -. | . | - |  |
| 1913.14 | .. | .. | .. | 164,110 |
| 1914.15 | .. | .. | .. | 211,882 |
| 1916.16 | . | . | .. | ${ }^{325,062}$ |
| 1916-17 | .. | .. | .. | 437,477 |
| 1917-18 | -. | .. | .. | 382,935 |
| 1918-19 | $\cdots$ | - | - | 426,864 |
| 1919.20 | . | .. | -. | 642,656 |
| 1020-2 | - | - | .. | 601,347 | It is designed to use 4,944 cubic feet p second for irrigation and to pass on 6,750 into the Ravi ; this allows for the irrigation of 648 thousand acres out of the 1,533 thousand which it commands, and it has already worked up to an irrigation approaching this figure as will be seen from the figures in the margin. The areas it irrigates in Sialkot and Gujranwala are in the hands of private owners and give no room for colonisation, but there are large plots of government waste in Sheikhupura which are already being colonised rapidly.

The Lower Bari Doab was commenced in 1906 and completed in 1917 ; the Yoer. $\quad$ Aores irrigated. $\begin{gathered}\text { 73.578 } \\ 1019 \text { inst irrigation was given from it in July 1913, }\end{gathered}$
 ${ }_{1915.16}^{16} \quad \because \quad . . \quad . . \quad{ }^{283,294}$ decade are shown in the margin. It is design-


 Upper Chenab ; this is to irrigate about 878 thousand out of the 1409 thousand acres which are commanded by it.

None of the three canals could work up to their proper capacity until the Upper Jhelum was completed in 1917 ; and it is probable that the irrigation from all three will increase considerably before they settle down to steady normal working.
9. The Punjab is fortunate in possessing an extensive system of railway communications. The main line of the North Western Railway from Karachi enters

Comman: eatlons. the province in the extreme south-west, and runs up to Samasata in Bahawalpur State whence it divides and connects up with a system of lines running more or less parallel with the great rivers and spreading out like the leaves of a fan till they reach another main line which runs along the northern boundary of the province from Attock via Rawalpindi and Lahore to Ferozepore and thence to Dèlhi.

This fan-shaped system of lines serves the whole of the western part of the province within a triangle based on Campbellpur and Ferozepore with its apex at Samasata.


From Lahore to Delhi there are two main lines, one via Ferozepore and Bhatinda and the other following the course of the Grand Trunk Road through Amritsar, Jullundur, Ludhiana and Ambala and thence through part of the United Provinces. These two main lines have numerous cross-branches and are also connected with other railways, such as the East India Railway from Delhi to Kalka via Ambala; and the Bombay, Baroda and Central Indian Railway from Delhi to Rewari and thence to Bhatinda via Sirsa and Hissar; together these various lines and branches form a very complete net-work over the central and south-eastern parts of the province.

The only portions of the province not served by railways are the Himalegn tract in the north-east, in which the only line is the short Kalka-Simla Railway, and the Dera Ghazi Khan District and the eastern part of the Bahawalpur State. The western part of the province, though well served by the fan-shaped system of lines radiating from Samasata, lacks railway communication in a transverse direction; the presence of the rivers and the difficulties in connection with bridging them have prevented the construction of lines running from north-west to southeast.

The main external trade of the Punjab passes down the North Western main line to Karachi, whilst the main lines to Delhi and thence direct to the ports of Bombay and Calcutta and other towns of the Indian continent provide the other most important external trade routes.

The following account of the construction of the Punjab railway system is taken direct from Mr. Oalvert's " Wealth and Welfare of the Punjab":-
"The first railway line (Amritsar to Lahore) was put under construction in 1856 and opened for trafic in 1861. Wood had to be used for fuel. The line from Lahore to

Multan, which at that time was connected with Karachi by the boats of the old Indus Flotilla, was opened in 1885. Coal was introduced in 1872, in which year one goods train left Lahore daily for Ghaziabad. Through commanication with Calcutts and Bombay was established in 1883. Thereafter progress was steady, if not rapid, as the following details show :-

| Main Line.- |  |  |  | 231 | miles, opened in | 1870 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| South to Lahore | - | $\cdots$ |  | 418 | miles, opened in | 1878 |
| Lahore to West | - |  |  | 418 | " | 1880 |
| Lahore to North | - | . |  | 242 | " |  |
| Branches- |  |  |  | 47 |  | 1881 |
| Colra-Basal | -• | $\because$ |  | 67 | " | 1884 |
| Amritasr-Pathankot | .. | - |  | 67 | " | 1889 |
| Rajpura-Bhatinds | . | . |  | 342 | " | 1890 |
| Sind-Sagar | . | - | $\cdot$ | 34 | " | 1890 |
| Sialkot (1884) Jammu | $\cdots$ | . |  | 33 | $"$ | 1892 |
| Raewind-Ferozepore | - | .. |  | . 33 | " | 1897 |
| Southern Punjab, main line | . | . | . | + 400 | ; | 1899 |
| Narwana-Kaithal | . | . | . | 23 | " | 1899 |
| Kundian-Campbellpore | . | . | . | 120 | " | 1899 |
| Feroze pore-Bhatinda | . | .. | . | 55 | " | 1900 |
| Wazirabad-Khanewal | $\cdots$ | . | . | 201 | " | 1901 |
| Ladhiana-Jakhal | - | . | . | 79 | " | 1901 |
| ,Kalka-Simla | . | . |  | 59 | " | 1903 |
| Ludhiana-Macleodganj | . | - |  | 152 | " | 1906 |
| Jech-Doab | . | .. |  | 149 | " | 1906 |
| Shahdara-Sangla | $\cdots$ | $\cdots$ |  | 55 | " | 1907 |
| Khanewal-Lodhran .. | . | - |  | 56 | " | 1909 |
| Amritsar-Patti (1906) Kasur | - | . | - | 54 | " | 1910 |
| Kasur-Lodhran | . | $\cdots$ |  | 208 | \% | 1910 |
| Khanpur-Chachran | . | . |  | 22 | \% | 1911 |
| Chichoki-Shorkot Road . | - | . $\cdot$ |  | 136 | " | 1911 |

Notes on the developmente whioh have taken place during the laat decade, together with figuree bringing this account up tio: date, vill be found in paragraph 39.

The road communications are far less extensive and connected than the railway system ; the only coherent system of metalled roads is that connected with the Grand Trunk Road which runs continuously from Calcutta to Peshawar and in its passage through the Punjab connects Delhi, Karnal, Ambala, Ludhiana, Jullundur, Amritsar, Lahore, Gujranwala, Jhelum and Rawalpindi. This road. is metalled throughout its length and has recently been much improved by the construction of road bridges over the great rivers of the Punjab, all of which it, crosses. Metalled feeder roads branch off from the Grand Trunk Road for short distances throughout its length, the most important being-from Delhi to Gurgaon. and Rohtak and to smaller places beyond them ; from Thanesar to Pehowa and, Ohachchrauli ; from Ambala to Kalka and Simla ; from Rajpura, near Ambala, to Patiala and Sangrur ; from Ludhiana to Malerkotla and Sangrur ; from Ludhiana to Ferozepore ; from Jullundur to Hoshiarpar ; from Lahore to Ferozepore and to - Sheikhupura; from Gujranwala to Hafizabad and to Sialkot ; from Wazirabad to Sialkot and thence to Jammu ; and from Rawalpindi into Kashmir via Murree.

Other isolated systems of metalled roads are in existence round about Lyallpur ; from Multan to Muzaffargarh and thence to Dera Ghazi Khan, in which the presence of a boat-bridge over the Indus only affords through communication in the cold weather; and from Pathankot to Dalhousie and through the Kangra Valley to Kangra, Dharmsala and Baijnath.

Numerous unmetalled roads traverse the country in all directions, except in the west which is badly provided with road communication; these roads are often metalled for a few miles where they approach a town or a line of railway. Unmetalled roads provide all that is needed for the indigenous system of transport of agricultural produce by bullock cart, but are of little use for lighter vehicular traffic or for motor transport.

The extensive canal system of the province supplements the road communications to a very large extent; the main lines of the canals run between broad banks and usually one of these is kept open to bullock carts and other heavy traffic whilst the other, though unmetalled, is kept in excellent repair and, except
in the rains, provides a first-class motor road which, though not open to the general public, can be used by permission when occasion requires.

The rivers and a few of the canals provide facilities for waterborne transport but the strength of the current prevents any regular up-stream traffic and they are mainly used for floating timber from the forests of the Northern hills to the railway system of the plains.

Except in the west the combined systems of communication are excellent; but in the west the scarcity of metalled and even of unmetalled roads allied with a railway system which has few lines running from west to east leaves much to be desired and the communications are sadly behind the requiremente of the rapidly increasing population of the canal colonies.

The postal and telegraph systems of the province are very complete, and the most inaccessible spots have unexpectedly frequent deliveries. The postal authorities have done much to hasten the improvement of road communications in the hills by the adoption of motor services beyond the limits of the railways. Railway and Canal telegraph lines extend to tracts beyond the reach of the Government telegraph system, and these can be used for official purposes and, in cases of emergency, by the general public.

A notable development of the past decade has been the extension of thetelephone system ; many towns have small systems of their own and trunk lines connect Delhi, Ambala, Kalka, Simla, Jullundur, Amritsar, Lahore and Rawalpindi and extend into the North-West Frontier Province.

Oivil wireless telegraph stations are in existence in Delhi, Jutogh (Simla) and Lahore; there is also a military radio station in Rawalpindi, whilst the Royal Air Force maintain stations in Lahore and Ambala.
10. Under former rulers the revenue necessary to support them and their large armies and numerous courtiers was collected in kind and was only limited by the cultivators' ability to pay; and the authorities were always ready. to eject him in order to install anyone who would pay more revenue. Anything which a man produced in excess of his requirements was taken from him in the form of revenue, whilst, even had he been able to keep a surplus from the revenue collector, the absence of communications and markets prevented him from profiting by its sale, In these conditions there could be no rent over and above the revenue, and land possessed no capital value.

J The village was in every respect self-supporting ; it had its own carpenter, blackamith, potter, weaver and other artisans, all of whom rendered services to the agriculturists for which they were paid by shares of the harvested grain; petty shopkeepers existed in every village and were mainly paid in kind. Cash was practically unknown to the cultivator; the only form of capital he could produce was sunk in jewellery which was generally concealed on account of the insecurity of the times. As a result of these conditions no members of the rural, community possessed fluid capital ; land had no value both because there was no one to purchase it and because there were no excess profits to be made from it; sales of land were practically unknown before the advent of British rule.

The immediate result of the British occupation was to introduce security of tenure and a greatly reduced revenue.* The reduction immediately created a surplus, and, with the growth of communications, markets came into existence and this surplus became saleable. This encouraged extension of cultivation, the more so because the land revenue was fixed for long periods and during their continuance no extra revenue was demanded on account of new cultivation. As cultivation was extended and the surplus for sale became larger and larger a very large export trade was slowly established. In old days, there being no surplus even in normal years, the failure of the monsoon rendered famines inevitable; at the present day irrigation renders the results of a bad monsoon less disastrous whilst the deficit in produce does not lead to famine so much as to reduction of export. The normal export provides a margin up to which produce may be decreased without stinting the province. Export also tends to prevent violent fluctuations in price as, unless the produce of any year is insufficient to meet provincial requirements, prices will be governed by world prices and will not vary so readily as a result of local seasonal conditions.

[^0]All these facts have led to an amazing increase in the productivity of the land and the prosperity of the people. The creation of an agricultural surplus led to the possibility of rent and with its advent arose the new relation of landowner and tenant, the former being able to live without expenditure of his own energy and resources; land immediately gained a commercial value and sales and mortgage became common.

The whole course of British Rule has been marked by rapidly increasing land value; up to about twenty years ago the land values were only such as were warranted by the increase in production and prices, but there is little doubt that during the last twenty years they have been more than economic. This is mainly due to speculation in land, encouraged by the steadily rising prices; it has - been rendered possible by the fact that cultivators have no means of investing capital except in land or jewellery. With them spare cash has generally gone in unproductive expenditure or in land purchase; and the fact that purchase of land may not return interest on their money is no bar to such purchase.

The increasing prosperity of the people and increase in land values has been accompanied by a great increase in indebtedness. Directly the British occupied the country the revenue, though reduced, was made payable in cash and was fixed irrespective of seasonal variations (in former days the revenue though excessive had perforce been limited by the produce available;) at the same time the British paid the army and the large number of labourers employed on public works in cash. The cultivator, who had no experience of cash transactions, was suddenly asked for regular payments in cash; and at the same time other classes of the community became possessed of cash which they spent in the new markets, thus creating a cash capital .which drifted to the local shopkeepers and moneylenders. The conditions necessary to the growth of borrowing were brought into operation-the cultivator needed cash and possessed a valuable commodity in his land on which he was able to raise credit, and the local shopkeeper had amassed a cash balance and was in a position of power when dealing with the cultivator who had no knowledge of cash values; the cultivator in spite of his increased prosperity immediately began to borrow from the moneylenders. In the early days of this movement, when land values were still small, the moneylender advanced money against the coming crop; communications and markets being yet in their infancy the price of the future crop was entirely dependent on the season and hence the moneylender's business was risky ; on this account he was entitled to, and did, charge very high rates of interest. As land value increased, and as the moneylender found that the new courts of law would enforce his claims, he began to advance money against the land rather than against crops, and in doing so did not reduce his traditional high rates of interest. The growing impoverishment and financial subjection of the agricultural classes caused great anxiety to government as far back as 1872 ; many remedies were tried, amongst them the introduction of elastio systems of revenue varying with the nature of the season, and the advance of government loans to agriculturists. All these proved insufficent to stop the evil and, after much discussion, the Land Alienation Act of 1901 was introduced; under its provisions a member of an agricultural tribe may not sell land to any-. one except another member of such a tribe nor may. he mortgage the land to a non-agriculturist unless the terms of the mortgage include provision for automatic redemption. Since the passing of that Act the financial position of the agrioultural classes has undergone steady improvement, sales and mortgages are still extremely frequent, but the balance is in favour of the agriculturists. On the other hand the Act does not appear to have reduced the credit necessary to the conduct of cultivation nor has it led to a decrease in the value of land, which is still freely transferred amongst the agricultural tribes. In some cases members of agricultural tribes have taken to moneylending but, even so, transfer of land to them is less harmful than to the professional moneylender for they are interested in land and realise the factors necessary to its productivity. Continued sub-division of holdings encourages sale for many owners have holdings smaller than that which they could cultivate and are potential purchasers; the scattered nature of holdings may render one plot far more desirable to the neighbouring owner than to its own owner whilst the small size of the plots renders their purchase well within the oredit of the villagers. The absence of industries and opportunities for investment and the lack of economic knowledge allow small owners to purchase
land at more than its economic value. As a result sales and mortgages are still excessive in number and extent but do not prejudice the agricultural community as a whole.

The enormous amount of capital sunk in the purchase and mortgage of land has not been a source of benefit to the land itself; the major portion has been dissipated and the only forms of permanent improvement left by the ancestors of the present population are found in the existence of wells and of a few small embankments to prevent floods, in a certain amount of levelling and in the existence of trees which afford timber and shade. Exceptions to this may be found in the hills where the pressure on resources has led to the laborious terracing of otherwise uncultivable hill-sides and, possibly, in the new canal colonies where a more enlightened spirit is beginning to be manifested. On the other hand government has oreated improvements which affect vast areas, such, for instance, as the great canal and railway systems and the less advanced road systems. - It is unfortunate that the direct financial profits which have attended the construction of canals and railways were not also available from roads, for whilst the former are well up to the requirements of the province the latter are woefully undeveloped.

The ancient system of cultivation naturally was limited to the production of food and other local requirements and land was'not devoted to the crops for which it was most suited. The absence of surplus did not encourage extension of cultivation and hence plenty of land was available so that each cultivator was able to raise his crops without resort to laborious intensive cultivation. The extensive system of tillage and limited nature of crops entailed work only at certain periods of the year and produced the habit of wasting. long periods in idleness; it demanded little manuring and was accompanied by the existence of long fallows and failed to introduce any knowledge of rotational systems of agriculture. The habits of centuries cannot be changedin a short period and though holdings are now small they are still cultivated by the wasteful extensive method. There is an enormous difference between the results produced by the various cultivating castes, yet the difference between the best and the worst is nothing to the difference which could be made in the best by the introduction of scientific methods and continuous labour.

With the introduction of communications the cultivator found that, of his traditional crops, that which had the most easy sale was wheat; as a natural result he has concentrated his surplus production on this crop and a great export trade has grown up in it. In 1870 wheat was grown on about $5 \frac{1}{2}$ million acres; since then the ares of the province has been greatly reduced, yet the average area under wheat now amounts to nearly 9 million acres in British territory alone. When the British first occupied the country there was no export of wheat, but during the decade 1886-95 the export averaged 278 thousand tons, and during the last decade, in spite of artificial restrictions, the export by railway and river of wheat and wheat flour averaged over 840 thousand tons per annum.

Whilst accurate statistics are not a vailable, it appears to be true that the price of land has risen more than wages of labour, and that wages of labour have risen more than the price of produce which itself has risen more than the cost of production. The non-working landlord takes a fixed share of the produce and pays the land revenue; the land revenue has represented a diminishing share of the produce and hence the landowner has been taking an increasing share in produce of increasing value and gains by the general prosperity. The tenant takes a fixed share of the produce and has to bear the cost of cultivation ; the former has been increasing more rapidly than the latter and therefore the tenant is also improving his position. The labourer is better off than before because his wages have risen more rapidly than the price of produce. All classes have benefited with the exception of the owner who cultivates through paid labourers and those who have bought land on borrowed capital. If these statements are true it must follow that owners desire tenants and that tenants desire tenancies ; this is - verified by the fact that during the last fifty years the number of tenants and the proportion of the total cultivated area which they cultivate has risen very greatly. The tenant has no security of tenure beyond that created by his scarcity value, in consequence he is not encouraged to improve the land; practically all improvements; such as the sinking of wells and planting of trees to provide timber, are carried on by owners and not by tenants. To this extent the increase in the proportion of land cultivated by tenants is an economic loss.
11. The Panjab suffers from many disadvantages tending against industrial progress. All industries collect round sources of power and at the termini of cheap lines of transport. The Puajab possesses inferior coal in the west and iron in the north, whilst oil has recently been discovered in the extreme northwist; this separation of the natural supports of industry militates against its establishment. Water-power exists in the Himalayas but at present is not made available ; schemes for its utilisation are now in progress and may provide the basis on which to found industry.

The Punjab is at an enormous distance from the sea; on three sides it is surrounded by sparsely populated countries which will never provide large markets for its industries, and on the fourth side it adjoins the United Provinces with similar means of production ; it must therefore look for its markets either to itself or to distant countries. In so far as it provides its own wants it is assisted by its isolation which, by adding enormous freightage to the values of imported articles, creates a natural system of protection. In so far as its industries will supply distant markets, this same fact places them at a great disadvantage with similar industries elsewhere; it follows that the opening for industries in the province is limited to the production of local requirements, especially those of a bulky nature, and of commodities for export which are of small bulk in relation to their value, or which replace raw materials, which are at present exported, by partly manufactured materials of lesser bulk. As regards local requirements there is a large opening for food, clothing, building materials, and all commodities used in agriculture ; such industries are already springing into existence ; instances are afforded by flour mills, ice factories, tanneries, woollen mills, glass works, saw mills and cement works, but the absence of any manufactures of agricultural implements is most noticeable and is due to the primitive implements which are at present employed. Instances of industries for export are given by carpet factories and cotton ginning factories; the former produce articles of high value in relation to bulk whilst the latter lessen the bulk of raw material which is needed for export. The further manufacture of cotton into yarn or cloth does not lessen its bulk so that spinning and weaving factories would have to compete, in foreign markets on even terms with old established factories elsewhere. The 'exports' of the province consist almost entirely of raw material amongst which wheat, pulses, oilseeds, raw cotton and wood largely predominate. Wheat is scarcely more bulky and is far less perishable than flour; no flour mills, beyond those necessary to supply local requirements, could ever be successful. Manufactured wooden articles occupy more space than timber and their production must also be limited to local requirements. Ginned cotton is of less bulk than its products. None of these raw materials therefore provide an opening for export industries. Oilseeds on the other hand greatly exceed their most valuable product in bulk; if the oil were extracted locally greater profits would accrue by reason of the smaller expense of transport, and at the same time the oil cake and other bye-products would form an asset to the Punjab. The export of machinery is rendered impossible on account of its bulk in relation to value, whilst the scattered nature of the mineral resources of the Punjab almost prohibits its production even for local use ; but the isolated position of the province renders it imperative that all repairs to machinery should be done withirf the province; at present the enormous waste due to machinery being out of action whilst spare parts are being awaited is so great that the training of skilled mechanics and erection of extensive repair shops is a crying necessity.

At the present time the demand for industrialism comes from those seeking to employ capital and from the middle classes seeking employment outside the literary professions which are over-crowded; it does not come from a desire to employ unoccupied labour ; agriculture employs all the available labour and is providing that labour with increasing profits. A great extension of industrialism can only take place by withdrawing labour now employed in agriculture, and must therefore be accompanied by a decreased agricultural production or by the adoption of agricultural methods which would increase the produce per man employed.

The industrial community, though it may produce the wealth necessary to support itself, must yet have a source from which to draw its food. Its existence therefore depends either on import or on local agricultural surplus; in ancient times neither of these existed and industrialism was impossible; at the present
time there is a local agricultural surplus but large imports of food are prohibited by geographical position, hence all industrial life must depend for its food entirely on the surplus provided by agriculture. As long as the agricultural surplus is devoted to local needs, including the support of the industrial community, a bad season must create scarcity and famine which at once set back the prosperity of all classes ; to avoid this there must be a surplus which is exported so that in times of scarcity the local population can be supported by reduction of exports. For a long time the production of wheat has been such that export has been possible and the local population has been kept from famine ; but although of recent years war conditions have sent up wheat prices enormously, yet in 1921 the supply of wheat happened to be so short that the whole of the wheat crop was required in India with the result that the price rose to previously unknown heights. This fact shows that the export of wheat has not yet become sufficient to provide a perfectly safe margin. This being so the growth of a large industrial population, unless accompanied by greatly increased agricultural production, will be a source of danger.

The problem before the Punjab is that industrialism is required to employ capital and brains but that the necessary labour cannot be obtained except by its withdrawal from agricultural pursuits ; whilst, even if it could be found, means for its support in safety would demand increased agricultural production. The solution would appear to be that the capital and brains should first of all be directed to the improvement of agriculture so that it may provide food for the industrial community without a diminution in the export of food which forms the necessary safety margin against famine and, at the same time, the improvement must be so great as to set free labour which is at present employed in agriculture. The difficulty is lessened by the consideration that in so far as the industrial labour is drawn from agriculture it will not add to the food necessities of the country.

The existence in trade of a whole series of middlemen, the functions of whom could be exercised by one man, provides another source from which industrial labour could be drawn without increasing the drain on the agricultural surplus.

Adoption of advanced intensive cultivation increases the amount of labour per unit of area, but, unless pushed very far, it also increases output per man. The solution is not to be found in crowding men on to the land or in reducing the area under cultivation but in occupying those prolonged periods in which the farmer with his present system spends in idleness; much can be done in this direction by the introduction of crops which require labour in the off-seasons; if scientific rotation and artificial manuring were introduced more autumn crops could be grown without prejudice to the spring crop; the catch-crops which are grown near towns after the spring crop has been harvested could be encouraged, and permanent improvements could be carried out in the off-seasons which would economise effort in the busy periods (for instance, the amount of daily labour which could be saved and the increase in area commanded by a well which could be caused by the construction of permanent waterproof channels are enormous). Capital could be employed in planting orange groves and fruit orchards which, after they were established, would employ less but more continuous labour than wheat cultivation, and yet would yield a greater return.

Up to a certain point the desired result of increased production accompanied with less but more continuous labour could be obtained by intensive systems of coltivation, but up to a certain point only. The most paying crops are usually of a perishable nature, their production must be limited to supplying local markets. (The production of fruit for export would have to be accompanied by the growth of a canning industry which on account of heavy freights would compete on uneven terms with established industries elsewhere).

We have seen that owing to its isolated position the Punjab can never import the bulk of its food, and moreover it must export produce which is suitable for its own food so that scarcity years may be tided over by reduction of export. Hence wheat must always remain the principal product and the principal agricultural export of the country; the production of perishable and valuable crops must be limited to stupplying local markets, or must be raised by rotation with wheat and mintit not monopolise the land.

Though the Punjab is only just beginning to embark on centralised manufacture it has always possessed cottage industries; much attention has recently been directed to the possibility of improving and encouraging these. It is a matter . of general experience that manufactures tend to drive out cottage industries; the latter lack two of the three essentials-labour, capital and organisation-and are therefore at a disadvantage. These two missing essentials, capital and organisation, can be supplied by co-operation, and in this movement lies the great hope for the success of cottage industries in this country. But in other countries where cottage industries have survived in competition with mass production it will be found that they are supplementary occupations of people engaged in other pursuits ; in India they are the monopoly of particular castes and their adoption by others is largely prevented by prejudice. If the farmer and his family could be persuaded to spend their spare time in cottage industries they could largely dispense with the services of the occupational castes; much of the work of the potter, the carpenter and the weaver could be dispensed with and the members of these occupational castes would be set free for employment in centralised industries without adding to the existing demands upon the produce of the land. .The day however is yet far off before the farmer will consent to consider the matter; at present the tendency is in the reverse direction and the artisan classes are adopting agriculture as a subsidiary occupation to their own. It will be noted in the chapter on occupations that the factory hands employed in carpentering, machine.fitting, and even weaving comprise a remarkably small proportion of those who are carpenters, smiths and weavers by caste.

The following conclusions may be drawn from this paragraph and give some indication of the lines on which successful development may be expected; the present tendencies in development will be dealt with in the chapter on occupation.

Industrial development is hampered by the separation of raw material and power. Isolation and enormous freightage encourage manufacture for local markets, but prevent manufacture of buiky articles for export; they encourage partial manufacture of raw materials resulting in diminution of bulk.

The demand for manufactures comes from a desine to employ available capital and organising ability. Labour is not available in large quantities without being drawn from agriculture; some could be rendered available by recruitment from amongst unnecessary middlemen and from amongst the artisan classes whose present work could largely be taken up as supplementary employment by others. The fond of both agricultural and industrial population must be produced in the province, and exports must largely consist of food of the same nature. To support industry agriculture must be made to yield more produce per man employed; this must be done, not by ousting wheat, but by growing valuable crops in conjunction with wheat and more especially those which provide labour in those seasons which are now spent by the farmer in idleness.

For the sake of clarity I have treated the desirable changes in agriculture as forming a condition precedent to the establishment of industrialism; but it is clear that these changes and the growth of industrialism should take place conourrently and would then be mutually beneficial.

[^1]
## Section II.-Area, Population and Density.

Aotual, ress. dent; normal, and nstural population and the popilation recordod at the consun.
12. The term "population," used alone and without definition, leads to many misunderstandings and it is necessary to lay down early in this report what is meant by the expression when used in it. The simplest meaning and one which I shall call "actual population" is the number of persons within the boundaries of a particular place at a particular time.

For statistics which are to form the basis of administration the actual population has disadvantages; for instance a place of pilgrimage may be practically deserted throughout the year and crowded on one day; its actual population at any moment on that day is a useless item of knowledge for those administering it at other times; statistics of actual population are affected by fortuitous movements of the people which upset their normal distribution.

Going to the other extreme we can apply the term population as referring to the number of persons residing in a particular place. Here we are at once confronted with the difficulty of defining residence : but however we define it, we shall not get a satisfactory basis for statistical work ; many places habitually contain a large proportion of persons who do not reside in them,-an extreme instance is afforded by the city of London ; the administration of such places must provide for these non-residents who, though varying in composition, are always present. It would no doubt be possible to lay down a definition of "resident population" which might be of use for special purposes in relation to a small unit, but never one which would apply to a large area ; for instance in the Punjab alone there are many persons who are undoubtedly residents of the Punjab but not residents of any particular district.

An indication, but certainly no definition, of what is meant by " normal population" is the number of persons within the boundaries of a particular place at a particular time when the conditions affecting the movements of persons in that place and the locality around it are normal. Such a normal population would include a normal number of visitors and exclude a normal number of people temporarily away from the place. Population varies both by reason of migration and by reason of births and deaths; the latter cause of variation is in constant progress and leads to a gradual permanent change, and that change is one which most certainly affects the normal population. Hence the necessity for inserting "at a particular time" in any attempted definition of normal population, a necessity which complicates the process of calculating that population. An average of actual populations, recorded at fixed intervals over a considerable period of time, might be regarded as the normal population for the middle of that period, and provided the period was of sufficient length this method would eliminate the effect of alnormal migrations; but the method assumes that the excess of births over deaths is a regular factor and altogether overlooks the fact that there are seasonal variations in normal populations. Take for instance the case of a hill station which is practically deserted in winter and crowded in summer; such an average of actual populations would not give a normal population for any given time of year.

The term " natural population" will be found in various subsidiary tables in this report, it relates to the population which would exist had there been no migration ; that is to say it refers to the actual population diminished by the number of persons in the area dealt with who were born outside that area, and increased by the number of persons born in that area but living outside it. Like all adjustments in population statistics it is an approximation; we have no method of ascertaining the total number of emigrants to all parts of the world who are still alive; and in practice the number of those added to the actual population only includes those enumerated at recent censuses elsewhere. However as most of the Punjab emigrants go to other parts of India, where the census was held on the same date as in the Punjab, the error from this source is not great. Apart from this numerical error it is evident that the whole course of the emigrants ${ }^{\text { }}$ lives has been altered by leaving their birth-place, and in particular that their children, being born outside their district of birth, are not reckoned amongst its natural population whilst the children of immigrants are included.

It has been mentioned in the introduction that the final enumeration in connection with this census was carried out between 7 P. M. and midnight on March 18th, 1921 ; though a preliminary census had been held so as to simplify the work
at the last moment, all entries in the preliminary records which were not in accordance with facts in existence on the census night were deleted. The census figures are therefore, in the main, figures of the actual population on the night of the 18th March ; births and deaths which occurred during the five hours the enumeration was in process may or may not have been recognised but the point is of little importance. Some parts of the province were however inaccessible at the time of the censuis and in these, as explained in the introduction, a census had been carried out in the previous autumn; that census too was one of actual population. Between the autumnal censuses of these inaccessible tracts and the final census in the remainder of the province a certain number of persons must have passed in and out of them; probably very few had gone into them as they are largely deserted during the cold weather even by their residents, and no visitors from outside would willingly visit them before the passes closed and so be shut off from the outside world. Such few persons, if any, who were in them in March but not at the time of the autumn census were not enumerated at all ; on the other hand considerable numbers of those enumerated in the autumn had probably brought flocks of sheep and goats over the passes before they closed and spent the cold weather according to their custom as nomadic shepherds in graxing these flocks in the foot-hills and plains. These people would in the ordinary course be enumerated again in March and thus appear twice in the census records, but to prevent this all had been provided when first enumerated with a pass stating the fact, which they were directed to retain and to show to anyone attempting to enumerate them again. The people concerned are illiterate shepherds and it is far more likely. that these passes are treasured amongst their possessions as mystic certificates granted for some unknown reason than that they were put to their proper use ; however, here too, the numbers concerned are far too small to affect the accuracy of the general census to any appreciable degree even if double enumeration did occur.

The statistics therefore deal with the actual population on the 18th March of the main area of the two provinces, and with the actual population of small portions of the Punjab at different dates in the previous autumn, provision having been made to avoid these overlapping by an endeavour to prevent double enumeration.

The statistics in their final form deal with census units, that is with districts and states, towns and, in the Provincial Tables, with tahsils. Visitors to any of these units are shown amongstthe population thereof, whilst residents who were away at the time of enumeration are not shown. People who were enumerated whilst actually travelling are shown amongst the population of the place within the boundaries of which they happened to be at that moment; butin one Table, No. III, they have been shown separately.
13. The Imperial Tables with which this chapter is mainly concerned are the first, which shows the area, number of inhabited houses and the population of all administrative divisions, and the second, which shows the variation in population of these divisions since 1881. Table XI, which gives statistics of birth-place, should also be consulted with reference to movements of the people. The first of the Provincial Tables printed at the end of Part II of the report gives for tahsils the same details that Imperial Table I gives for districts and statos. In addition seven subsidiary tables dealing with points discussed in this chapter are printed at the end of it.

The areas quoted for districts and states are those of the most recent survey conducted by the Survey of India Department, adjusted for subsequent changes in boundaries; but it should be noted that survey figures are not available for tahsils and other small units and that figures for these have been taken from the revenue records. Throughout this report survey figures will be quoted wherever available; and in other cases the less accurate revenue record figures will be given.
14. The area and population of the Punjab, with its political divisions, Area and

|  | Area in square milea. | Population, |
| :---: | :---: | :---: |
| Punjab .- | 198,005 | 25,101.060 |
| British Territory | 90,848 | 20,085,024 |
| Punjab Statea | 37,059 | 4,416,086 |
| (A) . $\cdot$ - | 5,820 | 408,019 |
| Delhi ${ }^{(B)} \because$ | , 31,230 | 4,008,017 |
| Delhi $\quad$. | 883 | 488,188 |

Referonee ${ }^{\circ}$ Oablet. and Delhi are given in the margin. The Populatoz Punjab as a whole exceeds the British Isles in area by about one-eighth and its population amounts to nearly two-thirds that of England and Wales; the population of the British Territory included in it is comparable with that of Spain though it is contained in an area not much greater than
half of that country. The Punjab States in the aggregate exceed Ireland in area by about one-sisth and have much the same population; the recent administrative change which has been effected since the census places the principal Punjab States, with a population of just over four millions, in direct political relationship with the Government of India and leaves a number of small states with a total population of only just over four hundred thousand under the political control of the Punjab Government.

The population of the Punjab is compared with that of the largest provinces

| Provinoe. | Population. |  |  |
| :---: | :---: | :---: | :---: |
|  | British Territory. | 8tateg. | Total. |
| Madras | 42,318 | 8,460 | 47,779 |
| Bengal . | , 46,695 | 897 | 47,692 |
| Onited Provincos | 45.376 | 1,135 | 46,511 |
| Bihar and Oriba | 34,002 | 3,980 | 37,962 |
| Bombay | 19,348 | 7,410 | 26,758 |
| Punjab .. | 20,685 | 4,416 | 25,101 |
| Note,-000's omitted. |  |  |  |
| Natural Division. |  | a Pop | alation. |
| Indo-Gangetio Plain, Weat |  | 9,296 | 11,446,716 |
| Himalayan .. .. |  | 2,050 | 1,737,801 |
| Sub-Himalayan .. |  | 0,478 | 5,838,869 |
| North-Weat Dry Arsa | . | 6,081 | 6,077,674 | in India in the marginal table and it will be seen that the province ranks sixth in respect of total population, whilst if British Territory alone be considered it takes the fifth place on the list. Delhi with its population of 488,188 comes at the other end of the list of Indian provinces, of which it is the smallest both as regards area and population.

The areas and population of the four natural divisions of the Punjab are shown in the margin; they contribute 46, 7,-23 and 24 per cent. of the total population respectively.

Population of Administrative Dirlalons.
15. Of the five divisions into which the twenty-nine districts of the Punjab are grouped for administrative purposes, the largest is Multan with an area of 31,207 square miles, whilst Lبahore, with very nearly five million inhabitants, ranks first in population.

Amongst districts, Kangra with'an area of 9,978 square miles is by far the most extensive ; butitincludes much uninhabited mountainous country and only ranks fourteenth in respect of population. Lahore District with $1,131,330$ persons heads the list in respect of numbers; Simla with 45,327 persons and an area of only 101 square miles is the smallest district in both respects.


| Average Popalation of Britinh Distriota. |  |  |  |
| :---: | :---: | :---: | :---: |
| Bihar and Orime | .. | " | 1,762,009 |
| Bengal | - | " | 1,667,098 |
| Madram | . | - | 1,667,370 |
| United Provinces | - | - | 945,329 |
| Panjab .. | - | - | 713,277 |
| Bombey .. | ., | . | 683,290 ${ }^{-}$ |
| Asmam | - | " | 633,853 |
| Oontral Provincee | - | - | 632,117 |
| Dolbi | -. | . | 488,188 |
| North-Weet Yrontior |  | - | 450,288 |

The average size of a district is 3,444 square miles and the average population 713,277 persons; the district is. the true administrative unit throughout India and the average population of districts in different provinces is compared in the margin.

The Punjab States vary enormously in size and political importance; Bahawalpur with an area of 15,003 square miles is the largest but ranks below Patiala in population, having only 781,191 persons against $1,499,793$ in the latter state; at the other end of the scale come the collection of hill states in the neighbourhood of Simla, one of which is only four square miles in area whilst, another only has a population of 185 persons.

The proportion of the whole population of the Punjab enumerated in each district and state is shown in diagram No. 3 in which the lengths of the strips opposite each unit represent the total population; the diagram also shows the relative population of British Territory and of the Punjab States.

:8. The mean density per square mile is 183 in the Punjab and 823
Denalty. in the Delhi Province ; as the latter consists of a large city with a very small area of surrounding country the density of the total population is of little interest.

Figures of the mean density of some leading European countries accordBolgium Engtnad and Ẅales Grmany .. .066
$\because 049$ .. 049 , peagn, and g a comparison which will assist Euro8ootland $\quad \because \quad . \quad 161$ pean readers to visualise the extent to which the Punjab Irolend $\quad \because \quad \cdots 161$ is populated. Amongst the figures quoted are those for $\begin{array}{llll}\text { Spain } & \because & \because .107 & \text { Belgium and Norway which are respectively the most }\end{array}$ will be seen that the heavily and lightly populated countries in Europe. It but it must be rememajab is comparable with France as regards density, in the province and themered that towns are comparatively few and far between countryside is and that the general distribution of the population over the rural countryside is thicker than in that country.

The donsity of the Punjab is very close to the mean density for the whole of India, which is 177 persons to the square mile ; a curious fact is that both in India and the Punjab the density in British Territory is far heavier than that in Indian States ; in India as a whole the density is 226 and 101 in British and Indian territory respectively, whilst in the Punjab the corresponding figures are 207 and 119. An examination of the figures, district by district and state by etate, shows that this marked difference is not due to any peculiar characteristic of the Punjab States but is merely due to the fact that these happen to be
situated in the less densely populated regions ; for instance the Bahawalpur State, the Simla Hill States and Chamba, which between them cover nearly two-thirds of the area occupied by the Punjab States, happen to be in the extreme south-west and north-east which are the two most sparsely populated tracts in the province.

The density is compared with that in other Provinces and States in India British Terriory. State. in the margin; it will be seen that the

| Indis | .. 2226 | India | .. 101 |
| :---: | :---: | :---: | :---: |
| Dolhi | .. 828 | United Provinces | 191 |
| Bongel | .. 608 | Bengal | . 165 |
| United Provinces: | . 426 | Punjab | .. 119 |
| Bihar and Oriesa | . C 409 | North.Wert Fronti | tier 111 |
| Madras | .. 297 | Rajputana | -. 76 |
| Punjab .. | $\cdots 207$ | Kashmir | . 39 |
| Ajmer-Merwara | . 183 | Baluchistan | 5 |
| N.-W. F. Province | .. 168 |  |  |
| Bombay .. | .. 157 |  |  |
| Absam .. | .. 143 |  |  |
| Central Provincen | . 139 |  |  | eastern half of India is the most densely populated and that the density decreases from north to south; though the west is less thickly populated throughout it shows the same general feature of a diminishing density from north to south. It should be noted that whilst the thickly populated United Provinces adjoin the Punjab on the east, the other three sides of the pronnce are bounded by Rajputana, Baluchistan, the North-West Frontier Province, and Kashmir which are amongst the most deserted parts of the whule of che Indian continent.

Donsity in Distriots and : stated.
17. Diagram No. 2, though designed to show the distribution of population, also forms a rough visual guide to the density, for the proximity of the spots representing units of 25,000 persons is in direct relation to density. Diagram No. 5 however shows the same thing in a more usual way though it is inferior in that it does not show minor differences of density; the actual figures for density are given in diagram No. 4 in which districts and states have been arranged

in order according to the density of the total population. Delhi comes at the head of the list, but this is purely owing to the ar ificial nature of its constitution; omitting the urban area the density of its countryside is very close to that of the neighbouring tracts of Gurgaon, Rohtak and Jind which appear a long way down the list. The greatest density is found in the next ten districts and states. on the list, and the map shows that all these are contiguous; with the exception of Lahore they all lie in or alongside the sub-montane tract, where rainfall is comparatively heavy and the sub-soil water level is high. The solitary exception of Lahore, which lies further from the hills, is not in reality an exception to
the generalisation that the most heavily populated tract lies at the foot of the hills, for the density of this particular district is due, like that of Delhi, to the inclusion of a large urban area in its midst.


This group of densely populated districts is situated then in one of the most fertile parts of the province; other very fertile parts depend on canal irrigation for their fertility to an extent which this does not ; hence whilst this region may not now-a-days be strikingly more fertile than others, it andoubtedly has been so in the past; the denseness of its population can therefore be ascribed at once to ite capability of supporting a heavy population. The next twelve districts and states on the list, with the one exception of Lyallpar, all lie in two well-defined areas; firstly the remainder of the sub-montane strip, and secondly the south-east corner of the province. At one end of the sub-montane strip come Ambala and Kalsia, at the other Gujranwala, Gujrat, and Rawalpindi. Why should not these have populations rivalling that in the first group of districts? And why should Jhelum, which lies in their midst, come so far below them again? Ambala and Kalsia, though close to the hills and possessing an abundant rainfall, are less fortunately situated as regards rivers than the tract to their west and in consequence the level of the sub-soil water is lower; irrigation from wells is difficult and there is practically no canal irrigation. Gujranwala spreads well beyond the sub-montane tract, and only a small portion of it has the characteristics of that tract; the remainder is largely iriigated from canals, parts of which are of recent construction. Jhelum and Rawalpindi lie in a part of the sub-montane tract where the country is broken by outlying hills and is much less fertile than that to the east. It is not surprising that these come well below the rest of the sub-montane tract in their ability to support a large population, and when it is noticed that Rawalpindi owes its position in the list very largely to its urban population it becomes evident that here again density, bears a direct relation to agricultural resources. Gujrat is a level tract and its natural charaoteristics lie between those of Sialkot and Jhelum. Taking the whole strip of sub-montane country from Ambala to Rawalpindi; it would appear that density is directly dependent on agricultural conditions; so closely dependent in fact that it seems probable that the law of diminishing returns has come into operation.

Turning now to the south-east corner of the province, where the density is comparable with that in the less favoured parts of the sub-montane tract, we find Gurgaon, Dajana, Nabha, Rohtak, Karnal, Ferozepore, Patiala, Jind and Faridkot, which all lie in one block, with a very even density; these all lie in the Indo-Gangetic Plain and conditions in them are similar ; Loharu and Hissar howevar, which lie near them, have a much less dense population; this is natural for they border on the desert country of Rajputana and have little irrigation. Part of Ferozepore resembles Hissar, but there is much canal irrigation and this
has beetr sufficiently long established to have made ite effect felt threngh many gemerations; forty years ago the density in Ferozepore was lese than that of any district in this tract except Hissar. Lahore by nature is more closely connected with this tract than with the sub-montane tract, and its rural population does not show a much greater density. This block of country is so nearly homogeneous as regards agricultural conditions, and population is spread so evenly through it, that here again we are drawn to the irresistible conclusion that pressure of population on produce must be the determining factor in the density.

By arranging all the units in this area according to density of rural
 population, as in the margin, several points, tending to confirm this conclusion, are brought out. Delhi's rural popalation lives in the immediate vicinity of a city and this always makes for intensive cultivation and heavy population. The rural area of Lahore is affected in the same way, and in addition is far more widely irrigated
$\because \because{ }_{229}^{229}$ than any other in the tract. Pataudi and Gurgaon both
 Hiesar .. .. .. 140 tract, but in both there is a tendency for it to decline, Loharu $\quad \because \quad \because \quad \because \quad 82$ and, as will be seen in the paragraph on the agricultural conditions of the decade, the pinch of poverty is more often felt here than elsewhere in the province. Next comes a group in which the density is practically identical and lastly come two units where it is much lower; in these two however we are faced with a rapid expansion of population in the last forty years.

The remaining unite on the list attached to diagram No. 4 lie either in
Weekern Plain. Bimalayan Trach the western plains or in the Himalayan region; there is no possi-

| Lyallpur | .. | .. ${ }^{88}$ | Biluapur |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }_{\text {Sta }}$ | . |  |  |  |  |  |
| Mrontgomery | . | .. 148 | Nahan |  |  |  |
| Shabpus | .. |  | Kangra |  |  |  |
| ${ }_{\text {M Multan }}^{\text {Muzargarb }}$ | $\because$ | $\cdots{ }_{9}^{134}$ | ${ }_{\text {S }}$ Simiza | Sta |  |  |
| Milanwargi |  |  | Chamba |  |  | 4 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | ble connection between the two, though it happens that they are intermingled when arranged in order of density; these are separated and the density of their rural populations is ahown in the margin. In the western plains the density varies enormously ; as regards soil and climate, these plains are fairly homogeneous, bat their cultivation depends almost entirely on irrigation. The unite at the head of the list are copiously irrigated and have beer colonised by government agency; the population in all these irrigated units is increasing by leaps and bounds and nowhere shows any sign of having reached a state of equilibrium. Here then although density has no connection with the theory of diminishing returns yet it is directly connested with agricul tural conditions for the present rapid increase is entirety due to increased fertility; but as there is as yet no pressure on resources it does not vary in direct proportion to fertility. The units at the lower end of the list consist of wide stretches of dry plain in which no cultivation is possible without irrigation; in them cultivation is confined to specially favoured plots in which inundation or laborious well-irrigation renders it practicable ; the population may be near the maximum that the present agriculture can support, but the advent of canal irrigation would immediately alter the position. Further discussion of the density in these western plains is best left to later paragraphs concerning movements of the population, for there is nothing static in the present conditions and the present density is merely a stage in a continuous movement.

In the Bimalayan tract the relative density of the different units is absolutely traceable to their distance from the outer edge of the hills; Bilaspur, which adjoins Hoshiarpur and nowhere penetrates far into the hills, has the greatest density; next come Mandi, Suket and Nahan which lie furtherdin but do not run up on to the higher ranges; and lastly come Kangra, the Simla Hill States and Chamba, in which the sparseness of population is in direct ratio to the proportion of the total area which lies in and behind the main ranges.

The only district which has not been dealt with as part of a distinct tract is Attock; this, if regarded as part of the Sub-Himalayan Division; shows a remarkably low density, but it has none of the natural characteristics of that division;
it lies largely amongst arid dry hills in an inhospitable country, and forms no exception to the rule formulated below.

To sum up, density varies everywhere in accordance with agricultural resources to the exclusion of all other factors; it is sa directly proportionate that the conclusion that there is pressure on these resources is irresistible; yet this same direct proportion also indicates that other factors have not yet been brought into play and hence that the pressure on resources is not extreme, for in that case industrialism would have been forced into existence and would have led to variations in density independent of agriculture. An exception to the rule exists in the irrigated portions of the western plain where population is rapidly incressing and as yet has received no check by its pressure on resources; whilst the beginnings of more acute pressure are observable in the extreme east of the province where there is a steady decline in population in Ambala and Gurgaon, and a diminishing rate of increase in other districts.
18. In discussing the distribution of the total population in the preceding paragraph it has been impossible to avoid some reference to the incidence Rural Popo: of the rural part of the poplation. in this pararaph the distribution of the relation and to rural population will be discussed in greater detail with a view to discovering Agrieultural ite relation to agricultural conditions. The discussion will be limited to British condiltons. territory so as to avoid basing arguments on the incomplete and, in some cases, unreliable agricultural statistics which are all that are available for the states. Suffice it to say that an examination of such figures as are available reveals no peculiar points in connection with any of the states, all of which appear to resemble adjoining British districts in regard to the matters which will come nnder discussion.

In any tract which is entirely self-supporting and has no imports and exports the presence of a town would create a drain on the produce raised and thus lessen the amount available for the raral population; in such tracts it would be natural to discuss the relation between total population and agricultural conditions. But the Punjab is not such a tract; its communications are sufficient to ensure that the needs of a town are ultimately met from produce raised in distant parts of the country ; here the presence of a town affords a market for the produce of the vicinity and increases the value of agricultural lands by encouraging intensive cultivation which necessitates a denser agricultural population. Of two equal areas of land of equal quality that which is nearer a town is more productive ; its owner adopts more intensive systems of farming so as to supply the town with produce of high value and obtains part of his own food by purchase, and in doing this he benefits because the money value of that food is raised on a smaller area than would be required to raise the food itself. As a plot of land will maintain its owner in greater affluence if it be situated near a town, it follows that it will support a larger rural population than a similar area in the depths of the country.

Hence before we can examine the relationship between density and cultivation, we must exclude the urban part of the population; and, even after we have done this, we may expect a greater density of the remaining rural population in such districts as contain large urban communities.

It may be argued that, though agricultural land in the neighbourhood of a town demands a dense agriculural population, it may not support such a dense rural population as land elsewhere because the agricultural community is able to supply its needs from the town and is therefore not allied with such a large supplementary population of artisans and petty traders. This argument is not applicable to the Punjab where it is well known that villages in the neighbourhood of towns have just as many menials, artisans and petty shopkeepers as those eisewhere.

If we omit the urban population from our statistics the density in the Britiah territory of the Punjab drops at once from 207 to 185 persons per square mile. In England and Wales, by omitting the population of all urban areas with a population of five thousand or more persons, the density drops from 649 to 172 persons per square mile. This fact assists us in visualising the distribution of rural population over the Panjab countryside, but it forms the basis of no comparison for the rural population of England is not primarily dependent on the produce of the tracts in which it lives.

Diagram No. 5, in the previous paragraph, shows the density of the rural

|  | $\therefore$ | Density of rural population in Britiah Territory per square mile. | Peroentage of net cultivated to total area, 1921. |
| :---: | :---: | :---: | :---: |
| Punjab .. | $\cdots$ | 185 | 40 |
| Jullundur .. | $\cdots$ | 493 | 70 |
| Bialkot .- | .. | 479 | 70 |
| Amritsar .. | . $\cdot$ | 467 | 70 |
| Gurdaspur | . | 418 | 64 |
| Hoshiarpur | -• | 397 | 48 |
| Ludhiana | .. | 337 | 75 |
| Delhi | . | 310 | 56 |
| Gujrat | .. | 304 | 54 |
| Ambaia | . | 298 | 57 |
| Lahore | . $\cdot$ | 290 | 61 |
| Lyallpur | . . | 289 | 89 |
| Gurgaon .. | . $\cdot$ | 275 | 68 |
| Sheikhupure | . | 241 | 48 |
| Rohtak | $\cdots$ | 239 | 60 |
| Karnal | *.. | 238 | 49 |
| Gujranprala | $\cdot$ | 237 | 63 |
| Remalpindi | . | 230 | 40 |
| Ferozepore | . $\cdot$ | 229 | 77 |
| Jhelum | . | 157 | 35 |
| Jhang | . | 149 | 31 |
| Montgomery .. | . | 148 | 34 |
| Bimla | . | 144 | 15 |
| Shahpur . | . | 148 | 39 |
| Hisasar .. | $\cdot$ | 140 | 71 |
| Multan .. | $\cdot$ | 134 | 30 |
| Attock .. | $\cdot$ | 116 | 34 |
| Muzaffargarh .- | $\bullet$ | 90 | 16 |
| Dera Ghazi Khan | . | 78 | 16 |
| Kangra .. | . $\cdot$ | 76 | 8 |
| Mianwali .. | . $\cdot$ | 81 | 17 | population as well as of the total population, but the former is in an inconvenient form and the figures are repeated in the margin with the districts arranged according to the density of the rural population.

There is practically no manufacture outside the towns and there is very little room for error in assuming that the rural population is entirely supported by local agriculture; by this I do not mean that its food, clothes and other requirements are produced locally, but that its only primary source of wealth is the local agricultural produce and all its requirements are satisfied by that wealth.
A comparison of the two columns of figures shows at once that, with very few exceptions, density follows extent of cultivation ; and, further, that variations in density are greater than variations in the extent of cultivation. We can therefore lay down the two following principles as being of general, though not universal, application :-density of rural population primarily depends on the proportion of land which is cultivated, and density increases at a greater rate than that proportion. The latter principle admits of two explanations ; it may be due to the Malthusian theory of diminishing returns which postulates that an increase in population leads to a disproportionately small increase in resources and therefore leads to a reduced standard of living; or, it may be due to the fact that the actual cultivation in tracts which are capable of wide cultivation is superior in quality as well as quantity.

Probably both explanations are partly true ; for instance, there can be no doubt that the cultivation in Jullundur, in addition to being more thickly distributed, is very far superior in quality to that of Dera Ghazi Khan ; yet it is possible that the extension of cultivation in the former district has been pushed to such limits that the poorest land under cultivation is inferior to land which may be left uncultivated in the latter.

More detailed comparison of the two columns of figures reveals the following exceptions to the general rule :-Hoshiarpur, Sheikhupura, Simla and Kangra are far more densely populated than other districts with similar proportions of cultivation, and on the other hand I.udhiana, Ferozepore and Hissar vary in the opposite direction.

In Sheikhupura there has been much colonisation in the last few years and the cultivated area is in the process of very rapid extension.

Simla and Kangra lie in the Himalayan tract; they and the states which adjoin them all have large areas of waste which is not unproductive and numbers of people earn or supplement their income by collecting wood and forest produce or by grazing herds and flocks in these wastes. In this tract the underlying assumption that the rural population is dependent on local agriculture is incorrect. To a far less degree the same remarks apply to Hoshiarpur. In Simla a large proportion of the inhabitants make a living by supplying the transport necessary to the exiatence of the summer capital in their neighbourhood; and in both Kangra and Hoshiarpur an exceptionally large number of persons earn their living in the army and in domestic service throughout the length and breadth of the province.

Ferozepore and Hissar lie on the borders of Rajputana and much of their land is of poor sandy quality in which the cultivated area is devoted to raising crops of low value ; the sparseness of their population may be ascribed in the main
to the inferiority of their cultivation, but at the same timeit must be noted that the population of these two districts (especially that of Ferozepore) has been increasing since 1881 at a far greater rate than in any other districts of the Eastern Punjab. We may conclude that in these two districts, whilst the quality of the soil precludes a dense population, the present density is exceptionally light and leaves room for future increase. The case of Ludhiana does not admit of such obvious explanation and must be left for discussion till a further stage has been reached in the analysis of the statistics.

Having established these principles, the next step is obviously to exclude

 the waste and to calculate the incidence of the rural population on the cultivation. This has been done in two wayb and the results are shown in the margin; in the first the incidence is calculated on the area of land under cultivation, in the second upon the area of matured crops. The basis of the two sets of figures are given by the net cultivated area of 1921 and the average of the matured areas recorded in the nine years 191213 to 1920-21; the latter period was chosen as it eliminates the complication due to the changes in ${ }^{4}$ the 'Delhi boundaries which took place before 1912-13; unfortunately separate statistics for matured areas in Delhi, Gujranwala and Sheikhupura were not available and these districts have been omitted from the second get of figures. The first thing to notice is that the first set of figures gives the incidence on cultivated aroa without making any allowance for its quality, and hence affords data from which to discover the extent to which density on cultivation varies with the quality of that cultivation.

Only one feature of the quality of agricultural land-namely the area of matured crops it produces-is capable of quantitative measurement; the second set of figures shows the incidence after this has been eliminated. If we had reliable figures for yields for each district and could combine them so as to get average yields for all crops, we could then carry the process a step further and by calculating the incidence of rural population on actual produce we should see at once the extent to which pressure on subsistence is present in each district ; failing this the incidence on matured area gives some indication of that pressure though it is affeoted by the differences in yields for which allowance must be made before any conclusions can be drawn.

I shall now examine the first column of figures in an attempt to trace if any conneotion exists between incidence of rural population and the quality of agricultural land. It has already been stated that cultivation in the Punjab is affected more by rainfall and irrigation than by difference in soil, and I shall endeavour to trace the connection between density and these factors, first, by considering rainfall in districts where the irrigation is similar and, second, by considering irrigation in districts where the rainfall is similar.

Turning to the statistics for irrigation given in paragraph 8 it is seen that, out of the twenty-eight districts there mentioned, twelve have less than 28 per cent. of their crops irrigated, seven have between 36 and 54 per cent. and nine have over
70 per cent. irrigated.

| Taking the first group of twelve distri |  |  |  |
| :---: | :---: | :---: | :---: |
| Districta with losa thian 28 per cont. irrigated. | Inoidence. | Rainfall. | Irrigation. |
| Kangra .. .. | 984 | 74 | 68 |
| Simla .. | 972 | 63 | 0 |
| Hoshiarpur .. | 832 | 35 | 11 |
| Gurdaspur ${ }^{\text {R }}$. ${ }^{\text {a }}$ | ${ }_{8}^{652}$ | 84 | 28 |
| Rawalpindi Ambala | 838 <br> 522 <br> 8 | 32 32 | ${ }_{8}^{2}$ |
| Jhelum $\quad .$. | 443 | 26 | 5 |
| Gurgaon .- .. | 407 | 28 | 17 |
| Rohtah .. ./ | 338 | 20 | 27 |
| Attook .. .. | 340 | 20 | 9 |
| $\begin{array}{lll}\text { Mianwall } \\ \text { Hisar } & \because & .\end{array}$ | 361 198 | 18 | 12 18 | ts, which have little irrigation, and arranging them in order of incidence on cultivated area, we get the figures reproduced in the margin. With the solitary exception of Hissar the incidence varies throughout according to the rainfall, and the extent of irrigation appears to have no appreciable effect. The exceptional case of Hissar has already been explained and these figures support the explanation given.

We can now enunciate another principle;--in tracts with less than one-third of the cultivation irrigated, the incidence of population on cultivated area is primarily determined by the rainfall.
Treating the next group of seven districts, with moderate irrigation facilities,

| Distriots with from 86 to 54 per cent. irrigated. |  |  | Incidence. | Frainfall. | Irrigation. | Woll irrigation. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Jnllandar | . | -* | 701 | 27 | 64 | 64 |
| Sis!kot | . |  | 682 | 32 | 53 | 48 |
| Gujrat | - |  | 659 | 26 | 36 | 16 |
| D. G. Khan |  | $\cdots$ | 400 | 6 | 43 | 11 |
| Karnal | * | . | 486 | 30 | 86 | 14 |
| Ludhisna | - | $\cdots$ | 48 | 28 | 37 | 28 |
| Forozepore | . | -• | 297 | 20 | 48 | 14 | in the same way we get the marginal table which, though it is not so strikingly convincing as that which preceded it, will yet be found to support the following principle:-where irrigation extends to more than one-third of the cultivation, but not less than one-half, the incidence on cultivation depends primarily on the extent of irrigation but is also affected by great differences in rainfall. Here again an exception to a general rule is afforded by Ferozepore, the light density in which has already been explained.


| The remaining districts, which have more than 70 |
| :--- |
| Districts with over 70 <br> per cento irrigated. |
| Amritsar | ..

0 per cent. of their matured crops irrigated, when arranged in the same way, show that, where irrigation is widely extended, the rainfall becomes a negligible factor in regard to its effect on density. The figures also. indicate that the extent of ${ }^{\prime}$ well irrigation is a more important factor than the extent of irrigation from canals. The significance of the figures is somewhat obscured by the fact that Lahore, Montgomery, Lyallpur and Shahpur are all distriets in which population has increased by over 10 per cent. in the last decade and is obviously not in a static condition, so that in them density cannot be expected to be fully influenced by agricultural conditions. In fact the figures indicate that Lyallpur and Shahpur are lightly populated in comparison with other districts, and that in them further large increases may reasonably be anticipated.

| By grouping districts according to rainfal |  |  |  |
| :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Inen- } \\ & \text { donoc. } \end{aligned}$ | $\begin{gathered} \text { Irrigea } \\ \text { tion. } \end{gathered}$ | Ren |
|  |  | 20 0 11 11 83 28 88 8 8 36 | $\begin{aligned} & 74 \\ & 63 \\ & 85 \\ & 32 \\ & 34 \\ & 32 \\ & 32 \\ & 30 \end{aligned}$ |
|  | 701 701 870 859 852 448 443 443 407 308 398 290 207 | 54 70 70 36 28 37 76 8 17 17 27 8 46 | 27 24 28 28 26 23 26 26 20 20 20 |
| Bainfall leas than 20 inoheeMuzaffargerh <br> Dora Ghati Khan <br> Jhang <br> Lahore <br> Montgomory <br> Lyallpuz <br> Mianwall <br> Hiesar |  | 77 78 78 48 88 78 87 87 87 98 78 712 16 | 8 15 18 10 18 10 10 18 18 18 18 |

and examining the effect of rainfall and irrigation on density of population within these groups, though we cover much the same ground and arrive at many of the same conclusions we are able to throw a little further light on the subject. This converse process is shown in the margin, and tends to establish the following principles:-where the rainfall exceeds 30 inches per annum it outweighs other factors in determining density of population over cultiva-: tion; where it lies between 20 and 30 inches it is stzll the main factor, but very large differences in the extent of irrigation also have a considerable effect; where it is less than 20 inches it ceases to have any appreciable effect.
We can now examine the figures for incidence on matured areas which, as already explained, eliminate part of the variations due to differences in quality of land, and tend to reflect pressure on resources, this tendency being partially obscured by the fact that differences in yields have not been eliminated. The list of districts is headed by Simla-where there are 928 members of the rural population to every square mile of matured area, which allows just over two-thirds of an acre of matured crops per head-and runs down to Hissar in which there is an average of just over two acres of matured crops to each' person: It includes districts in which conditions are obviously exceptional, and it will simplify the examination to exclude these at once. We have already seen that Simla, Hoshiarpur and Kangra form such exceptions, for in them the rural community has extensive resources in addition to those afforded by agridulture whilst even so the inhabitants resort to outside service in very large numbers indicating that the present. resources of the districts are insufficient to support the population; a view which is supported by the fact that in Kangra and Hoshiarpur the rural population has only increased by five per cent. in forty years whilst in Simla it has declined by four per cent. in the same period.

Montgomery, too, is a district that must be removed from the list because it owes its position in it to fortuitous circumstances; the matured area based on an average of nine past years gives very misleading results in a district where large aress have been irrigated, colonised and brought under cultivation in the last few years. On general grounds it is probable that this district is very far from being in the congested state suggested by the figures; like other newly colonised tracts the areas allotted are more than sufficient to support the colonists and for many years the newly broken soil will probably yield increasing returns and enable the population to expand rapidly. without detriment to the general standards of prosperity and comfort.

At the lower end of the list Lahore, Lyallpur, Shahpur and Ferozepore are all districts in which population has been increasing very rapidly during the last decade, whilst in Hissar population has been increasing steadily since 1881. This fact, taken together with their low position on the list, indicates very clearly that there is little pressure on resources and that further increase in population may be anticipated without anxiety. At the same time it must be noted that the very low figures for Ferozepore and Hissar are partly due to the presence of poor soil and that the capacity for increase is not nearly so large as the bare figures indicate; this is particularly true in Hissar where absence of irrigation and a light rainfail render the emps peculiarly liable to disastrous failure ; under present economic conditions a district where the crops fluotuate excessively cannot support nearly
so many people as a district in which the crops maintain the same average with－ out much variation from year to year．

By the omission of the nine districts mentioned the list is reduced to a form in which it is far more suitable for comparative purposes；it now includes districts in which the incidence lies between 664 and 412 persons to the square mile ；or in which the average matured area per head varies between 0.96 and 1.55 acres，a difference which could easily be obliterated by differences in yields；this being so it is obviously wrong to jump to the conclusion that there is greater pressure on agricultural resources in districts at the head of the list than in those at the bottom ； we have，in fact，come to the point where figures fail us and quantitative analysis must yield to general considerations based on local knowledge．

The list showing incidence of rural population on matured area，in its reduced form，together with a few leading statistics for each district is reproduced below－

| － |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Grijat | 604 | 26 | 21 | 15 | 40 |  |  |  |  |
| Sisilrot | 648 | 32 | 5 | 48 | 48 | 8 | －178 | 5 | 18 |
| Jullundur | 636 | 27 | 0 | 8 | 34 | 11 | $-176$ | 2 | 4 |
| Rewralpindi ．． | 633 | 32 | 0 | 2 | 48 | 1 | 24 | 4 | 21 |
| Gurdsppux | 617 | 34 | 11 | 17 | 36 | 8 | －93 | 2 | 3 |
| Amritsar | 881 | 24 | 40 | 80 | 38 | 10 | $-113$ | 5 | 4 |
| Mucaffargark ．． | 862 | 6 | 83 | 24 | 45 | 7 | －4 | 0 | 29 |
| Karnal－． | 856 | 30 | 22 | 14 | 20 | 18 | 2 | 8 | －88 |
| Moltan ．． | 846 | 7 | 78 | 14 | 89 | 4 | 63 | 8 | 60 |
| Ambals | 838 | 32 | 0 | 6 | 27 | 8 | －59 | －1 | －8 |
| Grargan | 623 | 25 | 6 | 11 | 7 | 17 | $-83$ | －7 | －10 |
| Jhelum ．． | 507 | 26 | 0 | 8 | 49 | 4 | －68 | $-7$ | $-8$ |
| Rohtal $\quad$ ． | 496 | 20 | 19 | 8 | 10 | 20 | － 6 | 8 | 4 |
| Jhang | 476 | 10 | 58 | 28 | 48 | 5 | $-112$ | 0 | 46 |
| Jodhiana $\quad$ ． | 468 | 26 | 9 | 28 | 27 | 20 | $-84$ | 10 | 88 |
| Ders Ghasi Khan | 482 | 6 | 32 | 11 | 32 | 4 | $-19$ | $-7$ | 28 |
| Attook | 437 | 20 | 1 | 8 | 48 | 8 | －16 | －1 | 15 |
| Mianwali－ | 412 | 12 | 5 | 7 | 36 | 28 | $-35$ | 5 | 37 |

Probably Jullundur has the richest cultivation of any district in the province ；it possesses an ample rainfall，excellent soil，very extended well irriga－ tion，splendid marketing facilities，and an agricultural population largely com－ posed of castes which supply the best and most intensive farmers known in the Punjab．Sialkot resembles it very closely，but does not have quite such good marketing facilities and raises a larger area of wheat and a smaller area of crops of＂market garden＂variety．

Gurdaspur and Amritsar are situated in the same fertile tract；the former is differentiated by a heavier rainfall and less irrigation，the latter by the exist－ ence of much canal irrigation which is unfortunately accompanied by water－ logging；their slight inferiority in the way of natural advantages is certainly more than counterbalanced by the lesser incidence of their rural population．

These four districts stand apart from the rest of those on the list by reason of the excellence of their agricultural conditions，and their position near the head of the list does not necessarily indicate undue pressure on resources， though it leads us to look for indications of its existence in other directions； evidence of its existence is afforded by the fact that population has remained practically stationary for over forty years，and that at the present time there is a marked balance of emigration over immigration．As regards natural advan－ tages these districts may perhaps be graded in the order Jullundur，Sialkot， Amritsar，Gurdaspur which is not the same as the order in which they appear in the list and we may conclude that the margin of surplus is less in Sialkot than Jullundur，and less in Gurdaspur than Amritsar．

The natural advantages in Gujrat are certainly less than in the four dis－ tricts mentioned above，yet its rural population has a smaller relative area of
crops ; there can be little doubt that pressure of population is very severe in this district. The recent opening of the Upper Jhelum Canal has improved the conditions and will continue to do so; until the district has had time to settle down under the new conditions it is not possible to estimate their effect. : It may safely be asserted that Gujrat has become dangerously congested, but that the situation may be saved by the new canal ; even with the amelioration in conditions which will be caused by the new irrigation it is unlikely that the district will support a considerably greater population than that already in existence.

In the Sub-Himalayan tract and west of the foregoing districts lie Jhelum,
Rawalpindi and Attock; in respect of irrigation and composition of their crops these three districts are remarkably similar and all are characterised by the presence of low hills containing much unfertile land. In respect of population they are remarkably dissimilar, yet Rawalpindi with the highest incidence shows a tendency to increase whilst the others do not. Rainfall amounts to 32 inches in Rawalpindi, 28 inches in Jhelum and 20 inches in Attock; the forests of Rawalpindi form an asset of the rural population in addition to its crops; easily accessible irrigated lands in Shahpur and in the colonies to the south have attracted many emigrants from Jhelum for several generations past. These facts help to explain the large differences in density but it is still impossible to avoid the conclusion that Rawalpindi is far more congested than the province as a whole, that Attock supports far fewer people than it is capable of doing, and that the declining population of Jhelum is not caused by pressure on resources.

Proceeding down the list we come to Muzaffargarh which adjoins Jhang and Multan and resembles them in many of its agricultural aspects. The incidence on matured crops is 562, whilst it is 546 in Multan and only 476 in Jhang. These three districts have low rainfall and copious irrigation; in all there has been a very great increase in population since 1881, and in all that increase has followed extensions of irrigation. The extensions in Muzaffargarh are of less recent date than in the others, and it has had more time for population to adjust itself to existing conditions; in it a definite check has recently occurred in the increase of the inhabitants. In Multan and Jhang the increase has been greater and is still continuing at a rapid rate; a very slight check has occurred in Jhang. owing to the fact that attractive employment in new colonies has drawn away some of the people who, though quite well off in their own districts, saw chance of improving their position by migration. We may conclude that Muzaffargarh is nearing the point when production limits population, though there is certainly no indication that pressure on resources is unduly heavy; and also that Multan and Jhang have not reached that point ; everything points to the conclusion that Multan and Jhang are lightly populated and may expect to see a further rapid increase.

Ludhiana, Ambala, Karnal, Rohtak and Gurgaon all lie in the eastern plains and have many characteristics in common; it will be convenient to discuss them together. The presence of light sandy soil is reflected by the statistics quoted which show that the proportion of wheat is far lower than anywhere else in the province ; it is replaced by pulses and inferior crops to which the soil is more suited; this inferiority gets more marked from north to south which is the order in which the districts have been mentioned. The figures for incidence on crops vary from 550 in Karnal to 468 in Ludhiana; they are too near those for the rich tracts round Jullundur to reflect the enormous difference in the quality of crops ; they are at much the same pitch as in the extensive tracts of rich irrigation to the west which are undoubtedly fit to support a greater density than these eastern plains. In short, they indicate that the whole of this eastern tract is overcrowded; which indication is supported by the facts that except in Karnal ánd Rohtak there is great loss of population by migration to other parts of the province, and that except in Rohtak there has been an universal decline in population since 1881.

In these districts agricultural and political conditions have remained unchanged for a great many years; here, if anywhere in the province, population might be expected to have adjusted itself to conditions. In one way this expectation is realised for in the tract as a whole population appears to have approached nearer the limit of resources than elsewhere in the province ; in another way the
expectation is completely falsified, for the variation in density as between the districts shows no relationship with the variations in their resources. One explanation accounts for both these points ;-the inhabitants are Hindus of a less enterprising nature than the Sikhs who live east of them; affection for their ancestral lands, strong throughout the province, is perhaps strongest here; they have submitted to straitened conditions without an effort to escape from them by seeking permanent employment elsewhere, and though there is emigration it is mainly local; the only extensive movements to Lyallpur and other canal colonies have been from Ambala and Ludhiana. This one feature accounts for the tract having become overcrowded as a whole, and also accounts for the - vercrowding being markedly different from district to district.

It has already been indicated that the order Ludhiana, Ambala, Karnal, Rohtak, Gurgaon, is one of diminishing quality of the soil; Ambala has the heaviest rainfall but practically no irrigation ; Ludhiana and Karnal with rainfalls not far below that of Ambala have 37 and 36 per cent. of their crops under irrigation, but the former district is more favoured than the latter by reason of the greater extent of well irrigation ; in respect of natural advantages Ludhiana is better off than Karnal which is again better off than Ambala. Gurgaon and Rohtak have less rain and less irrigation than either Ludhiana or Karnal, and both grow much less wheat ; the heavier rainfall in Gurgaon is offset by more extensive irrigation in Rohtak; on the whole there is little to choose between the two though probably advantages in the soil give Rohtak a stronger position than Gurgaon. It is difficult to know how to place Ambala with respect to these two ; it excels in soil and climate but has practically no irrigation.

Arranging these five districts in the order of their natural advantages, or,
 least people, whilst throughout there is no relation between the burden of population and the capacity to bear it. We may conclude that the pressure on resources is heaviest in Gurgaon and not much less severe in Ambala and Karnal, whilst in Ludhiana it is very much less than in any other of the five districts. This conclusion is supported by the fact that the population of Gurgaon and Ambala has rapidly fallen off since 1881 to an extent which is not accounted for by migration. The decrease in the same period in Ludhiana does not affect the conclusion as it all occurred in one decade and was due to epidemics of plague. Loss by migration is also heaviest in Ambala, Gurgaon and Ludhiana; in Ludhiana the inference raised by the loss by migration is partly nullified by the fact that the inhabitants are less conservative than in the other four districts, iand that a greater proportion of them received grants of land during the colonisation of Lyallpur.

The only districts not yet discussed are Dera Ghazi Khan and Mianwali which appear at the end of the list; Mianwali, with little rain and scarcely, any irrigation, appears to be in the position on the list which its natural disadvantages render appropriate, and the figures give no indication as to whether there is or is not any considerable pressure on resources. Dera Ghazi Khan also appears to occupy a position warranted by its circumstances, though a comparison with the much more heavily populated districts of Multan and Muzaffargarhthan which it has much less irrigation-tends to show that there is room for expansion.

The principles, and the particular local points, which this lengthy paragraph tends to establish, may be summed up as follows :-

Towns may create a drain on the agricultural resources of the province but within districts their existence tends to enable the countryside to support a heavier rural population.

Density of rural population depends primarily on the proportion of the land cultivated, and secondly on rainfall and irrigation,

Where rainfall is under twenty inches per annum, density on cultivation depends entirely on irrigation ; where it is over thirty inches, entirely on rainfall. incidence of Consely where less than one-third of the cultivation is irrigated, the -thirds is irrigated, irrigation is the determining factor.

Quality of soil only finds third place in the factors affecting density, and is practically without effect except in the south-east of the province.

In general the existing distribution of population is in very close agreement with these principles; so close that as a general proposition it may be asserted that the population throughout the province has approached sufficiently near the limit of resources to render that limit operative in determining density.

At the same time minor differences of distribution occur which are not in accordance with the present extent of resources, and these minor differences indicate that the various districts may be grouped as follows :-
(1) Districts where there is severe pressure on resources-

Kangra, Hoshiarpur, Simla, Gurgaon, Ambala and Gujrat.
(2) Districts where the pressure is felt but in a less degree-

Karnal, Rohtak, Rawalpindi, Sialkot, Jullundur, Amritsar, Gurdaspur, Ludhiana and, probably, Gujranwala and Delhi,
(3) Districts where the population is suitable to the resources availableMianwali, Jhelum, Muzaffargarh and, probably, Dera Ghazi Khan.
(4) Districts where resources could support a greater population without detriment to its welfare-
Ferozepore, Hissar and Attock.
(5) Districts which are under-populated-

Montgomery, Lahore, Lyallpur, Shahpur, Multan, Jhang and, probably, Sheikhupura.
It must be noted that this grouping is arranged for present conditions, indicating the position at the moment; it does not allow for future changes in conditions, such as probable extensions of irrigation and cultivation. It is difficult to assign positions to Gujranwala and Sheikhupura on account of the absence of separate statistics and they have been placed in groups containing adjoining and similar districts.

## Section III.-Variation in Population at Previous Censuses,

19. The Punjab stands at the ancient gateway of India and through it have passed the successive swarms of immigrants and invaders, who were the progenitors of by far the greater part of the present population of the Indian continent. The Aryans, the Scythians, the Greek armies under Alexander, and the long succession of Mohammadan raiders and conquerors have all swept across its plains and have all left their mark on the province and the great country beyond it.

In it the Hindu religion had its birth and in it the most ancient sacred books of that faith were written; one of the greatest characters in the history of Buddhism was born in the province; but the Buddhist faith has practically disappeared, whilst the centres of Hindu learning and culture have been driven eastwards before the Musalman invaders who left behind many settlers of their faith and forced that faith upon a large number of the earlier inhabitants. The Punjab also is the home of the Sikh religion, which, starting as a peaceable revolt against the complexities and Brahmanical subjection of Hinduism, developed under Mohammadan oppression into a military and political organisation. Musalmans now compose 51 per cent. of the population whilst Hindus have declined in numbers till they only include 35 per cent. and from amongst them have arisen the Sikhs of whom 12 per cent. of the population is composed.

Throughout its history the Punjab had been the scene of constant violence and bloodshed which culminated in the 18th century in an orgy of rapine and wild disorder ; early in that century the Sikhs, with their rising military power, raided and ravarged the eastern parts of the province and extended their exactions to the central and northern tracts; their depredations were followed by the invasion of Nadir Shah, the Persian, who swept through the Punjab destroying and laying waste, and the desolation was completed by a series of great famines which ocourred in the middle of the century. Thereafter the country was the scene of constant invasions by the Duranis from the west and of struggles for supremacy between the Sikhs and Mahrattas; in the middle of fifty years of bloodshed and disordar the countryside was again desolated by a terrible famine in 1783.

At the beginning of the next century some measure of peace was restored -owing to the rise in supremacy of the great Sikh leader Maharaja Ranjit Singh, whilst in 1803 the British became masters of the territory now roughly included
in the districts of Delhi, Gurgaon, Hissar, Rohtak and Karnal and also extended their protection to the States in the eastern part of the Province. Famine and fever however waged constant warfare against the population during thes comparatively settled period. After Ranjit Singh's death a state of anarchy arose which constantly threatened the peace of the Brtish borders and led to the first Sikh war which ended in March 1846 and resulted in the occupation of Lahore and the cession of the Jullundur Doab to the British; two years later insurrections in the south-west led to the second Sikh war and the establishment of British rule throughout the province.

The country was suffering the natural effects of centuries of warfare and violence; a harrowing picture of the conditions which prevailed occupies several pages of Mr. Ibbetson's Census Report of 1881. The south-eastern districts of the province, ravaged in turn by Sikh and Mahratta, were desolated; each group of villages was at deadly enmity with its neighbours, and much of the countryside was practically a desert inhabited only by a few tribes of marauding nomads. The hill country, which had long been suffering under local strife, had been overrun by the Gurkhas before the Sikhs gained supremacy; the desolation caused by the Gurkhas was little relieved by peace under the Sikh Government which , forcibly collected a revenue which impovenshed the people and left them scarcely sufficient for the barest existence. In the west the Sikh rule had had least hold and the country was in a violent state of disorder ; might was right, local leaders were in constant warfare and every second or third year the country was invaded by Sikh armies who laid it waste with all the excesses natural when wild and uncultured men are let loose amongst their hereditary religious enemies.

In the centre and south-west the Sikh rule was stronger and more equitable but, though some approach to government was maintained, the main object was to wring from the cultivators the last farthing which could be extracted without compelling them to abandon their fields. The Sikhs promoted and extended cultivation as far as possible under a system which held forth the minimum of inducement to the cultivator, but they respected no rights and recognised no property when such respect or recognition conflicted with their pecuniary interests.

Little wonder that the peace and security afforded by the British administration, combined with government activity in developing and improving the resources of the conntry, led to material progress at a rate which elsewhere would be little short of miraculous. It is this material progress, hampered at first by recurring famines and always by disease, that has most affected the spread of population, and the account of the Punjab since it came under British rule may be confined to these subjects.

The progress made during the last ten years is detailed at some length in Section IV of this Chapter and it is unnecessary to deal with it here. Figures illustrating the development of the province from 1863 to 1911 are given in the following table ; these have been taken from past Census Reports and other sources: in compiling the table it was found that figures obtained from differeut sources varied considerably and those which have been entered cannot be verified as accu. rate though they are quite near enough to illustrate all that is required of them. In some cases the figures do not refer to the actual year recorded above them, but to a preceding or following year; no attempt has been made to adjust the figures for subsequent changes of boundaries and they all refer to the province as it existed in the year under which they are entered :-

|  | 1803. | 1808. | 1881. | 1801. | 1801. | 1911. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Cultivated ares. Square miles |  | 31,513 | 36.756 | 40,424 11.699 | 43,587 14,860 | 46,325 16,636 |
| Irrigated area. Square miles | 195 | 9,350 1,758 | 11.170 2.364 | 11,699 3,808 | 14,860 6,631 | 16,636 0,753 |
| Irrigated by State Canals | 1,195 | 1,758 859 | 2.364 | 2,239 | 1,932 | 2,558 |
| Motalled Roads. Miles , | 32 | 858 | 1,056 | 1,821 | 4,264 | 5,360 |
| Number of Schools | 32 | 1,806 | 2,098 | 0,640 | 7,479 | 7,278 |
| Number of scholars in thousands | .. | 72 | 168 | 248 | 250 | 347 |
| Number of literato per mille- |  |  |  |  | 65 | 63 |
| Males Fomales | . | $\because$ | ${ }_{1}$ | 2 | 3 | 6 |
| Esxports in lakho-Maunds | $\cdots$ |  | 103 | 160 | 249 | 568 |
| Exports is lakhorupees |  | * | 373 | 694 | 1,150 | 2,088 |
| Imports in lakhs-Maunds | . | - | 63 | 122 | 251 | ${ }^{651}$ |
| - . | - | $\cdots$ | 710 | 920 | 1,546 | 2,984 |
| Prioe of wheat, in rupees per | 1-2.9 | 2-2-7 | 2-3.5 | 2-1-8 | 2-8.0 | 2-12-0 |

The railway mileage for 1901 and 1911 is that recorded in the Census Report of 1911, but in the Punjab Administration Repurt for 1911-12 the total railway mileage was shown as 4,043 miles; spparently the latter figure only relates to the North-Western Railway.

The growth of cultivation, irrigation, communications and export, whilst adding to the prosperity of the people, have been the great safeguards against famine which has become of less and less frequent occurrence as the country has been developed; the most severe famines which have occurred since annexation are noted below-

1851-52. Drought almost amounting to famine.
1860. Severe famine throughout the country east of the Sutlej; the price of wheat in Delhi rose from 24 to 8 seers per rupee within 12 months. Government relief was organised on a large scale in Rohtak and Karnal and neighbouring districts.
1868-69. A far more severe famine in the same part of the country, government relief was given freely, over ten million daily rations were distributed but even so death from starvation was considerable. Fever, cholera and small-pox followed in the wake.
1877-78. Drought aimost amounting to famine, accompanied by unprecedented cuttle mortality.
1897. Scarcity throughout the province, severe in the south-east but scarcely amounting to famine.
1900. Severe scarcity approsching to famine conditions in the south-east.

1901-02. Famine in Hissar, a small amount of relief being necessitated.
1905. Scarcity in the bouth-east, famine relief works opened in Gurgaon.
1908. Famine conditions reappeared in Hissar and Gurgaon.
1911. Fodder scarcity.
1913. Fodder scarcity in the south-east.
1916. Scarcity not accompanied by femine in the south-east.
1919. Scarcity conditions in the Ambala Division and in Dera Ghazi Khan.

1920-21. An exceptionally bad year, necessitating remissions and suspensions of revenue and the granting of concession rates for carriage of fodder. No famine occurred, test relief works were opened in Hissar but proved umecessary.
It may be said that no disastrous famine has occurred since 1868 ; scarcity conditions in recent years have never produced famines; the agricultural conditions which prevailed in 1920-21 were such as would have led to severe famine fifty years before, but the establishment of a normal surplus of produce and the existence of a good system of railway communication sufficed to ward off famine without the help of government relief works.

It, will be noticed that the south-east of the province has suffered most on every occasion of scarcity, and this fact adds weight to the quantitative analysis of agricultural conditions which has been set out in paragraph 18.

Deaths have been registered in the Punjab since 1867 and births since 1880 ; the system of registration is not such as to ensure that all the occurrences are recorded, but it has undergone

|  | Rate per mille. |  |
| :---: | :---: | :---: |
| Perivd. | Birthe | Deathe. |
| 1888-1880 |  | 25 |
| 1881-1800 | .. 89 | 31 |
| 1801.1000 | + 41 | 33 |
| 1001.1010 | . 41 | 44 |
| 1011.1020 | . 46 | 37 | steady improvement, so that the earlier figures on record are probably much below the truth. The recorded birth and death-rates for the inter-censal periods are given in the margin and according to them the excess of births over deaths was greatest in the period 1881 to 1900 and was nearly equalled in the last decade. Since 1880, when births were first recorded, the number of deaths has exceeded the number of births in eleven out of the forty-one years. These exceptionally unhealthy years, with the birth and deathrates recorded in them, are shown below-


| Year. |  | Death-rale. | Birlh-rate. | Losa per mille. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1890 | $\cdots$ | 47 | 39 | Losa 8 | Fever. |
| 1802 | . | 49 | 38 | 11 | Fever. |
| 1900 | $\cdots$ | 48 | 41 | 7 | Plague. |
| 1901 | - | 36 | 95 | 1 | Plague. |
| 1802 | - | 4 | 44 |  | Plague. |
| 1003 1004 | - | 49 | 43 | 6 | Plague and fover. |
| 1804 1905 | $\cdots$ | 48 | 42. | 7 | Plague. |
| 1907 | $\because$ | 82 | 41 | 21 | Plague. |
| 1908 | $\cdots$ | 81 | 48 | 21 8 | Plague. |
| 1918 | - | 81 | 40 | 41 | Influenza, |

The ravages of plague for twenty years, and particularly between 1900 and 1907, constituted the most serious drain which the province has had to face since
it entered upon a peaceful history; it is to be hoped that the enormous death-rolr of 1907 narked the culmination of its attacks, and that the comparative freedom which has since been enjoyed may continue. The whole period that plague has been present in India has been one of continuous research and effort on the part of the medical profesaion'; knowledge of the disease and its causes has made great headway and, which is more important still, the people in general have learnt the simpler precautions which should be taken against it and have outgrown their earlier prejudices against those precautions.

All previous figures for mortality have been slight compared with those of the year 1918 when the country was paralysed by the influenza scourge, an account of which will be found in a subsequent paragraph. Hadit not been for this visitation the last decade would have been the healthiest on record ; the average death-rate, omitting 1918, was only $31 \cdot 6$, and though the rates recorded for the period 1868-1890 were less than this the improvement in registration must outweigh the recorded difference; on the other hand the birth-rate of 44 for the last decade is the highest on record in the province.
Past cossuses. .20. The census with which this report is concerned is the seventh taken in the Punjab. The census of 1881 was conducted with far greater detail and accuracy than the two which preceded it and is the first for which the majority of the statistics can be compared with those of later date. Since then a ceusus has been held every ten years ; the administration of each has been founded on that of the preceding one and the experience gained on each occasion has resulted in all probability in each census being a little more thorough in its administrative details and accurate in its statistical results. The dates of these censuses with the name of the officer deputed to superintend the operations and the territory concerned are noted below-

| Date. | Superintendent. | Terriory. |
| :---: | :---: | :---: |
| 1st January 1855 | .. Sir Donald McLeod | .. British Territory only; including the present Punjab and the North-West Frontier Province but omitting Delhi, Hissar, Rohtak, Gurgaon, and part of Karnal. |
| 10th January 1868 | .. Mr. A. Roberts | $\therefore$ British Territory only; including the present North-West Frontier Province, Punjab and Delhi. |
| 17th February 1881 | Mr. D. J. Ibbetson | .. British Territory and the Punjab Stateb, the former including the same territory as in 1868. |
| 26th February 1891 | Mr. E. D. Maclagan | The same territory as in 1881. |
| 1st March 1901 | Mr. H. A. Rose | .. The same territory as in 1891 but with separate statistics for (1) the Punjab including Delhi and (2) the NorthWest Frontier Province. |

10th March 1911. .. Pandit Hari Kishen Kaul, The Punjab including Delhi and the
18th March 1921
Mr.b., C.I.E.
The present Punjab and Punjab States with separate statistićcfor Delhi.
The following account of the territorial changes which have occurred sincee 1855 will be of assistance if this report is compared with those of past censuses :In 1855 the Punjab did not include Hissar, Rohtak, Gurgaon, Karnal, Simla, Sheikhupura, Attock, Mianwali, Montgomery, Lyallpur and Muzaffargarh as separate districts, but did include Thanesar, Gugera, Leiah, Khangarh, Dera Ismail Khan, Peshawar and Kohat which no longer appear amongst its administrative units.

Between 1855 and 1868 Hissar, Rohtak, Gurgaon, Karnal and Sirsa were added by transfer from the old North-West Provinces ; Thanesar was abolished as a district and its area distributed between Ambala and Karnal ; Simla was recognised as a district and its administration separated from that of the surrounding Hill States. The new districts of Muzaffargarh, Montgomery and Bannu were created by rearrangement of the boundaries of Khangarh, Leiah, Gugera and Dera Ismail Khan and the first three of these ceased to be districts.

No changes of importance occurred between 1888 and 1881, but between 1881 and 1891 Sirsa was abolished and its area distributed between Ferozepore and Hissar.

In 1901 Mianwali was formed out of parts of Bannu and Dera Ismail Khan; Rawalpindi was increased at the expense of Hazara; and the districts of Peshawar and Kohat, with the remaining portions of Hazara, Bannu and Dera Ismail Khan, were removed from the province to form the new North-West Frontier Province.

In 1904 a new district of Attock was formed from parts of Rawalpindi and Jhelum, and in the same year Lyallpur was formed from parts of Jhang, Montgomery and Gujranwala. In 1909 and 1910 Muzafiargarh and Gujranwala were onlarged at the expense of Mianwali and Lahore respectively.

Changes which have occurred since 1911 are given in detail in paragraphs 2 and 3 of this chapter, and complete the history of the growth of the present limits of the Punjab and Delhi Provinces.

In addition to the changes in territory which are noted above many minor changes in boundaries, both internal and external, have occurred between the various census dates; the tables prepared at the present census show figures for 1881 and onwards, accurately adjusted for all such changes, but contain no reference to the statistics of 1855 and 1868. It is now extremely difficult to adjust the figures of these two censuses so as to apply to existing administrative divisions, but the following attempt supplies a few leading statistics which may be accepted as approximately correct. The 1855 census showed 12,717,821 persons as enumerated in British Territory ; Mr. Ibbetson worked out the 1855 population of that territory, together with that of the south-eastern districts which had been incorporated in the Punjab. after 1855, at 15,161,32i persons, a figure which was also accepted by Mr. Maclagan: This figure however includes $1,200,736$ persons in the districts which have gone into the North-West Frontier Province; of these about 218,000 were in what is now Mianwali and 991,736 in the area now lost to the Punjab ; hence the 1855 population of the present Punjab and Delhi was about $14,169,585$ persons. Of these about 597,440 were in the old Delhi District and of these again about 325,405 were in that part of the old Delhi District which now forms Delli Province.

At the time of the 1855 census a careful estimate of the population of the Punjab States was prepared and that part of it connected with the present Punjab States amounted to $3,750,606$ persons.

The 1888 census resulted in the enumeration of 17,611,498 persons, and minor territorial changes led Mr. Ibbetson and Mr. Maclagan to take 17,609,518 as the figure to compare with those for 1881 and 1891. This figure includes $1,718,200$ persons residing in the old districts of Dera Ismail Khan, Bannu, Peshawar, Kohat and Hazara; of these about 239,000 were in the area now known as Mianwali and the remaining $1,479,200$ in the area since transferred to the North-West Frontior Province. Hence the 1868 population of the present Punjab and Delhi was about $16,130,318$ and of these 608,850 were in the old Delhi District and of these again about 331,619 in the part of it which is now included in the new province of Delhi. We can now compare the total population at all seven censuses as foliows:-

| Yenr. |  | Present Punjab. |  |  |
| :---: | :---: | :---: | :---: | :---: |
| $1805$ |  | $13,844,180$ | $\begin{aligned} & 4,750,606 \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { Present Delhi. } \\ & \mathbf{3 2 5 , 4 0 5} \end{aligned}$ |
| 1868 |  | $18,798,639$ $16,938,910$ |  | 331,619 |
| 1891 | ". | 18,652,202 | $3,861,683$ $4,263,280$ | 350.499 |
| 1001. | $\cdots$ | 19,942,227 | $4,263,280$ $4.424,388$ | 372,760 |
| 1911 | * | 19,578.673 | $4,424.398$ $4.212,794$ | 405,409 |
| 1021 | - | 20,685,024 | 4.416,036 | $\begin{aligned} & 413,447 \\ & 498,188 \end{aligned}$ |

21. Accepting the figures given at the end of the last paragraph the Fuctantions
 1855 and 1868, though it witnessed the which had preceded it. The 1868 censugreat progress compared with the times which had preceded it. The 1868 census report estimates that the cultivated area the first census was en pent. bice $1855-1001$. as shown in the margin.
It is possible that the increased accuracy of records at each census, at any rate up to 1891, accounted for an appreciable amount of the apparent increase and, if this is so, the actual rate of increase has been more steady than that shown by the figures.
The period between the censuses of
increased by nearly 32 per cent. in the thirteen years; the only perennial canal which was open at the time of annexation was the Western Jumna which then irrigated some 625 square miles in Karnal and Delhi ; by 1868 it was irrigating 750 square miles whilst 470 more were irrigated by the Upper Bari Doab which had then been open for eight years; inundation canals irrigated rather over 500 square miles at annexation and 800 by 1868. Between 1855 and 1868 the number of miles of railway open to traffic rose from 32 to $468 ;{ }^{\circ}$ and in the latter year there were 760 miles of telegraph line in operation and an annual delivery of ten million letters within the province.

This peace and progress was naturally favourable to the increase of population and, though there was a severe famine in 1860, it is not surprising that the annual rate of increase which amounted to $1^{1} 09$ in British Territory should be higher than any that has been recorded since.

In the 1891 report it will be seen that the increase between 1855 and 1868 is given as 16.1 per cent. and that there was difficulty in accounting for this great increase. Possibly much of it was fictitious and due to incomplete enumeration in 1855 in the wilder districts now included in the North-West Frontier Province; the omission of that area from the figures reduces the increase to 14.1 per cent. which is not improbably great.

The next inter-censal period was one of even more marked peace and progress; great attention was paid to the construction of metalled roads and railways, the length of which had risen by 1,881 to 1467 and 1,056 miles respectively; the number of patients treated annually in government dispensaries rose from 471 to 1,368 thousand; the number of school-children more than doubled, and the post and telegraph services were enormously improved. But the initial bound with which the people of the province had recovered after their long existence amidst anarchy and oppression had reached the top of its trajectory in 1868 and thereafter was losing momentum ; cultivation increased by only 17 per cent., extension of canals progressed somewhat less rapidly than before and the irrigated area rose by only 19 per cent.; the increase in population was only half that in the previous period and was at the annual rate of 0.56 per cent.; it is probable however that the rate was greater than this up to 1878 after which followed three years of scarcity and sickness.

It is useless to discuss the rate of increase in population in the Punjab States previous to 1881 for the only record of that population is given by the estimate prepared in 1855 which did not rest on actual enumeration.

During the decade ending in 1891 the increase in population was again rapid and at the average rate of 1.01 per cent. per annum ; the aggregate increase of $10 \cdot 1$ per cent. was only accompanied by an increase of just under 10 per cent. in the area under cultivation, and, though the area irrigated by State canals rose by 64 per cent., the increase in irrigation of all sorts was very slight.

The rapid increase in population occurring in conjunction with a diminution in the rate of extension of cultivation is all the more surprising when it is noted that the recorded death-rate was 31 per mille as against 25 per mille in the previous period, and that in the year before the census was taken it rose to 39. per mille and was largely in excess of the birth-rate. It is true that material progress other than agricultural had been rapid, but this has little immediate effect on population, and the only circumstances in which the decade appears to have been more favourable than the previous period was the total absence of famine. The Census Report of 1891 ascribes the rapid increase entirely to this one feature and supports this theory by comparative examination of the rates of increase in different tracts.

The average rate of increase in the Punjab States was 1.04 per cent. as compared with 1.01 in British Territory, whilst the balance of migration during the period was from the States to British Territory ; if this migration be eliminated the annual rates come to 0.99 and 1.11 respectively. A large portion of the population of the States lives in the south-east of the province which had always been the part most affected by scarcity and famine ; in a period in which population increased rapidly on account of freedom from scarcity it is natural to expect the greatest increase in the tracts previously most liable to scarcity. A comparison of the figures for States with those of adjacent districts shows

[^2]that the greater increase was due to accident of positiors and not to any peculiar difference between the States and British Territory.

The next ten years were marked by much extension of canal irrigation and the foundation of the first of the great canal colonies. The area irrigated by State canals increased by 71 per cent. and the total amount of irrigation by 25 per cent. ; but on the other hand the extension of cultivation was practically confined to the newly irrigated colony lands and the total increase amounted to less than 8 per cent.

The limits of cultivation were being approached in the long settled tracts, and whilst famine was ceasing to be a deciding factor in spread of population its place was being taken by density and pressure on resources.

There was no actual famine during the decade but great scarcity prevailed more than once in the south-eastern districts, yet communications and distribution had so improved that this scarcity did not affect the numbers of the population and in these districts the increase was not less than in those which did not suffer.

Both the death and birth-rates showed an increase over those for the previous decade, partly due no doubt to more complete registration, but the excess of the latter over the former remained the same; there were however two bad years, 1892 and 1900, in which the deaths largely outnumbered births and the period cannot be described as healthy. It was in this decade that plague first made its appearance and commenced its long and bitter warfare against the health of the province.

With increasing density and a less rapid extension of cultivation a diminution in the rate of increase of population was natural and the drop in that rate to $0 \cdot 69$ per annum is fully accounted for by these factors.

The rate of increase in State Territory was 0.38 per annum, but part of the difference was due to migration from the States to British Territory, and if this be eliminated the rates of increase for British and State Territory come to 0.67 and 0.46 respectively. Except in Patiala, where the increase was much less than in adjoining British districts, the detailed figures are very similar for states. and districts which lie near each other.

We can sum up the principal factors in the variation in population in the four inter-censal periods which have been diacussed as follows :-

1855-68. A poriod of resilient recovery from oppression, enabling a depleted population to increase at a rate impossible under normal conditions.
1868-81. A period starting under more normal conditions allowing less but yet ample room for increase and therefore showing a declining rate, the decline in. the rate being intensified by scarcity and disease in the last few years.
1881-91. A decade free from scarcity and famine which allowed a rapid increase in a country not yet fully populated.
1891-1901. A decade in which pressure on resources began to be felt and in which extension of cultivation was almost entirely confined to tracts opened up by new canals. Colonisation was as yet so recent as to have led to no appreciable increase in population as a result of relief of pressure. Health conditions somewhat adverse.
Though these may be the principal factors it must be realised that no aumming up can attempt to do more than indicate a few which stand outamongst the multitude of conditions and fortuitous events which affect the growth of population.
22. . In connection with changes in population the decade 1901-11 was Variatons

| Year. | DEATE-RAT景 THOX |  |  | Birth-rate. |
| :---: | :---: | :---: | :---: | :---: |
|  | All oangen | Pever. | Plague. |  |
| 1901 | 35 | . 25 | 1 |  |
| 1808 | 44 | -88 | 9 | 18 |
| 1808 | 49 | 20 | 8 10 | 48 |
| 1904 | 419 | 18 | 10 | -42 |
| 1005 | 47 | 18 | 20 | 42 |
| 1900 | 86 | 180 | 17 | 44 |
| 1807 | 61 | 80 | 80 | 14 |
| 1908 | 80 | 80 | 80 | 40 |
| 1909 | 80 | 88 | 8 | 48 |
| 1010 | 38 | 17 | 7 | 85 48 |
| 1001.10 | 44 | 24 | 10 | 41 | marked by one overwhelming in the feature rendering all others in-1011. significant in comparison, this was the terrible prevalence of disease; fever, to which the greatest mortality in the province is invariably due, was more widespread and fatal than ever. and was accompanied by epidemics of plague of great violence. The crude birth and deathrates for each year of the decade are shown in the margin and

 have a normal, the normal death-rate from fuating quantity can be said to fever may be placed at aboat 18 ; the rate rose to an unprecedented the Punjab before 1896 and rented height in 1908. Plague was unknown in its maximum intensity during thexperience leads to the hope that it reached the may eventually disappear; every part of the province except the dry tracts in the west and the hill districts in the north-east suffered severely; one of its worst features was that it caused a greater mortality amongst females than males and thereby accentuated the disparity between the sexes which has always been a feature of the Punjab, and hence not only reduced the population but affected it in such a way as to lower its reproductive capacity.

In every year of the decade except 1906, 1909 and 1910 more deaths were
 registered than births, and for the whole decade the vital statistics, which are reproduced in the margin, showed an excess of deaths over births amounting to 557,447 in British Territory alone; but, owing to migration and other disturbing causes, the census results showed an increase of 46,672 males and a decrease of only 402,979 females resulting in a total decrease of about 355 thousand. This decrease amounted to $1 \cdot 8$ per cent. of the 1901 population and was accompanied by a decrease of over 211 thousand or 48 par'cent. in the Punjab States, the most important of which are situated in the tracts most affected by the epidemics; the decrease in the Punjab as a whole amounted to 2 per cent. and was accompanied by a decline from 854 to 817 in the number of females to a thousand males.

In the middle of this period of disease and death occurred the terrible earthquake of 1905 which was felt almost throughout the province and was most intense in the western parts of the Kangra District; in the zone of greatest destruction this earthquake caused over 20,000 deaths amongst a population estimated at about 375,000 .

As a result of government activities material progress, though necessarily hämpered by the unfavourable health conditions, was very great. Irrigation from government canals was extended rapidly; the Lower Jhelum Canal was opened in 1901 and by 1910 had brought water to 1,166 square miles of previously unirrigated land ; the area irrigated from the Lower Chenab was increased by 602 square miles; 1,105 miles of new railway routes were opened, the most important being those serving the new canal colonies; the post and telegraph services were extended and improved.

Colonisation of the dry areas brought under canal irrigation was pushed on throughout the decade and, after the abnormal health conditions, formed the most important factor in the growth and movement of population. Whilst the population of the Indo-Gangetic plain and of the Sub-Himalayan area dropped by 8.9 and $5 \cdot 9$ per cent. respectively and whilst that of the hill tract only increased by 2.0 per cent. there was an increase of no less than 17.8 per cent. in the North-West Dry Area which includes these colonies; this was due both to immigration and to partial immunity from plague ; the increase of 655,551 persons was accompanied by an excess of births over deaths amounting to 440,648 and more than one-eighth of the population were recorded as immigrants from elsewhere at the census of 1911.

The colonisation, being entirely provincial, had no direct effect upon the total population of the province, but indirectly, by transferring persons from
congested to sparsely populated tracts, it must have encouraged its growth; by chance it also encouraged its growth by removing persons from districts which were afterwards most affected by disease to tracts where it was less severe. It is impossible to isolate the various factors affecting the growth of colony population, but that the "natural increase" is accelerated in the newly colonised regions appears to be indisputable from a consideration of the position of the Lyallpur District, which consists entirely of canal colony, in the following groups selected from the census statistics of 1911-
(a) Districts in which the greatest increase in population occurred between 1901 and 1911-
Lyallpur 45.5 per cent., Shahpux 29.8 per cent., Jhang 21.1 per cent., Multan 14.7 per cent.
(b) Districts in which the proportion of immigrants per mille of total population was greatest in 1911Lyallpur 660, Delhi 245, Shahpur 211, Lahore 211.
(c) Districts in which the birth-rates were highest in the decade 1901-10-Jhang 78, Gujranwala 48, Lyallpur 47, Sialkot 46.
(d) Districts in which the death-rates were lowest in the decade 1901-10
Dera Ghazi Khan 25, Lyallpur 26, Mianwali 29.
(e) Districts in which the proportion of children under ten years of age to persons between 15 and 40 years of age was highest in 1911-. Mianwali y0, Lyallpur 85, Montgomery 84, Jhang 83.
(f)

Districts in which the proportion of children under ten years of age to married women between 15 and 40 years of age was highestin 1911-
Lyallpur 229, Montgomery 227, Mianwali 222, Jhang 220.
That Lyallpur comes very near the head of a list of twenty-eight districts (Simla has been omitted as being abnormal) in lists $c, d, e$ and $f$ indicates very clearly that in colony tracts the reproductive power of the

| Inorease per cent. in Lyallpur |  |  |  |
| :--- | :---: | ---: | ---: |
| by age-groupe. |  |  |  |
| Total | $\because$ | $\because$ | 8.8 |
| $0-10$ | $\because$ | $\because$ | 21.8 |
| $10-16$ | $\because$ | $\because$ | 0.6 |
| $15-40$ | $\because$ | $\because$ | $8 \cdot 2$ |
| $40-60$ | $\because$ | $\because$ | $2 \cdot 1$ |
| 60 and over | . | $\because$ | 10.3 | population is higher than elsewhere ; allowance must be made for the facts that plague was not so prevalent in Lyallpur as in many districts, that colonists include many of the most virile of the population, and that the proportion of aged persons amongst them is small ; but on the other hand the colonisation of Lyallpur had mainly taken place before 1901 and the marginal figures show that most of the increase during the decade was by natural reproduction and not by the immigration of persons in the middle periods of life.

The fact that the Shahpur District which may be taken as typical of the new Jhelum Colony, appears high up in lists $a$ and $b$ but not in $c, d, e$ and $f$ confirms the general conclusion; that district was so newly colonised in 1911 that the population had not had time to show the effect of the new conditions in which it lived. It can be concluded that in the decade 1891-1900 the colonisation of the Chenab Colony effected a movement of population but had not begun to affect the increase of population, and that in the decade 1901-10 the Jhelum Colony showed the same feature whilst the Chenab Colony was beginning to take effect on the increase of population whilst losing its influence on the movement thereof.

The result of a declining population in a province which was beginning to feel the effeot of density of population in its settled tracts, associated with Government extension of irrigation facilities, is illustrated by the curious figures for extension of oultivation and irrigation shown below-


The increase in area irrigated through government agency was almost nullified by the decline in other sorts of irrigation.

The new canal irrigation was largely in tracts which had previously been unculturable (we have already noted that the Lower Jhelum Canal irrigated 1,16B square miles and that that of the Lower Chenab was extended by 602 square miles, all of which had been practically desert waste before), and hence was necessarily associated with new cultivation; yet the total increase in cultivated area was less than the increase in area irrigated by State canals, showing that, outside the colonies, cultivation must have-remained practically stationary.

The figures suggest two rather contradictory conclusions ;-that diminution of labour by disease and emigration resulted in contraction of effort, and that cultivation in the old districts had already been extended so far that it could go no further ; the first indicates a body of labour only just sufficient to cultivate the land, the second indicates a pressure of population on resources. The history of previous periods however all goes to show that the latter is the correctinference, and the former may be largely discounted on the ground that 1900 was an exceptionally dry year in which all wells were worked to their utmost capacity.

The public health and agricultural progress of the decade form gloomy subjects, and it is a relief to turn to the brighter picture afforded by the economic aspect of the peoples' life and the extension in trade and industrial effort.

The harvests of the decade were, on the whole, above average, prices fluctuated considerably but showed a marked rise above those of previous periods; wages rose practically. in proportion to prices, so that consumers did not sufier whilst producers flourished. The position of the agricultural community was strengthened by the passing of the Land Alienation Act of 1901 and at the same time a growing interest in co-operative credit societies which sprang up in districts acattered throughout the province led to a great improvement in the economic position of those who joined them.

The average wages of agricultural labourers and of artisans in towns are shown in the inset table and compared with the average price of wheat; there being no material on which to base an index number, the purchasing power of

wages has been shown in wheat which, being a common food and a staple which tends to regulate the price of a large number of other commodities, helps to indicate the real fluctuations in wages.

The number of factories employing twenty or more operatives rose from 132 in 1900 to 443 in 1911; both the volume and value of imports and exports was more than doubled in the decade; towards the latter end of the decade there was a boom in company promoting, and although most of the companies were unsound or even fraudulent their flotation showed the growth of a more enterprising spirit amongst those with capital and indicated that there was scope for more healthy enterprises.
23. The decade opened in hopeful circumstances; two years had gone by in which the general health had been good and promised a freedom from the epidemics and heavy mortality which had marked the previous eight years; a succession of satisfactory harvests, high prices for produce accompanied by a rise in wages sufficient to cover that rise, and a rapidly increasing export and import trade had left both the agricultural and trading communities in a condition of prosperity; the presence of capital and a desire to utilise it was indicated by the rapid expansion of joint-stock enterprise, and a real step forward in industry had been taken and had resulted in the number of factories doubling within the space of ten years. The terrible wave of disease had left a diminished population with a reduced capacity for reproduction, but on the other hand had been most severe in the more densely populated tracts and had helped to equalise the distribution of the people ; the opening of canals in the deserts of the west and the colonisation of the areas commanded by them had gone far to relieve the pressure in the districts from which the colonists had been drawn, whilst in those parts which had been first colonised the population was increasing rapidly and exhibited a: marked increase in vitality.

Unfortunately the first autumn crop of the decade was a bad one, but it was succeeded by a good crop in the following spring, so that on the whole the first year was un average one ; it was succeeded by two years of fair harvests and the fourth year of the decade 1914-15 produced bumper crops at both seasons. This period was one in which the public health was excellent, the death-rate was low, and the birth-rate increased each year showing the marvellous recuperative powers of the pgople whose fertility had suffered much as a result of the widespread fever epidemic of 1908. During the first three years of the decade the exports from the province increased at a very rapid rate and were associated with a rather smaller increase in imports resulting in the balance of trade turning in favour of the province ; joint stock enterprise continued to boom and, though a large number of companies failed, there was a great rush to register new companies of all natures.

This wave of good health, prosperity and enterprise now receiven a check: The boom in company promoting came to a sudden end ; the majority of ventires had been unsound from the start and were doomed to failure, and in 1912-13 a large number of fraudulent provident societies were wound up; in the following year there was a banking crisis and ten banks failed, to be followed by nineteen more in the next year; thereafter joint stock enterprise declined, its unsound nature having shalken the faith of the would-be investor.

The outbreak of war in August 1914 was accompanied by less disturbance in the life of the province than might have been expected; its one immediate effect was to reduce the amount of exports and imports but it had little effect on prices till 1917; though the people of the Punjab responded magnificently to the call for reoruits and added lustre to their ancient martial traditions in every war area, and though the reality of war was brought home to every village throughout the province, the direct effect of the war on population statistics is too small to be traceable.

In 1915 a severe outbreak of plague put an end to the period of increasing good health and vitality and the year showed a rising death-rate associated with a declining birth-rate ; the harvests of $1915-16$ were both of them bad, the production in the province was no longer able to nullify the effect of the war on prices and in 1917 commenced a period in which prices rose too rapidly to allow the economic system of the country to adjust itself and in which distress and hardship made itself felt. The strain on the railway systems of the country resulted in a dislocation of communications affd markets, and to some extent the province reverted to its condition of earlier dajs in which local variations in production had undue effect on local prices.

Political disturbance, engineered from Germany and America, in the early daps of war had produced a feeling of restlessness and the economic pressure enhanced this feeling and provided a fertile field for the dissemination of political propaganda of a virulent anarchic type.

Disastrous harvests in 1918-19, and the unparalleled loss of life which accompaniod an epidemic of influenza in the latter part of 1918, brought natters to a climas; open mutiny had to be quelled by force in the spring of 1919 and left an
aftermath of racial feeling accompanied by industrial unrest resulting in strikes and open opposition to authority．

Good harvests in 1919－20 proved insufficient to stay the upward rush of prices，and a general failure of crops in 1920－21 created a previously unknown position in which the margin of export proved insufficient to regulate prices which therefore became dependent upon local supply and demand and soared to heighte hitherto unknown，－so high that wheat was actually imported into India from Australia in spite of the heavy freightage charges．

The decade closed amidst a general gloom contrasting strongly with the cheerful circumstances in which it had opened ；in that gloom however there were yet signs of better times to come；the population was showing a recovery from the effects of the influenza unequalled anywhere else in India；the agricultural com－ munity had weathered the storm with remarkable buoyancy and a magnificent spread of co－operative endeavour had placed large numbers from amongst it in a position to reap full benefit from any improvement in conditions；trading returns were increasing rapidly in value if not in bulk and joint stock enterprise，cleansed by the failures of the earlier years，was beginning to make slight progress on sounder lines．

24．The Punjab，with its courageous and head－strong Sikhs of the plains， its determined Musalman fighting races of the Salt Range，its disciplined and steadfast Dogras of the foot－hills，and closely associated as it is with the cheerful and pugnacious Gurkhas of Nepal，has long been known as the Sword－Arm of India．These elements in its population with many others，some of whom had already been tried and tempered in the furnace of war and some who had not， all combined to add further meaning and point to that name during the long struggle in which the British Empire had to call upon its resources in men and material to the uttermost limits of its boundaries and outposts．

On practically every front in Europe，Asia and Africa the Punjabi was at some time or another to be found fighting and laying down his life in a struggle of which he but dimly realised the meaning；in his distant home－country his relations were training and rendering themselves fit to join him，all sections of the people were contributing in service or cash towards the success of the venture in which he was engaged，and the countryside itself was raising produce and even surrendering the capital improvements it had collected in times of peace in the same great cause．

At the census of 1911 the number of men enumerated in the province who were employed in the Imperial and Indian State Armies were 65,283 and 9,375 res－ pentively，these numbers including reservists and men on leave in the province；it was independently ascertained that there were at that time，apart from reservists， 94，701 Punjabis serving in the Imperial Army；of these 23，310 were stationed in the Punjab，69，173 in other parts of India and 2,218 outside India．

At the beginning of 1915 there were over 103,000 Punjabis，of whom 86,967 were combatants，in the Indian Army；during the war no less than 395，493 men were enlisted in the province and the total number who served in the army during the continuance of war was only just below half a million．Detailed figures for districts and States are reproduced below by the courtesy of Mr．M．S．Leigh from whose war history they have been abstracted；they are inserted here，not as a tribute to the magnificent efforts they illustrate，but as statistics showing the distribution of the martial races in the Punjab and throwing some light on the monetary resources of its inhabitants as shown by their contributions to objects connected with the war－

| Distriot or Stato． |  |  |  |  |  |  | －诺 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | 168 | 8，290 |
| Hiasar | $\because$ |  |  | 134 118 |  | 3,046 6,245 | 18，400 | 692 | 102 109 | 2，418 |
| Rohtak | $\because$ |  | 124 |  | 2，481 | 20，181 | 314 | 169 | 1，484 |
| Gutgron | $\cdots$ |  | 134 |  | 638 | 6，819 | 67 | 131 | 2，440 |
| Ambala | $\because$ |  | 121 |  | 1，755 | 10，254 | 315 50 | 173 24 | 6，124 |
| Aimla | ． |  | 72 |  | 217 | 2，213 | 6 |  |  |


| Diutrict or 8tate． |  | 高畐 <br> 号： <br> 트․億夏总我咅 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 823 | 129 | 815 |
| Kangri $\quad \because \quad \because$ | ${ }_{153}^{123}$ | 5，708 8,808 | 21，163 | 791 | 114 | 1，366 |
| Hophiarpur Jollundar | 138 | ${ }_{8,288}$ | 16，404 | 672 | 177 | 3，827 |
| Ludhions ．． | 90 | 8，995 | ${ }^{23,341}$ | 622 | 180 | \％，909 |
| Perozepose ．． | 186 | 2，224 | 20，538 | 325 |  |  |
| labore ．．${ }^{\text {－}}$ | 182 | 1，501 | 10，800 | 322 | 306 | 15，417 |
| Amritar | 1152 | ${ }_{5}^{5,328}$ | 23，500 | 804 802 | 229 | 2，415 |
| Gurdhapur－ | ${ }_{168}^{144}$ | 2,305 2,709 | 16，339 | 450 | 69 | 1，733 |
| Bialkot Gajranwals | 168 | 1，643 | 14，843 | 271 | 225 | 2，136 |
|  |  |  | 27，335 | 672 | 83 | 1，016 |
| Gujrat | 129 | 2，834 |  | 210 | 277 | 1，742 |
| Bhabpur | ${ }^{108}$ | 8，652 | 31，881 | 980 | 203 | 1，104 |
| Jhelum | 90 | 8,624 | 36，202 | 1，338 | 213 | 3，921 |
| Attook $\quad \because$ | 84 | 2，849 | ${ }^{18,881}$ | ${ }_{187}^{383}$ | 104 269 | 1，169 |
| Minnwall | 68 | 1，169 | 5，000 |  |  |  |
| Montgomery | 89 | 14 | 3，002 | 25 | 130 | 1，229 |
| Lyallpur ．． | 149 | 338 | 8，266 | 102 | 109 <br> 105 <br> 105 | 6，479 |
| Jhang $\quad$－ | ${ }_{188}^{88}$ | ${ }_{39}^{48}$ | 4，700 | 16 | 176 | 2，990 |
| Multan $\quad \because$ | ${ }_{95}$ | 18 | 2，042 | 6 | 118 | 649 |
|  | 88 | 10 | 1，047 | 8 | 65 | 612 |
| BRITIEH DIETRIOTS | 8，367 | 80，140 | 423，008 | 11，208 | 8，171 | 86，941 |
|  |  |  | 1，268 | 7 | 8 | 19 |
| Pajanad $\quad \because$ | 3 | ． | 450 |  | 50 | 234 |
| Kalda | 10 | ． | 1，014 | 3 | 138 | 363 |
| Loharu | 3 | 6 | 378 | ${ }_{4}$ | ． 7 | 35 |
| Nahan ．．．． | 28 | ．． | 1，207 | 32 |  | ${ }^{37}$ |
| Mandi $\quad . \quad$－ | $\stackrel{29}{9}$ | $\because$ | 1，124 | ${ }_{3}^{8}$ | 196 | ${ }_{94}$ |
| Sukot | 48 | 271 | 6，014 | 115 | 1，108 | 1，401 |
| Kapurthala $\quad \because$ | 12 | 178 | 3，934 | ${ }_{61}$ | 1，870 | ${ }^{1} 336$ |
| Faridkot $\quad \because$ | 28 | ${ }_{88}$ | 2，759 | 45 | 672 | 1，789 |
| Ohambe | 22 |  | 499 | 27 | 269 | 384 |
| Patiala ．．． | 248 | 3，888 | 37，020 | 780 | $\stackrel{8,232}{2318}$ | 4，500 |
| Jind ． | 46 | 1，283 | 8,673 | 311 | $\xrightarrow{2,013}$ | 1，150 |
| Nabhs ${ }_{\text {Bahamalpus }} \quad .$. | 48 131 | 1,086 3 | 7，000 $\mathbf{4 , 0 8 5}$ | 184 | ${ }_{611} 894$ | 11，535 |
|  |  |  |  | 1，586 | 16，943 | 26，028 |
|  |  |  |  |  | 372 |  |
| total punjab | 4，014 | 86，867 | 498，569 | 12，794 | 22，486 | 112，969 |

Close on one－eighth of the total number of males of military age joined the army ；in Rawalpindi and Jhelum Districts more than one man in every three served with the colours during the war．Contributions to war funds and war loans amount－ ed to thirteen and a half crores or to over five and a half rupees per head of popula－ tion．

The indirect effects of the war have been roughly indicated in the preceding paragraph and will be treated more fully in the succeeding paragraphs which denl with several phases of the provincial life which were materially influenced by war conditions．

It comes as a shook to the imagination to compare the mortality directly caused by the war with that due to natural causes；though war casualties were amongst the pick of the population they were numerically insignificant when contrasted with the death－roll caused by the slightest of epidemics；indeed it is undoubtedly true，as observed by Mr．Leigh，that the war saved more lives in the Punjab owing to the collection of men in cantonments where the ravages of influenza in 1918 were met by efficient medical precautions and remedies than it wasted on the field of battle．It is possible that the absence of so large a proportion of the able－bodied from their homes indirectly affected the population by lowering the birth－rate，but so many of these men were able to visit their homes on leave that the effect was not great enough to be discoverable from statistics．With regard
to its effect upon the numbers of the population the war is an almost negligible factor of a decade which it itself will render unique in history as long as civilisation lasts.

Redation Batween Vital
Statistles and statisticu
Cengus Census
Rosults.
25. We have already had to refer to vital statistics, and, before discussing those for the last decade in detail, it is necessary to examine the theoretical relation between them and census results and to try to estimate the extent to which reliance can be placed on their accuracy. The system of registration of births and deaths, which is the basis of the vital statistics, was fully described in the Census Report of 1911 and need not be discussed at length; suffice it to say that it depends on periodical reports made at police stations by petty village officers. The illiteracy of the majority of the individuals responsible for the reports combined with the difficulty of ensuring any effective check on the accuracy of their reports renders muny omissions possible but does not lead to the registration of any events which have not occurred, and it is therefore probable that the statistics show too few births and deaths; on the other hand the ratio of error by omission is probably much the same from year to year and from district to district, hence in normal times the vital statistics should give an accurate comparison of conditions in different places and at different times. On the whole, deaths are more widely known than births and possibly the vital statistics tend to omit more births than deaths, in which case they lead to an expectation of a larger population than is revealed by an ensuing census, as was the case in 1911 ; on the other hand severe epidemics, such as the influenza epidemic of 1918, form occasions on which it is impossible for the village officer to keep accuunt of the deaths which are occurring on every side, and in some localities they may carry off all those officers whose duty it is to make and receive reports; a priwri the : number of deaths registered during such epidemics may be expected to be far less than those which actually take place.

There is no satisfactory way of comparing vital statistics with census results for areas subject to fluctuating migration; using the term native to indicate a person born and enumerated in the area concerned, the following diagram shows immediately that the solution of the problem is impossible :-


We have figures for the first two quantities on the left and for the first three quantities 'on the right of the diagram; each of the seven lines shows the origin and goal of an unknown number of persons; in mathematical language we have seven unknowns connected with five known quantities hy only five equations; there is no one correct solution to such a problem and hence to correlate vital statistics with census figures we must import various assumptions as to the nature of the stream of migration. great wave of migration entirely altered the constitution of the population of any tract and that a return wave occurred before the census of 1921, then the vital statistics refer to persons who were in the tract neither in 1911 nor in 1921 and hence have no connection with the census figures.

Subsidiary T'able $V$ at the end of this chapter contrasts the increase in the actual and natural populations of all districts with the excess of births over deaths
during the decade, that is, with the natural increase ; but before that table can be of any use it is necessary to understand how far the three sets of figures should agree if they were absolutely accurate, and I therefore explain the connection between them below:-The increase in actual population exceeds the natural increase by the excess of immigration over emigration in the decade.

The natural population of 1021 equals the natural population of 1911 plus all births in the district minus deaths amongst persons born in the district. But the deaths amongst personsborn in the district equal the derths in the district minus the deaths amongst immigrants plus the deaths amongst emigrants. Hence the increase in natural population exceeds' the natural increase by the excess of deaths amongst immigrants over deaths amongst emigrants.

To compare the figures we want, in the first case, to know the excess of immigration overemigration in the decade, and in the second case, to know the excess of deaths amongst immigrants over those amongst emigrants ; neither of these quantities are known and neither of them can be calculated from the figures available.

As a matter of fact the two equations which have been mentioned are identical:-the immigration during the decade equals the immigrants enamerated in 1921 minus those enumerated in 1911 minus the deaths amongst immigrants; similarly, the emigration during the decade equals the number of emigrants enumerated in 1921 minus those enumerated in 1911 minus the number of deaths amongst emigrants. If we substitute these equivalents in the first equation it reduces itself to the second equation.

We can however establish a direct connection between the census figures and the vital statistics provided we assume that the stream of migration is constant and also assume some reasonable death-rate as being applicable to migrants.

The death-rate in the Punjab has averaged 36.2 per mille during the last decade, but 44.7 of the deaths have been amongst children of less than five years of age so that the death-rate amongat the remainder has only been 20 per mille. Most of the migration of the P पnjab is within the province and the migrants include few children of ténder age, hence it is reasonable to assume a general death-rate of 20 per mille amongst them.

With this general death-rate one fiftieth of the immigrants present in 1911

| 810 |
| :---: |
| 830 |
| 850 |
| 870 |
| 8900 |
| 900 |
| 930 |
| 950 |
| 900 |
| 000 |
| 0,000 | die each year and at the end of the decade only four-fifths of them survive. Of 1,000 new immigrants coming in during the year 1911-12 ten die in that year and twenty in each of the nine remaining years so that 810 survive at the end of the decade ; of 1,000 new-comers in 1912-13 ten die in that year and twenty in each of the remaining years so that 830 survive; and so on. This out of 10,000 new immigrants who come in during the decade only 9,000 survive as shown in the margin.

The immigrants in 1921 are made up of the survivors of those present in 1911 and of the survivors of the new immigrants who came in during the decade, hence the number of immigrants enumerated in 1921 equals foar-fifths of those enumerated in 1911 together with nine-tenths of those who have come in since that year. Hence the number of immigrants of the decade oan be calculated from the census figures and in an exactly similar way the number of emigrants during the decade can also be calculated.

The excess of immigrants over emigrants during the decade has been caloulated according to this method for every district and state and the results are entered in column 11 of Subsidiary Table IV.

But, as we have already seen, the total increase in any district is made up of this excess and of the excess of births over deaths; hence we can calculate the excess of births over deaths from the census figures alone and compare the result with the numbers actually recorded.

As the systam of registration precludes the possibility of more births or deaths being recorded than actually occur, any error in the vital statistics must be in the direction of showing too few; and if calculation from the census figures shows a greater excess of births over deaths than the recorded figures the error must be in the number of births recorded and vice versa.

The inset table shows the corrections that must be applied to the vital statistics in order to make them agree with census results, provided the assumptions on which the calculations have been based do not vitiate the argument; but before we can accept these corrections we must see how far those assumptions are justifiable. The assumptions that have been made are: -(1) The death-rate amongst migrants is about 20 per mille; (2) the same number of immigrants come in and the same number of emigrants go out every year; and (3) once an immigrant comes to a district he does not leave it and an emigrant never returns.

The first assumption is based on general grounds and it is safe to assume that the deathrate amongst migrants is not far from 20 per mille; for the sake of argument let us assume the impossibly high death-rate of 40 per mille amongst migrants and work out the result; selecting a few districts at random we find that in Attock the recorded deaths should be increased by 14.9 instead of 16.6 per cent.; in Multan by 6.8 instead of by 5.5 ; in Kangra by 3.1 instead of 5.2 ; whilst in Shahpur the recorded births should be increased by $17 \cdot 4$ instead of by 25.4 . The result of assuming an impossibly high death-rate is to alter the conclusions but slightly, hence the result of 20 per mille not being an absolutely correct death-rate for migrants will affect the results very slightly indeed. In other words the first assumption scarcely affects the accuracy of the result.

Now take the second assumption ; by assuming that the migration was constant we found that nine-tenths of the migrants of the decade survive at the end of it; if all the migration occurred directly after the 1911 census then fourfifths of them would survive, whilst if it all occurred just before the last census the whole of them would survive; in other words, the difference caused in the figures in column 11 of Subsidiary Table IV would have to be increased or decreased by only one-ninth even if the whole migration took place in 1911 or in 1921, hence the difference necessary in them on account of the slightly fluctuating nature of migration must be very slightindeed.'

The third assumption however leads us further astray as much migration is temporary; if an immigrant both arrives and departs during the decade he has no effect at all on the statistics; if however he was enumerated as an immigrant in 1911 his subsequent departure is equivalent to an unrecorded death. Similarly a man who both emigrates and returns during the decade does not affect the calculations, but if an emigrant enumerated in 1911 returns during the decade his arrival is equivalent to an unrecorded birth in the district.

The third assumption therefore affects the accuracy of the result in districts in which the immigrants and emigrants recorded in 1911 were largely temporary migrants and have since returned to their homes.

Having analysed the effect of the assumptions on which they are based wo can now examine the results. At the head of the table are districts in which either (1) the deaths have not been fully registered, or (2) immigrants in 1911 have since returned to their homes. Amongst the districts at the head of the list are Attock, Lyallpur, Jhelum, Gurdaspur, Jhang, Sialkot and Muzaffargarh in all of which the balance of migration has been away from the district and probably several immigrants recorded in 1911 have since left them; in these our third assumption has probably. resulted in magnifying the correction which
is necessary in the recorded deaths. Amongst the districts at the foot of the list Ferozepore, Lahore and Montgomery are districts which have been gaining by migration and to which no doubt many old emigrants have returned, in them the correction to be applied to the number of births on record has probably been exaggerated.

On the whole our-third assumption has tended to enhance the corrections which the figures show to be necessary; yet, even as they stand, these corrections show that remarkably little error exists in the vital statistics; in only five districts out of twenty-five does the error exceed ten per cent. It has always been recognised that vital statistics are inaccurate but I have been unable to find records of any attempt to gauge the extent of the inaccuracy, I believe that this attempt establishes the fact that the vital statistics are far less erroneous than their most friendly critics have imagined.

Having, I hope, proved that the method employed does not lead to violent errors and also that the majority of the vital statistics are very close to the truth, I must give some reasons to account for the exceptional cases of Montgomery, Shahpur and Simla. In the last case this is easy for more than two-thirds of the population of this district is urban and almost entirely consists of periodic or occasional visitors; this district forms an example of the fictitious case, mentioned early in this paragraph, of an area in which the vital statistics refer to persons who were present in the district at neither census.

In Montgomery the immigrants constituted 11 per cent. of the total

| Distriot | 1 mmigranfs . |  | Emigrants. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 1911. | 1921. | 1911 | 1921. |
| Simia | 47 | 31 | 35 | 28 |
| Shahpar | 21 | 11 | 5 | 5 |
| Montgomory | 11 | 20 | 20 | 15 |
| Hisagr | 17 | 12 | 4 | 7 |
| Gujrat | 4 | 7 | 15 | 12 |
| Jholum | 7 | 6 | 12 | 16 |
| Borozopore | 21 | 19 | 14 | 12 |
| Rawalpindi | 13 | 16 | 9 | 8 |
| Arabala | 17 | 15 | 19 | 19 |
| Jlang | 6 | 4 | 16 | 14 |
| Slalkot | 8 | 7 | 25 | 27 |
| Amritsar | 12 | 11 | 22 | 28 |
| Karnal | 13 | 12 | 11 | 10 |
| Kangre Attode | 5 | 4 | 6 | 7 |
| $\begin{array}{ll}\text { Attook } \\ \text { Muzaffargarh } & \text { O. }\end{array}$ | 4 | 3. | 6 | 6 |
| $\begin{array}{ll}\text { Muzaffargerh } \\ \text { Jullundur } & \text { O. }\end{array}$ | ${ }^{6}$ | 4 | 4 | 4 |
| Jullundur | 11 | 11 | 22 | 26 |
| Honhiarpur $\quad$. | 16 | 16 | 24 | 20 |
| Lohtiarpur | 21 | 7 | -18 | 20 |
| Qurdnspur $\quad$ O | 21 | 21 9 | 12 | 13 |
| Multan | 11 | 11 | 19 | 19 |
| Mianmall | 1 | 1 | $\cdot 7$ | 7 |
| Dorn Ghazi Khan | 3 | 8 | $\stackrel{7}{4}$ | 7 | population in 1911 and noless than 20 per cent. in 1921 ; in Shahpur the immigrant proportion of the total population dropped from 21 per cent: to 11 per cent. in the decade; where the stream of migration is so great as this any assumption concerning it must lead to appreciable error and in these two districts, at least, I abandon reliance on the accuracy of the conclusions I have drawn. The existence of these exceptions renders it necessary to indicate the districts in which violent fluctuations in the proportion of immigrants at the two censuses most affect the results; this is done by the inset table in which I have tried to place those districts for which the results must be least reliable at the top. Excopt in the first three districts the fluctuations have been insufficient to affect the results materially, whilst the figures in the lower part of the table show how very constant the stream of migration must be throughout the greater part of the province and therefore support the conclusion that the results are little affected by the second assumption on which they were based.

Before leaving this subject it is perhaps necessary to meet an argument by which the whole method might be attacked, which is that the discrepancy between vital statistios and census results has been assumed to be due to errors in the former rather than in the latter. My reply to this is that census figures for total population are subject to very little error; those for immigrants and emigrants are however affeoted by birth-places being incorrectly recorded, for instance an immigrant father may give his own birth-place for every member of his family forgetting that some members were born after his immigration; the error therefore is limited to one of the four figures for immigrants and for the vital statistics and of 1921. Using the same method, but assuming that the vital statistics are correct, we find that the error in Attock would be any one
of the following :-
(1) Immigrants of 1921 should be 46,065 instead of 16,830 .
(2) Emigrants of 1921 should be 495 instead of 29,732 .
(3) Immigrants of 1911 should be 51,078 instead of 19,446 .
(4) Emigrants of 1911 should be- 3,516 instead of 28,116 .

All these errors are far beyond the bounds of possibility, hence it is reasonable to assume that the comparatively small correction in the vital statistics is the one to be adopted. Similarly in all other districts it will be found that there is either a small error in the vital statistics or an impossibly large error in the census figures, and hence it is entirely justifiable to use the census figures as a check on the vital statistics but not to invert the process.
Public Heall.
26. Except for the devastating epidemic of influenza which swept over India in 1918 and caused the largest number of deaths which have ever occurred in the Punjab in one year since any record of vital statistics has been maintained, the health of the province maintained a high general level throughout the decade.

Compared with other provinces in India both the birth-rate and the deathrate of the Punjab are high ; in 1916, 1919 and 1920 the Punjab showed the highest birth-rate in any of the ten large reporting provinces in India; in 1911, 1914 and 1915 the Punjab birth-rate was only exceeded by that of the Central Provinces, whilst in the remaining four years of the decade only the United Provinces and the Central Provinces showed higher birth-rates. In 1915 the Punjab was unfortunate in showing the highest death-rate in India, and in 1917 Bombay was the only province returning a higher death-rate; in the other eight years the Punjab has stood third on the list three times, fourth twice and seventh twice, whilst in 1920 it took ninth place.


In reading the following brief account of the health conditions of the decade, great assistance will be found from reference to diagrams numbers 9 , 10 and 11 which will be found to illustrate the characteristics of the years in a way which enables each to be regarded in association with the others:-


1911 was described at the time as an exceptionally healthy year except for the occurrence of plague, which disease contributed 8.9 to the death-rate of the year. The healthiness was mainly due to a defective monsoon which resulted in a freedom from fever which only contributed 15.3 to the death-rate and was lighter than in any previous year since 1887. There was an outbreak of cholera in the Sialkot District, but though severe for a time it was not of sufficient extent to affect the death-rate of the province to any appreciable degree. A glance at the diagram shows that the birth-rate of this year was exceeded five times in the decade and that in six subsequent years the death-rate was lower; yet at the time the birth and death-rates were described as high and low respectively, showing at once how much more favourable the conditions of health were in this decade than the last.

1912, described as the healthiest year since 1886, quite eclipsed the previous year in the brightness of its vital statistics; another weak monsoon resulted in an even further decline in the death-rate from fever, plague abated and there were no epidemics except one of small-pox. The total death-rate of 26.6 was the lowest for many years and was accompanied by the very high birth-rate of $45 \cdot 3$, due probably to the effect of three consecutive healthy years on the fertility of the population.

1913 started with a legacy from the previous year in the shape of small-pox, and this disease continued till the middle of the year causing a greater mortality than it had done for seventeen years previously ; in February it accounted for 8,551 deaths, the highest number ever recorded from it in a single month. An early and weak monsoon produced conditions unfavourable to the spread of plague which showed a mildness unknown for many years; the conditions were also unfavourable to fever, and though fevers accounted for more deaths than in the two previous years they could not be termed severe. The death-rate rose to $30^{\circ} 2$, the birth-rate just exceeded that of 1912 being $45 \cdot 4$ which was the highest recorded in the province since 1900. .

1914 proved to be yet another healthy year; the continued sequence of these had a cumulative effect on the birth-rate in each year and in this year it rose to 46.3 , the highest for any year in the decade; this rate had been exceeded only once since 1878, namely in 1899. This year marked the end of a series of years in which the fertility of the people gradually recovered after the prejudicial effect of the great malaria epidemic of 1908. In this year the mortality from both fevers and plague increased, and though neither of these were heavy they showed an appreciable effect on the total death-rate which rose to 32.0 .

1915 was a bad year in comparison with those preceding it ; heavy rain in March and April delayed the hot weather and produced conditions favourable to the flea, the chief disseminator of plague, and a severe epidemic of this disease resulted ; in respect of other diseases the year was a healthy one. The total deathrate rose, entirely on account of plague, to 36.3 and at the same time the birth-rate dropped to 43.6 .

In 1916 a heavy and prolonged monsoon caused an increase in malaria, and more than half the deaths of the year were caused by fevers. In other respects however the year was a bright one; plague was less than it had ever been in the Punjab since it first made its appearance in the province, in fact in July the province was declared to be free of plague for the first time for twenty years. The total death-rate dropped to 30.7 and the birth-rate rose to $45^{\circ} 6$ being the highest recorded in any province in India.

In 1917 heavy rainfall in April and May followed by a monsoon which gave much rain from June right on into October, produced conditions in which an epidemic of fever was inevitable; from September onwards malaria was rife and the epidemic was the worst since 1908. Plague on the other hand was very light and the year was the lightest small-pox year on record. The birth-rate reached practically the same figure as in the previous year, but the death-rate rose owing to the fever epidemic to 37.9 .

The first nine months of 1918 shewed little indication of the dreadful visitation of disease and death which swept the province in the closing months of the year. Plague was severe in March and April, but otherwise all diseases were less active than usual; it is true that two epidemics of influenza appeared in August and September, the first in Lahore, Simla and Amritsar, and the second universally spread over the province from Gurgaon to Attock; but the influenza was of a mild form and caused inconvenience but no alarm, in fact the death-rates in
these two months were the lowest during the year. But in October influenza of a most malignant type spread over the whole countryside, and the death-rate for the month leapt up to 13.9 per mille against a normal average of $2 \cdot 8$; in the next month it increased to the staggering figure of 34.2 and in December declined to $7 \cdot 0$ against a normal average of $2 \cdot 9$.

The next paragraph deals with this outbreak of malignant influenza and in this review of the years of the decade suffice it to say that the death-rate for the year rose to $81 \cdot 0$ whilst the birth-rate dropped down to $39 \cdot 6$; population which; according to vital statistics had been increasing rapidly and steadily throughout the decade, now fell within the short space of three months to very little more than it had been at the end of 1913 five years previously. Though the outbreak lasted but three months, the death-rate for the year rose to the highest figure on record, and that for November to a figure incomparably higher than had ever been recorded before in a single month.


1919 proved to be a very healthy year; small epidemics of cholera and small-pox formed unpleasant features but did not prevent the death-rate from dropping to the lowest on record since 1912. A very short-lived monsoon resulted in little fever, and plague was light. The low death-rate was mainly the result of the absence of fever and plague, but it is a matter of speculation how far that absence was due to the weeding out of the weaklings by the awful mortality of the previous year.

There was no recrudescence of the influenza though a few cases were reported and caused anxiety to the medical authorities, but the disease left its mark upon the year in the shape of an exceptionally low birth-rate. It is noteworthy however that the low birth-rate of 40.3 returned in the Punjab was yet the highest returned by any province in India; and that the death-rate of 28.3 was exceeded by eight out of the other nine large provinces; which two facts illustrate the marvellous recuperative powers of the population.

1920 was again a healthy year ; there was little rain except for some unusual falls in May and there was little fever. The Punjab again took pride of place in India in respect of its birth-rate of 42.9 , which, though low, was considerably in excess of that of the preceding twelve months; and again its death-rate of $\mathbf{2 8 . 6}$ was exceeded by six other provinces.

To sum up, the decade may be described as an exceptionally healthy one with the exception of the one appalling outbreak of influenza in 1918 ; in a series of particularly good years 1915 and 1917 stand out as less healthy than the rest owing to epidemics of plague and fever respectively. This series of good years has resulted in a high birth-rate, which however was brought down with a rush in 1918 and has not yet reached its former level though it has improved in each of the subsequent years.

At the end of the decade there were most cheering signs of a rapid recovery after the desolating events of 1918; the death-rate was exceptionally low and though the birth-rate was naturally at a low ebb after the exceptional mortality amongst young adults in 1918 it was yet improving; both in respect of its birth-rate and death-rate the Punjab was comparing most favourably with other parts of India, and renewing its depleted population at a greater rate than any other province.
27. Rumours of the existence of influenza in the Punjab arose in July of 1918, but no cases were definitely reported till August when the disease appeared in recognisable form in Simla, Lahore and Amritsar ; the disease was then in a mild form with very low case mortality and caused no anxiety ; it was more prevalent. amongst Europeans than Indians. This light epidemic died out and was succeeded by a second in September which was of much greater extent and spread throughout the length and breadth of the Punjab; butit too was of a mild variety and caused few deaths. The mild form of the disease in both epidemics is illustrated by the fact that the death-rates in August and September were lower than the average for those months and were less than in any other months of the year.

In October the disease appeared for the third time ; it was now in a malignant form and was allied with a very fatal type of pneumonia; by the middle of the month it had spread throughout the plains of the Punjab and reached the hill districts soon after. It appears to have been spread mainly by returning military units, post office and railway employees and general travellers; the infection was extremely rapid, the period of incubation being rather less than two days.

From the middle of October to the middle of November the state of the province beggars desciption. Hospitals were choked, dead and dying lay by the sides of the roads, burial grounds and burning ghats were strained beyond their capacity and corpses lay awaiting burial and cremation. Terror and confusion reigned supreme, the postal and telegraph services were disorganised, and a harassed and depleted medical service struggled valiantly but ineffectually to cope with the disease. During this period large numbers of the educated classes earned the gratitude of the sufferers by devoted self-sacrifice and social service, whilst medical students throughout the province rendered every assistance within their power.

The disease proved especially fatal to young adults including women of child-bearing age, and was said to single out pregnant women more than others. It was capable of treatment, and even elementary knowledge of simple rules of
health would have rendered it far less disastrous; as far as can be ascertained the case mortality was rather under five per cent. amongst Europeans, about six per cent. among In dians of the higher classes who were ableto obtain medical attention, and anything over fifty per cent. amongst the Indians of the countryside who had no knowledge of the treatment to be adopted and could not obtain medical aid. In towns though the medical staff could not attend all cases, they were able to do a great deal more than in rural tracts by the publication of advice as to simple precautions and expedients, with the result that the mortality in urban areas was only 36 per mille as against 51 per mille in rural areas.

During the firgt five years of age males were more subject to attack than females, butabove this age the mortality amongst females was much in excess of that amongst males; the greatest mortality was amongst persons of 15 years of age and upwards each succeeding age group after this showing a greater death-rate from the disease than that below it. This is clearly shown by the marginal figures which show the death-rate for each group amongst both males and females.

It must be noted that no separate returns of deaths by influenza were prepared at reporting stations; in its various phases the malignant type resembled sometimes pneumonic plague and sometimes relapsing fever; it was almostinvariably returned under the head of fevers, and separate figures for it have been compiled by the medical authorities by deducting the normal number of deaths in each month from the total recorded during the epidemic ; this method was no doubt rough and was more likely to result in minimising the number of deaths than in exaggerating it for it is probable that during the epidemic the mortality from other fevers was less than the normal for the time of year. It is, however, not from misclassification so much as from failyre of the registration system that we may expect errors to exist in the returns prepared for influenza; with the countryside being devastated by the scourge it must have been impossible for village chaukidars to give in accurate reports of the number of deaths; it is extremely probable that a great deal of the mortality never found its way on to the death registers, and that the vital statistics grossly underestimate the number of deaths caused by the epidemic. As far as the statistics can be trusted, the incidence of the death rate in the different districts of the province is given below-


The mortality was heaviest in the south-east of the province, but there is some doubt as to the figures for Gurgaon as in that district there was an epidemic of relapsing fever going on concurrently with the influenza and it was impossible to separate the figures for the two ; the hill districts were affected least, and it may be noted that it was in these that the epidemic appeared and disappeared latest.

By the end of November the influenza was rapidly disappearing in the plains, but it was nearly a month later before the hill districts were free. Though the epidemic died out as quickly as it appeared, and did not recur in the last two years of the decade, it left behind it a population depleted of its young adults and its effect on the birth-rate. will probably be traceable well into the next decade.

The diagrams which illustrate the preceding paragraph show far more clearly the effect of the epidemic than any description can do; note for instance the enormous rise in the death-rate of 1918 and the sudden drop in population in the midst of a period of continuous and fapid increase as shown by diagrams 9 and 10 ; and, more striking than all, note the course of the death-rate by months over the whole decade as shown in diagram number 11.
28. It has nften been said that the spread of canal irrigation is accompanied connection by a deterioration in the health of the people, due to the conditions of canal- irrigated tracts being favourable for the production of malaria. In paragraph 62 of the 1911 Census Report this drawback of canal irrigation was made the subject of comment, and a diagram was inserted to show the connection between it and fever mortality; in examining that diagram I have failed to see that it supports. the theory that it is said to illustrate.

The theory is an important one and I have gone into the available statistics in great detail, but can find nothing in support of it; it is however so widely accepted, that I insert a diagram illustrating one of the many ways in which I have attempted to test it. The basis for the fever mortality figures in this diagram are those for rural tracts only, and by omitting the figures for 1918 from the totals of the decade .I have eliminated the influenza epidemic, which spread without any relation to irrigation ; separate figures for malaria are not available but it constitutes the principal disease amongst those tabulated as fevers. For irrigation figures I have chosen those given in the Season and Crop Report for 1918-19 as they appear to be representative for the decade as a whole.


The diagram shows at a glance that there is no obvious connection between canal irrigation and fever; six widely irrigated districts have a yery low fever deathrate, the most widely irrigated of all is exceptionally free from fever. Only two widely irrigated districts have high fever mortality, whilst two more have a mortality close to that for the province as a whole. Mianwali and Ambala, with practically no canal irrigation, suffer severely from fever; Lahore, Shahpur, Lyallpur and Ferozepore with widespread canal systems are remarkably free.

Moreover in those irrigated districts which do suffer severely from fever there are special causes for its prevalence, which, though they arise from canal irrigation, are not neceseary concomitants of it; these districts are, Gujranwala, Karnal, Multan and Amritsar.

In Gujranwala, Karnal and Amritsar the presence of water-logging has long been recognised as inimical to health and its eradication has been the subject of much thought and endeavour ; in Multan, surrounded by rivers, there is a very large area of irrigation by inundation, which leaves water lying on the surface far longer than irrigation from perennial canals. If these four districts were omitted from the diagram, the majority of irrigated districts would be left congregated at the bottom of it, almostindicating that canal irrigation is beneficial in combating fever; but I certainly do not put this forward as a theory and I limit my conclusions to the negative assertion that statistics show no connection between fever and canal irrigation except when accompanied by water-logging.

The introduction of canals may lead to an increase of fever, but does not bring an increase sufficient to render the tract more liable to fever than tracts where canals are unnecessary.
29. The following statement in which sown and matured areas are shown as percentages of the average sown and matured areas for the decade and failed condititions or as percentages of the average sown and matured areas for the decade and failed the Decade. areas as percentages of the sown areas, gives a rough idea of the nature of each harvest and the result on the total produce for each year of the decade.

This statement together with diagrams numbers 7 and 8 which illustrate

| Year. |  | Kharif. |  | Habi. |  | Tolat. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Bown. | Failed. | Sown. | Failed. | Matured. |
| 1011.12 | . | 69 | 31 | 111 | 14 | 93 |
| 1912.13 | . | 108 | 24 | 94 | 18 | 99 |
| 1013.14 | $\cdots$ | 111 | 24 | 00 | 10 | 89 |
| 1914.16 | . | 112 | 18 | 115 | 7 | 122 |
| 1915-16 | . | 81 | 27 | 100 | 24 | 84 |
| 1910.17 | . | 118 | 10 | 111 | 10 | 118 |
| 101718 | $\ldots$ | 111 | 19 | 122 | 11 | 123 |
| 1918.19 | . | 78 | 41 | 70 | 10 | 74 |
| 1919.20 | . | 110 | 17 | 101 | 10 | 110 |
| 1020.21 | . | 104 | 36 | 78 | 28 | 75 |

 this paragraph should be referred to as the note on each of the years of the decade is read and will then be found to reflect most of the characteristics of those years. The scales of the two diagrams should be carefully noted, otherwise they will give a wrong idea of the relative importance of spring and autumn crops; for in order to show the variations in the latter, they have had to be shown on a much larger scale than the spring crops.

The decade opened disastrously; there were no early rains in 1911 and kharif sowings were very much restricted in consequence and covered a smaller area than in any other year of the ten; this was in one way fortunate for an intense drought which lasted from the middle of June till the latter end of August caused very heavy failure.

The canals stood the strain upon them very well, but irrigation on their lower reaches was scanty; and the water in the rivers was so low that many inundation canals failed to function at all; in freely providing water for fodder crops the Government canals did good work and saved thelives of thousands of cattle, for fodder scarcity was acute.

Most unusually heavy falls of rains occurred on October 26th and continued for some four weeks; entirely changing the agricultural outlook and enabling the people to attempt to recoup
their losses by sowing spring crops on a larger area than usual. A wet January raised hopes of a record spring harvest, but extreme dryness in the next two months dashed these hopes; showers in April saved the wilting crops and the resulting harvest was well above normal.

The result of the miserable kharif and good rabi was a total of matured crops for the year only 7 per cent. below average.

1912-13. A wet April assisted the sowing of cane and cotton; a weak and fitful monsoon which arrived rather lateand ceased earlier than usual, was not favourable to kharif crops, but nevertheless the sown area was above average. Irrigated cotton did particularly well, as. it usually does in years of little rain, and the season also proved favourable forcane; other kharif crops though showing a marked improvement over the previous year were not good ; failure amongst bajra and jowar was. extensive and led to a scarcity of fodder in the ensuing cold weather.

The early cessation of the monsoon led toreduced rabi sowings, and an exceptionally dry October and November createdrather a gloomy outlook, but later on there were plenty of showers and an average crop resulted.

1913-14 was another normal year without specially marked characteristics; the early part of the year was wet and led to increased kharif sowings, cotton and jowar were both sown in much larger quantities than usual. The early part of the monsoon produced copious precipitation but August was an exceptionally dry month and the monsoon withdrew completely in September. Cotton and cane did remarkably well, but jowar and bajra failed badly; the harvest was in general good in the west but poor to bad in the south-east; this accounts for the low outturn of jowar and bajra which are more extensively grown in the south-east than elsewhere; their failure again led to cold weather fodder scarcity in this part of the province. In spite of the early cessation of the monsoon, which interfered with the working of inundation canals, the heavy rains before August left the ground so moist that in the west the rabi sowings were in excess; but elsewhere they were restricted and the sown areas and produce of the spring staples fell off considerably.

The year 1914-15 was marked by an early monsoon which gave excessive rain in July and again in the latter part of September, but suffered a prolonged break in August. Sown areas were again above the average but there was a
decline in cane and cotton as the ground was dry at the time these two crops had to be put down, whilst the low price of cotton in the previous year also tended to prevent wide sowings. The heavy rain in July did much damage to maize, the outturn of which was poor; the south-east part of the province suffered most from the August break and once again the jowar crop was a bad one ; bajra which was more advanced at the time of the break did not suffer and did better than in the previous year. On the whole the kharif crop was more successful than in the preceding year, but maize, cotton and sugar were produced in much smaller quantities.

Early winter rains combined with the moisture in the soil from the downpours of September encouraged wide rabi sowings ; more rain than usual in February and March were favourable to the crops, and, except for rather unsettled weather at harvest time, the season was particularly good and resulted in the largest sown and matured areas ever recorded; a noticeable feature of the season was the enormous rise in the production of gram, this due to the fact that extension of sowings are almost always in unirrigated lands as the cultivation of irrigated lands is not subject to much fluctuation.

Two fair years and a good one had placed the fatming community in a strong position when 1915-16 opened, and it was fortunate that this was so for it turned out to be a trying year with two bad harvests.

The country was dry at the time of kharif sowings and very small areas were brought under cultivation in unirrigated tracts; a scanty and ili-distributed monsoon, which was 41 per cent. in defect in the aggregate, caused widespread failure amongst all crops; the Himalayan and Sub-Himalayan tracts however escaped the general misfortune ; all crops except maize showed a great falling off in sowings, and all except rice, maize and sugar faired badly and produced little, the three exceptions being crops which are most widely grown in the two tracts which escaped the general failure of the monsoon. Cotton sowings were restricted even more than others, the continued low price caused by war conditions prejudicing this crop.

A thoroughly bad lkharif did not destroy the optimism of the farmers, and, in spite of the bad monsoon, two periods of rain in September enabled them to sow rabi crops almost up to the normal extent. The sub-soil water was low, rivers were low and canals were running under difficuities; all depended on. the winter rain and this proved to be very scanty with the result that failure was very heavy, practically one-quarter of the sown area failing to mature at. all whilst the outturns on the matured areas were unusually poor.

The year was a trying one, but the peasantry stood it well thanks to their prosperous condition when it opened ; in the south-east, which had failed to participate to the full in the good fortune of the previous three years, the pinch was felt most and some slight distress made itself felt.

Conditions looked gloomy when 1916-17 opened, but some rain in June improved matters and helped cotton and cane sowing. The monsoon started in the latter half of July and gave very heavy precipitation throughout August; it alackened off again in September and finished up by giving very heavy rain in the beginning of October; it was very much more heavy and prolonged than usual. Kharif sowings leapt pu, maize which had been widely sown the previous year.showing less increase than others, and cotton also did not share to the full in the extension. The heavy rains proved beneficial to the kharif crops, but were rather too heavy for jowar whilst the cotton crop was a very variable one ; in the result excellent yields were given by all crops except jowar, and all except this and maize and cotton showed a very much greater production than in the previous year; this undoubtedly proved the best autumn cropping season in the decade. The heavy monsoon left conditions excellent for the rabi sowings, which did not fall far short of the records of 1914-15; all rabi crops shared in the widely extended sowings, particularly gram; yields were good, but that of wheat was moderate and the total produce of this crop did not show so much increase as might have been hoped from the extension in sowing.

The year which followed, 1917-18, was a curious one full of contradictory features. The early spring was dry but rains in April and May led to an extension of cotton and cane sowings; the monsoon started on the 2nd June and was continually active till it withdrew on the 25th September; its early start, and its extreme violence caused floods and prevented kharif sowings; and the area
under all crops except cane and cotton fell considerably. The season was one of such continuous rain that all crops except cane suffered more or less severely, and the produce of all except this one crop fell.

The continuous rain gave no opportunity for careful tillage before the rabi , sowings, but the moisture in the ground was so excessive that a large area of very hastily prepared land was sown and the total area under crops was far in excess of that in any other year in the decade; a dry winter did no harm and the amount of failure was small, hence the matured area for the crop was very far above normal-so much so that in spite of the poor kharif the cropped area of the year was a record beating even that of 1914-15. Yields however were not good, due partly to the fact-that the heayy monsoon and its accompaniment of a severe epidemic of malaria prevented careful preparation of the ground and also the usual attention which is paid to the growing crops. As regards total produce the year was most disappointing; all kharif crops except cane showed a marked decline, , and though the produce of rabi crops was far above normal only those of gram and barley exceeded the figures registered in 1915 and again in 1920, in both of which years the matured area was less than in this year. On the whole the year was good but disappointing, huge areas of matured crops producing yields of very moderate amount.

1918-19, the black year for India owing to the wave of disease which swept the country at the end of 1918, was alsa $\cdot \&$ black year agriculturally for the Punjab. Light rains in March and April assisted the sowing of cane and cotton, but the areas did not reach those of the previous year. The monsoon gave no rain except fitful showers in June and was much in defect throughout July; it improved during the first half of August and then gradually withdrew completely ceasing at the beginning of September, and altogether it only gave half the normal rainfall. As a result of the drought kharif sowings were very much restricted and the sown crops suffered badly, the produce of all crops except cotton fell off very markedly, that of bajra being particularly low. October and November were hot and dry, rivers were low, inundation canals started running late and left off early, and even the perennial canals carried much less than the usual supply; conditions were thus most unfavourable for rabi sowings and the influenza epidemic still further restricted them so that the sown area dropped to only 79 per cent. of its average for the decade, but as the major portion of this area was irrigated there was not a great deal of failure except in the south-east of the province.

Both harvests were very poor, the kharif approximating to the wretched one of 1911 whilst the rabi was the worst, except for that of 1921, in the whole decade ; the matured area for both harvests together was the lowest recorded during the decade. The only crops which did not do badly were cane, cotton and maize, most of which were either irrigated or grown in the Himalayan and Sub-Himalayan tracts which were not quite so rainless as the rest of the. province.

By the end of the year the agricultural community in the Ambala Division and in the Dera Ghazi Khan District were reported to be suffering from the adverse conditions ; cattle had suffered throughout the province; war conditions and a closure of goods traffic owing to railway strikes still further affected the situation and there were few breaks in the general gloomy outlook. Prices were high owing to the reduced cropping and an iticreased demand for export, but there was insufficient surplus grain for this to benefit the smaller proprietors.

In 1919-20 the monsoon gave heary rain for two months commencing in the middle of July, and there was showery weather both before and after it. October and November were unfortunately dry and restricted the rabi sowings, but all sown areas of both seasons showed large increases over the preceding year though they were not abnormally high; failure was lighter than usual and the yields were very much better.

Excessive heat in the early summer melted the snows rapidly and the monsoon, though short, was heavy; the rivers therefore ran at a high level. and the inundation canals had full supplies.

The figures for area indicate a good year not far above normal, but reference to diagram number 8 shows that the ultimate. produce of both harvests was exceptionally good; probably this was the best year of the decennium though
the figures for area disguise the fact and point to 1914-15, 1916-17 and 1917-18 being better.

1920-21 marked a return to the agricultaral conditions of 1918-19, rain was lacking throughout the year and canals suffered from the lowness of the rivers. The monsoon set in late in June but was very weak except in the south-east and in the Himalayan and Sub-Himalayan tracts; throughout the next three 'months it was greatly in defect and it was followed by a rainless antumn.

The kharif sowings were not restricted as much as might have beeni expected, but failure was very heavy ; the rabi sowings were the lowest recorded for over ten years and the small area sown had a higher percentage of failure than in any other year. The rabi crop was the poorest recorded for many years and the kharif was comparable with those of the bad years 1911, 1915 and 1918.

The year was one of mild distress; resort had to be made to suispensions and remissions of revenue and to the granting of concession carriage rates forfodder ; famine test works were opened in Hissar, and, though they proved to be unnecessary, this fact marks a nearness to famine conditions which had long been unknown in the Punjab.

The decade since the last census thus consisted of four good years, three moderate ones and three bad ones ; but it is useless to attempt to cumpare cropping and produce returns with those of former decades as cultivation in the Punjab has not yet attained a state of equilibrium and its constant extension renders the comparison of the results of years separated by any considerable period useless as a test of the conditions of such years.

The decade has been free from famine, and straitened conditions have only been experienced in the south-east which did not share equally with the rest of the province in the good years.

The diagrams attached to this paragraph do not indicate that the fluctuations in cropping are making any progressive change, all can be traced to the nature of the seasons and to temporary price conditions ; no crops'except cotton appear to be gaining at the expense of others, and even with cotton this tendency may be due to the fact, that prices were low at the beginning of the decade and improved rapidly towards the end rather than to any permanent disposition to sow it more extensively.
80. The figures for the year 1920-21, when compared with those for 1910
 given in paragraph 22, show Sultusfor or a decline of 17 per cent. in cultivated area associated with an increase of 30 per cent. in irrigated area, but examination of the figures for -intermediate years shows that this comparison does not give a true indication of the changes which have occurred. The actual figures for each year of the decade, together with those which have already been given for 1900 and 1910, are shown in the inset table; they show that thè comparison of figures recorded at ten year intervals is not a satisfactory gauge of progress ; fluctuations from year to year totally ecclipse progressive changes.

It is at once evident that years of favourable rainfall when the sown area is most extended are also years in which irrigation, and particularly that from wells, is restricted; and that well-irrigation is most widespread in dry years when the sown area is smailest; the years 1917-18, 1918-19 and 192081 indicate this very clearly. 1900 was a dry year and 1910 was one of good rainfall; the odmparison of figures for those years tends to magnify the increase in cultivation and decrease in welli irrigation; this consideration supports the
assertion made in paragraph 22 that by the end of the decade 1901-11 cultivation was nearing its limit of extension rather than that labour was scarce.

If we examine the general trend of the figures throughout the last decade, rather than the figures for the first and last. years, it is evident that irrigation from state canals has actually increased by 22 per cent. in the last ten years, that the irrigation from private canals and from wells has remained practically unchanged though varying from season to season, that irrigation from other sources shows a slight regular decrease, and that the total cultivated area does not show any regular extension sufficient to be traceable amidst the fluctuations due to seasonal differences.

During the decade the area irrigated from state canals has permanently increased by about 2,400 square miles without any corresponding increase in the cultivated area of the province ; this striking fact is not due to the separation of Delhi with its small area of cultivation which is roughly about 350 square mules and is insufficient to affect the figures.

We have seen that by 1920-21 the three canals opened during the decade


- Lower Rari Doabb $\quad \rightarrow \frac{1,332}{2811}$ from the Upper Chenab is of land which was previously uncultivated, it is clear that the cultivated area in settled tracts has, on the whole, declined.
Each decade has shown a rapidly decreasing rate of extension of cultivation outside the areas rendered cultivable by new irrigation; in the last three decades this has been very marked and it is evident that the province has now reached a stage when it can expect no increase in the area under cultivation except by the opening of new canals or the adoption of a different system of agriculture.

Though practicable schemes for still further extending the canal systems of the province are in progress, the problem of conveying available water to available wastes is becoming more and more complicated; the time is already approaching when the whole of the cold weather supply in most of the great rivers will be used for irrigation; storage of the excess waters of the rainy season does not hold out a prospect of providing a means for extending irrigation at a rate bearing comparison with that of the last seventy years; even if all engineering difficulties are overcome the wastes suitable for cultivation under irrigation are not inexhaustible.

Of the three great obstacles to increase in population-war, pestilence and famine-the first was removed directly British Government was established, the last was gradually removed by the growth of communications and of an agricultural surplus, and the second will be reduced as knowledge of even the simplest rules of hygiene spreads amongst the people; all now depends on the maintenance of the agricultural surplus; its existence has depended on the extension of cultivation which in the past has been rendered possible, in cultivable areas, by settled conditions and, in uncultivable areas, by the construction of canals; the first possibility of extension has now been exhausted, the end of the second is in sight; the system of agriculture must be changed so as either to raise more produce from the present cultivated area or to bring under cultivation areas which are at present regarded as uncultivable.
Pricas, Wages and Agricultural Debt.
31. There is a. very distinct difference between the prices realised by
farmers at harvest time and the subsequent prices realised in the larger grain markets ; the former reflect the nature of the seasons more, and the demand grain export less, than the latter.

The following short account refers to harvest prices:-In 1911-12 the prices of all grains remained high, being assisted by a brisk demand for wheat for export, but that of cotton dropped considerably; in the next year cotton improved whilst wheat went still higher. In 1913-14 cotton and sugar, of which there had been good crops, declined in price ; wheat rose slightly and the coarser food grains went up on account of scarcity.

1914-15 was an excellent year for the agricultural community; prices were high except for cotton which suffered owing to exports failing off on account of the war ; jowar and bajra fetched high scarcity prices, but, as these are mainly grown for home consumption, this told rather against than for the Punjab peasant proprietor. The next year was one of poor crops and prices rose all
round, that of cotton rose briskly as a demand for export once more asserted itself; in this year complaints about the high wages demanded by agricultural labourers began to be heard and scarcity of labour was, perhaps for the first time, a real handicap to the farmer.

In 1916-17, with the return of good harvests, prices showed a tendency to drop all round, but cotton and wheat were not affected; the year was one which fully restored the position of the people which had been somewhat shaken in the previous year.

A general slight increase in prices occurred in 1917-18 but the outstanding feature of the year was the price of cotton which soared above anything previously known ; the next year was marked by high prices caused by poor cropping and an increased demand for export, but there was insufficient surplus grain for this to benefit the smaller proprietors.

In 1919-20 excellent harvests following after a bad year resulted in a general drop in prices, but wages continued to rise rapidly; the bad harvests of 1920-21 forced up prices once more, and they attained the highest general level reached during the decade.

Turning from harvest prices to those obtaining in the principal grain markets of the province which are shown in diagram No. 16, we find a very rapid and practically continuous increase throughout the decade.


The outbreak of war in 1914 caused a sudden rise in prices at the end of that year and this continued the next year and was enhanced by a poor monsoon. In 1016 wheat exports were severely restricted,- prices hitherto unknown creating a position of grave anxiety, and a big check ensued ; in the following year exports were again restricted but military requirements necessitated a considerable export of wheat and gram and the prices of these two started to rise again. In 1918 and 1919 poor production combined with export for military purposes caused a further rise and in the latter year record prices were reached; in 1920 exports were still under control and good harvests resulted in an abatement of price.

How long the phenomenally high prices reached in the decade will continue after the adjustment of trade following the conclusion of the war it is impossible to foretell, but there is little prospect of prices ever falling to pre-war level and much of the rise must be permanent. The miserable crops harvested in the last year of the decade have since caused the unparalleled position in which India has had to import wheat from Australia and local prices have broken loose from the control aftorded by export.

Regular wage censuses have been held in the province in 1909, 1912 and 1917; amongst other statistics available in the reports are the normal daily wages of urban labour in some of the principal cities and the'normal daily wages of
rural labour in every district; it is difficult to estimate average wages obtaining in the province from these data but an attempt has been made as follows:-where the normal wages vary between two limits the mean of these has been taken for the unit concerned; in towns this has been multiplied by the number of people in the category concerned and .the average worked out accordingly; in rural areas the average of district mean wages has been taken without any attempt to allow for the varying numbers of people concerned in each district. The results are probably of sufficient accuracy to allow comparison of the three sets of wages and have been incorporated in the table reproduced below:-


The low wages of rural labour and especially those of plotghmen are mainly due to the fact that they are usually accompanied by some payment in kind. In calculating the figures in the last three columns the price of wheat has been taken as Rs. 3-12-0 in 1909, Rs. 3-3-0 in 1912 and Rs. 4-4-0 in 1917.

Variations in wages always show a drag over those in prices, and as the price of wheat was lower in 1912 than in 1909 and 1917 it is natural to find that' wages in that year had a comparatively high purchasing value. Without going into minor variations which the accuracy of the figures does not warrant; the table shows that wages have been increasing rapidly and that, except in the case of one class of urban labour, the increase during the period 1909-17 more than : compensated for the rise in prices.

Comparison with the figures given in paragraph 22 shows that urban wages and also the wages of unskilled agricultural labour had rather less purchasing: power than in the previous decade. It is unlikely that the immense rise in prices since 1917 has been fully reflected in wages and it may be expected that the report of the wage census to be held in 1922 will show a drop in the purchasing power of all classes of wage.

Up to about 1907 the purchasing power of wages had risen steadily, but since then there appears to have been a slight drop and it may be anticipated that the next enquiry will reveal a distinct drop. Turning back to paragraph 10 it is clear that this involves increased gains to the non-working landowner but does not necessarily lead to greater profit for the employer of urban labour ; this being so it is reasonable to expect that in the near future agricultural wages will rise at a greater rate than industrial wages.

It is interesting to examine the effect of a decade of rather unfavourable

| Year. |  | Area gut of cvery 10,000 acres of cultivated land which was |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | סim |  |
| 1011 | 11.9 | 68 | 88 | 44 | 129 |
| 1912 | 12.0 | 74 | 91 | 54 | 123 |
| 1013 | 11.7 | 70 | 90 | 66 | 107 |
| 1014 | 11.5 | 88 | 102 | 44 | 249 |
| 1015 | 11.6 | 83 | 87 | 40 | 180 |
| 1016 | 11.5 | 82 | 76 | 38 | 216 |
| 1017 | 11.4 | 78 | 67 | 35 | 227 |
| 1018 | - 10.8 | 60 | 69 | 35 | 252 |
| 1010 | 10.0 | 72 | 90 | 48 | 184 |
| 1020 | - 10.7 | 90 | 120 | 49 | 275 |
| Moan | . 11.4 | 78 | 89 | 46 | 104 | seasons and of rapidly rising prices and wages on the economic position of the farmer; the marginal table indicates that that position has undergone slight but steady improvement, the proportion of land under mortgage has steadily fallen, more land has been freed from mortgage than has been mortgaged, and the price of land has risen considerably.

The fact that the first three columns do not agree is due to the fact that the proportion of the total land which has been cultivated has varied from year to year; all the transactions involved in the table covered uncultivated as well as cultivated land.
32. The beginnings of the co-operative credit movement amongst the co-operative people of the Punjab were described in paragraph 55 of the last census report.

In 1911 there were four main types of society, two primary and the
other two secondary. ? The usual primary type
 was an agricultural credit society devoting its energies to advancing money to its members at favourable rates to enable them to pay off old debts and to survive the temporary strain of unfavourable seasons; of these there were then 1,074 societies scattered over twenty-three districts. Original nembers owned shares in the societies which they subscribed in instalments over a period of ten "years after which the shares were returnable; three-quarters of the profits were divisible amongst members as non-returnable shares and the remaining quarter-was indivisible and was to be utilised to form a reserve fund; other sources of working capital were loans and deposits from both members and non-members and from other societies. of the same type or from the central banks and unions which will be described below. The available working capital of these 1,074 societies.is detailed in the margin and consisted of about 304 lakhs; of this sum $9 \frac{1}{4}$ lakhs were in the form of loans by one society to another and formed part of the working capital of both the loaning and borrowing society, and therefore were counted twice over; it however cannot be called capital of the societies as a whole and omitting this item they worked with a capital of about 21 lakhs of which 16 were owned .eithor directly or indirectly by the members and 5 came from outside sources.

This type of society has retained premier place till the present time; certain modifications have been introduced ; for example, during the year 1911 the systemof granting Government loans to societies of this type was abandoned as they could exist without this help; in 1916 all members who did not own shares in societies were struck off the rolls, these members having formerly been admitted on a nominal payment but never having been full and useful members of the societies. It was found that with members owning shares of various amounts those who held large shares welcomed high rates of interest for the sake of the profitsharing thus losing sight of the true co-operative principle, and in 1918 an attempt was made to eliminate the three-quarter divisible share of profits ; nearly all the societies formed since then have adopted the principle of indivisible profit and many of the old societies have followed suit.

In 1921 the number of "primary societies of this type-" agricultural
 credit"-was 7,605 scattered over every.district of the province and including 196,691 members; the working capital was over 216 lakhs and was made up as shown in the margin; in 10 years the capital has increased from 301 lakhs to 216 lakhs ; that part of it. which is not derived from other societies and central bankshas increased from 21 to nearly 133 lakhs and whereas in 1911
$000^{\prime}$ s omitted-

| Year. | Loans 1 | Recoveries. |  |
| :---: | :---: | :---: | :---: |
|  |  | Ra, | Re. |
| 1911 | - | 22,79 | 10,38 |
| 1912 | . | 35,10 | 16,72 |
| 1913 | '* | 62,55 | 29.16 |
| 1014 | : | 71,59 | 39,83 |
| 1015 | . | 30,04 | 30,02 |
| 1918 | $\cdots$ | 33,25 | 25,35 |
| 1017 | . | 31,58 | 33,41 |
| 1918 | $\cdots$ | 33,04 | 32,40 |
| 1010 | . | 47,40 | 38.79 |
| 1020 |  | 67,19 | 40,36 |
| 1021 | " | 82,89 | 41,72 |

only 76 per cent. was owned by members now 89 per cent. is so owned. This marvellous advance in members and resources has been accompanied by a steady increase in useful endeavour; the main object of such societies is still the creation of funds to be lent to their members and the amount of loans lent out and recovered each year is noted in the margin (each year ends on 31st July).

It is the principle of these societies to advance loans only for legitimate objects and to encourage
loans have been borrowed have been tabulated thrift. The objects for which loans representative societies from time to time; each time this has been for representative societies from time to time; each time this has been
done the results have been somewhat similar and the following figures are typical and represent the averages of 1917 and 1918 in the form of percentages of the total money given out in loans:-payment of old debt and redemption of mortgage 25 ; purchase of cattle 21 ; payment of revenue 14 ; marriage expenses 7; household expenses 7; purchase of seed 6; trade 5; purchase of fodder 2 ; payment of rent 1 ; repayment of takavi (Government loans) 1 ; and miscellaneous 11. In 1915 a very interesting summary of some of the work done revealed that the members owed about $72 \frac{1}{3}$ lakhs to the societies but that by reason of their borrowings they had paid off at least 82 lakhs of old debt and mortgage and regained possession of over 8,000 acres of land, whilst they had also accumu-Iated savings of 50 lakhs in the societies' funds. Nor did this alone represent their financial benefit, for, by reason of their greater affluence, they had been paying off many old debts from their private pockets without resorting to loans from the societies, and it is estimated that co-operators are now paying off old debts at the rate of twenty lakhs per annum. Apart from the main object of creating funds from which to provide credit the societies brought into being a corporate feeling which could be directed by the leading members with the result that at various times the $\dot{y}$ have launched out into other branches of work, amongst which may be noted the purchase and distribution of improved implements and of improved seed, the sale on commission of agricultural produce resulting in selection and grading of produce and encouragement to plant good seed; the corporate spirit has also led to a desire for education, funds have been provided for scholarships and for school buildings and dispensaries; the inspecting staff has received training at agricultural colleges which they pass on to the members, members themselves have sent representatives to agricultural courses, and demonstrations of scientific methods of agriculture have been arranged in the villages; it has further led to joint social endeavour in the direction of restricting marriage expenses and other extravagant expenditure, and of submitting disputes to arbitration.

These varied interests have led to the formation of societies which are not

| - . - Class. | No. | NUMBER OP MENDERS. |  |
| :---: | :---: | :---: | :---: |
|  |  | Individuals | Societics. |
| Parchase and sale | 171 | 1,537 | 1,845 |
| Production and sale | 10 | 597 | 191 |
| Arbitration .. | 87. | 10,290 | - |
| Consolidation of holdings | 60 | 1,608 | " |
| Night sohools .. | 45 | 784 | - |
| Silt oloaranco .. | 3 | 49 | - |
| Reclamation of Cho waste lands . .. | 8 | 371 | - |
| Thrift and savings | 2 | 37 | - |
| Cattle and sheep breeding | 11 | 204 | - |
| Irrigation - | 1 | 16 | - |
| Cattlo purchaso .. | 2 | 92 | -• |
| Cattle insuranco | 37 | 629 | . | primarily credit societies and which have not been included in the figures given above; figures for these are given in the margin; they are all societies of agriculturists and have all grown out of the primary form of society of which there were 1,074 in existence in 1911. The objects for which they work are indi-cated by :their titles and they are working for the good of their members in many subsidiary ways. Members of these specialised societies are probably nearly all of them members of credit societies as well, so that we must not add them to the numbers of agricultural cooperators; and taking 196,691 as the number of members of agricultural credit societies and

noting that about 80 per cent. of the societies are amongst Musalmans, we find that one in every 20 persons actively engaged in agriculture and one in every 13 agricultural Musalman workers belong to co-operative credit societies; ${ }^{*}$ and from being a benefit to a few selected progressives in 1911 the movement has become one of general application affecting the whole of the agricultural life of the province.

So far we have dealt only with agricultural credit societies and their present day descendants. The other primary societies existing in 1911 were described as urban, and of them there were eleven, four of which were purely "credit " societies,' two "credit combined with produce and sale of stores" and five "industrial" consisting of four weavers' societies and one blacksmiths'. The co-operative movement in non-agricultural circles is necessarily more varied though less extensive than

| omitted | Rs. | amongst the agricultural classes. These |
| :---: | :---: | :---: |
|  |  | movement which has led to the formation by |
| Nomborsemberi loand lond dopand deporita | :. ${ }^{1,7}$ | movement which has led to the formation by |
| Inoses from mociotioe ${ }^{\text {a }}$ |  |  |
| Cosen from contral banks |  | 57 are amongst weavers; they include 116 "credit" societies and 180 "purchase and sale" |
|  | 8,74 | societies; their aggregate capital is shown in the margin, and they have 15,371 members. |

This form of co-operation has not captured the imagination of the people whom it helps to the same extent as the agricultural credit system; many societies have been formed and have been dissolved owing to lack of interest and the true co-operative spirit; industrial societies have needed much supervision to render them successful ; but gradually types suitable to each class are being evolved and the existing societies are the results of a process of survival of the fittest and are doing an immense amount of good work ; amongst the credit societies may be mentioned societies amongst employees of the North-Western Railway, the Telegraph Department, the Punjab Civil Secretariat, the Dhariwal Mills, and of various Municipalities and District Boards, but the multiplicity of detail is too great for a full exposition here. This completes a short analysis of the primary societies and we must now turn to the secondary societies which exist to supply capital and to organize the efforts of individual primary societies ; these are of four main forms, the Contral Banks and Unions ; the Supply Stores and Supply Unions; the first two are large credit societies that transact business with the primary creditsocieties, supplying them with capital in the form of loans and accepting deposits and loans from those which have surplus capital to dispose of ; besides supplying their own capital in the cause of co-operation they pool the capital of the primary societies and enable them to help.each other in a way they could not do by -themselves.

Members of the central banks include both individuals and societies and since 1916 at least half the shares issued have been reserved for societies; on the other -hand the union is an association of societies only and has no individual members. The share capital of the central banks is transferable but not returnable and the liability is limited by shares ; these banks pay a dividend on shares whilst the profits of a union are indivisible. The rival advantages of the two forms of secondary society are difficult to estimate ; the central bank is possibly more efficient in providing loans for it controls outside capital, but on the other hand the desire for dividends may lead to an unduly high rate of interest ; the union is not affected by .the greed of profit sharers and its supervision is much more efficient. The same difference which exists between central banks and unions differentiates Supply Stores and Supply Unions; the former include individuals amongst their members and the latter do, not. The former exist only in towns and have achieved little success, societies which are members of them are leaving them and seeking to join supply unions instead ; here again the defect of the supply stores is found in the selfishness of individual members.

- These large banks and unions control a large amount of credit and have inspired confidence to such an extent that they are able to obtain large cash credits from the Bank of Bengal and other financial corporations. The progress amongst

[^3]74 punjab oxnsot riport, 1921. otap. l-Distbibution \& movemant of popunation.
central banks and unions is exhibited in the following table:-


The co-operative movement at first caused widespread opposition from the money-lending classes but it is now an accepted fact and open opposition is rare; its existence in many cases has led to a reduction of the money-lenders' rate of ${ }^{-}$ interest. The first few years of the last decade were ones of rapid expansion and enthusiasm. The financial crisis which occurred in 1913 following on the closing of the Peoples' Bank in September of that year, followed by the outbreak of war, resulted in widespread contraction of credit; the co-operative societies suffered considerably but there was no such run to withdraw deposits as in the case of ordinary banks and the Post Office Savings Bank. The period 1914-1917 was however necessarily one of consolidation rather than expansion ; the central banks in order to meet an anticipated withdrawal of deposits were unable to loan all the requirements of the primary societies; a succession of poor harvests combined with war conditions strained the banks to their utmost, and in some cases members had to resort once more to the village money-lenders. On the whole the societies survived splendidly and the lull in expansion was made an opportunity for cancelling unsuccessful societies and removing undesirable members, so that by 1918 the co-operative movement was once more expanding rapidly with a body of members purged of undesirables. Since then progress has been continuous, and much as the movement has benefited the Punjab in the past this is nothing to what may be hoped for in the future.
Joint 8tock Companies. 33. The history of joint stock enterprise during the past decade is of interest in indicating several features of the commercial and financial life of the province. At the time of the last census there was a boomin companies of doubtful character ; ignorance of business methods amongst the promoters, and still more a well-founded belief in the ignorance and credulity of those who would be their creditors and clients, led to the flotation of numerous hopeless ventures. The following statement shows the number and capital of companies in existence on the 31st March each year. It also shows similar details for the new companies registered and for companies which ceased to work in each year:-


Nota-In 1012-13 eightecn companies were transferred to Delhi and in 1014-16 one company was transferrod to Bombay; in 1918-14 ons company was transferred from Delhi and in 1918-10 one oompany from fhe North-Weat Frontier Provinoe.

It will be seen that during the first year of the decade the rush to found new companies continued and in the next two years, in spite of a large number of failures, - many new companies were founded; in 1914-15 however arrecord number of failures was accompanied by practically no new enterprise. The number of companies continued to decline until 1919, since then there has been some increase. The capital invested in these companies has not decreased at the same rate as the number of companies; in fact, since 1916 capital of all classes has shown a steady increase. The reason for this is that companies which have failed were in many cases petty concerns with small nominal capital of which very little was paid up. The companies which have survived throughout the decade have been of a more satisfactory type with a larger capital of which a far larger proportion is paid up. In 1911, of the total nominal capital of 580 lakhs, only 48 per cent. was subscribed and 32 per cent. paid up; but in 1921, of thē nominal capital of 759 lakhs, 58 per cent. was subscribed and 47 per cent. paid up. At the time of the last census an objectionable feature of joint stock enterprise was the flotation of a large number of provident societies of a fraudulent type; in 1911-12 no less than 36 societies of this type were floated whilst in the following year 27 came to grief; at the same time banking enterprise of unsound nature was rife, and miscellaneous trading companies with insufficient resources were also being floated in large numbers. In 1913-14 the existence of the unsound banking businesses ended in disaster, 10 banks with paid up capital of 19 lakhs closed their doors, amongst them the Peoples' Bank with a paid up capital of 12 lakhs ; in the following year 19 more banking companies failed and, as a result of the damage to the finance and credit of the community, 22 trading companies also came to an end. These failores were inevitable on account of the unsound nature of the companies concerned, but they were expedited by the stringency caused by war conditions and their numbers were added to on account of the greater regulation of joint stock enterprise following on the passing of the Companies Act of 1913. The effects of the crisis lasted throughout the - decade, but by 1916-17 most of the totally unsound companies had vanished and of the 80 companies on the registers 78 were reported to be engaged in active business. In this year the Trust of India, the Associated Hotels and the Banyan Trust were all floated with a large capital of which a large proportion was paid up, and in the following year these firms and the Alliance Bank of Simla, all of which are connected with one large English firm of bankers, increased their capital; the large increase of capital in these two years shown in the statement was entirely due to English enterprise and the paid up capital of Indian firms actually decreased. The next two years, though producing few new companies, were years in which the existing companies were extremely active. The year 1919-20 showed a revival of joint stock enterprise, in that a large number of new companies were formed and oapital was increased all round ; it should be noted however that the Registrar of . Joint Stock Companies stated that though there had been an increase in the number of new companies floated there was little sign of any growth of healthy joint stock

| $\because$ Nature of company. | No. | OAPITAL 0000's omittid. |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Nominsl. | Sub-scribed. | Paid ap. |
| Banking and Loan .. $\left\{\begin{array}{l}1011 \\ 101\end{array}\right.$ | 20 | 2,22,0 |  | 65,4 |
| Bankag and Loan . ${ }^{\text {a }}$, 1921 | 26 | 8,05, 6 | 2,91,0 | 2,25,3 |
| Iolurance .. $\left\{\begin{array}{l}1011 \\ 1021\end{array}\right.$ | 14 | 71,7 30 | ${ }_{16,}^{2,3}$ | 2,8 |
| Tranport .. ${ }^{1011}$ 1021 | 1 | 1,0 | 16,7 1,0 | ${ }^{6} \mathbf{0}$ |
| Tradiug and Mank- ${ }^{1021}$ |  | 0,5 | 2,6 | 2,0 |
| Practuging locturing | 8 | 80,6 | 28,5 | ${ }^{21,0}$ |
| Mills and Presess .. ${ }_{1911}$ | 34 | 1,30,4 | 36,8 82,4 | 25,6 |
| Ous sad Presses $\cdots\left\{\begin{array}{l}\text { 1221 }\end{array}\right.$ | , | 21,3 | 16,3 | 15,2 |
| Mines and Qaarrios .. $\left\{\begin{array}{c}1911 \\ 1921\end{array}\right.$ | 8 | 28,7 3 3 | 4,4 | 3,3 |
| Land and Buildings . . 1911 | 3 | ${ }_{8,5}^{3,3}$ | 3,1 | 3,1 3 |
| Bmorice ${ }_{\text {1911 }}$ | 2 | 1,5 |  | 1 |
| Broworion $\cdot$ \{ 1921 | 8 | 18,0 | 18,0 | 18,0 |
| Sugar .. $\{1911$ | 2 | 4,5 | 1,6 | 1, |
| Others .. $\left\{\begin{array}{l}1911\end{array}\right.$ | $\stackrel{2}{3}$ | 8,0 6,7 | 8,6 | 4,8 |
| $\cdots{ }^{\text {O }}$ - 1921 | 2 | 70,0 | 48,4 | 45,7 | enterprise. The marginal statement shows the nature of the companies existing in 1911 and in 1921. The most important of these are banking and loan societies. During the decade 37 new banks were started and 42 dissolved. No less than 23 were floated in the first three years of the decade whilst 29 failed in the two years 1913-14, 1914-15. Those existing in 1921 are on a much more satisfactory basis than those of 1911 ; about 45 per cent. of the nominal capital is paid up, whilst of the 42 banks which failed, less than 10 per cent. was paid up. Insurance societies, which numbered 14 in 1911 and are now reduced to 4 , included the fraudulent

provident societies which have been mentioned above; 38 societies have been floated and 44 dissolved during the decade, whilst others have now been classified under other heads. Of the 44 societies dissolved, 22 existed for less than 12 months and 14 for less than 2 years; they had nominal capital of 71 lakhs of which only 4 lakhs was paid up; the province is well rid of such questionable businesses. The number of trading companies shows a decline from 58 to 44 in the 10 years, but during that period no less than 63 companies were registered while 70 failed, indicating the unhealthy state of joint trading ventures. The decline in joint industrial enterprise is most marked; 34 mills and presses existed in 1911 whilst only 9 remained in 1921 ; this is partly due to the registering centre of several such companies being transferred to Delhi, but the Punjab returns show 24 such companies which have been wound up; these 24 companies had a nominal capital of 97 lakhs of which 29 were paid up. The existing companies have a nominal capital of 21 lakhs of which 15 are paid up and include many sound and prosperous concerns. To sum up we may say that the past decade has been one of evident disaster for joint stock effort amongst the Punjab population; the wave of optimistic investment and fraudulent flotation in the early years led to a shaking of credit and a disruption of trade from which the province has not yet recovered; joint stock enterprise is therefore a subject of distrust, which prevents it from taking its proper place in financial and industrial expansion. Though the existing companies are mainly on a sound basis many of the largest and soundest of them are not indigenous but owe their capital and management to European firms.
Trado.
34. The main trade of the Punjab and Delhi is carried on by rail and river


| Wheat | 877 | Cotton goods | . 1,059 |
| :---: | :---: | :---: | :---: |
| Raw cottun | .. 494 | Sugar | .. 446 |
| Gram and pulses | .. 492 | Metala | 261 |
| Oilseeds | .. 112 | Coal and cola | .. 139 |
| Hides and skins | $\cdots 74$ | Jute | 136 |
| Wheat flour | .. 67 | Provisions | 87 |
| Wool | .. 38 | Oils | 85 |
| Jowar and bajra | 7 | Wooden goods | 78 |
|  | . | Apparel | 51 |
|  |  | Dyes and tans | 29 |
|  |  | Spices | 27 |
|  |  | Draga | 25 |
|  |  | Net Total | 350 |

Mame dibections of Trade.

| To or from |  | Exports. | Importa. |
| :---: | :---: | :---: | :---: |
| United Provinces | . | 640 | 834 |
| Rajputana | - | 254 | 173 |
| Bombay | - | 135 | 187 |
| Sind | . | 181 | 123 |
| Bengal | - | 15 | 199 |
| Kashmir | $\cdots$ | 21 | 73 |
| Ports of- |  |  |  |
| Madres | - | - 25 | 15 |
| Bombay | * | 401 | 645 |
| Karachi | . | 1,659 | 963 |
| Calcatta | - | 181 | 496 - | with other parts of India or with foreign countries through the ports of Karachi, Bombay and Calcutta; the weight and value of the imports and exports are registered on the railways'. and at river posts, the value is in many cases arbitrarily assigned and must not be taken to be more than a rough guide. The total imports during the decade, figures showing the average net import or export of the main articles of trade, and others showing the direction of the main streams of trade are given in the margin ; all these figures are in lakhs of rupees. In the previous decade both imports and exports had more than doubled, in this decade imports have increased steadily and have again doubled, but exports have fluctuated and at the end of the decennium only exceeded their initial value by about fifty per cent. Until the end of 1918-19 exports and imports tended to vary together and the balance of trade was first on one side and then on the other, the total trade for the firsteight years showing an adverse balance of only 419 lakhs against the Punjab, an insignificant sum well within the margin of error due to unregistered trade and to the arbitrary values assigned to registered goods; in the last two years however the balance of trade was against the Punjab to the extent of 882 and 2,196 lakhs.

The registered movements of gold and silver show an annual average net import of 530 lakhs; so that as far as any record exists the unfavourable balance of trade is not met by export of treasure, and indeed it is well known that the province absorbs vast quantities of gold and silver which disappear from circulation and yet are not exported. It seems to follow that during the last two years of the decade the province was living on credit and that unless there is a
great expansion in export there will be a diminishing import in the near future.

The steady increase in imports indicates a steady increase in prosperity and in the general standard of living, they have doubled in ten years and quadrupled in twenty whilst the increase in the number of people for whom they are imported has only been about three per cent. in twenty years.

That exports have failed to keep pace with imports is due to the fact that they consist almost entirely of agricultural produce dependent in amount on the nature of the seasons, combined with the definite governmental contral on exports which was instituted during the war in an attempt to check the advance in prices of food. Every single article that has any considerable net export is a direct product of the soil, and the bitterest opponent of Malthusian principles would hesitate to maintain that a trade which doubles itself every ten years can be made up entirely of agricultural produce on the export side. The trade of the Punjab has been rendered possible in the past by the vast extension of cultivation and irrigation; it may be rendered possible for a short time in the future by further extensions and by increased yields due to the spread of more scientific agricultural methods; but the time is rapidly approaching when imports must be replaced by more local manufacture if the standard of living is to continue to rise.

The nature of the principal imports indicate the needs of society in a simple state, and also show at once the main directions in which industrialism should be directed to meet the needs of the province.

In connection with the figures for trade with particular places, it should be noted that the balance of trade with foreign countries through the ports of India is in favour of the province, whilst that with other parts of India is heavily against it. In so far as imports of manufactured goods are concerned, it is more hopeful for the Punjab that the adverse trade balance should be with India than with foreign countries, for it will be easier for it to substitute its own manufactures.

A small volume of trade passes over well defined routes leading to Afghanis-
 tan, Central , Asia and Tibet; imports and exports are registered at trading posts and the total value of these in thousands of rupees during the last decade is shown in the margin; the total amount is so small that its effect on the resources of the province is negligible, and the nature of the articles included in. it indicates the impossibility of any great expansion.

- Of the imports from Afghanistan noless than 62 per cent, have been in fruit, vegetables and nuts whilst the only other items of importance have been ghi, hides, and skins, raw wool and drugs; the exports have consisted of 25 per cent. manufactured leathergoods, 25 per cent. Indian cotton piecegoods, 18 per cent English cotton goods, and small quantities of rice and iron.
The registration of trade with Central Asia was only placed on a satisfactory-basis in 1913-14, and for the last eight years of ${ }^{-}$ the decade the principal merchandise imported and exported
was as shown on the left; the imports of raw silk and of charas are by far the most important and supply a considerable proportion of the quantities available in the provincial markets; amongst exports it is sad to note that less than one-fifteenth of the cotton piece-goods are manufactured in India.

Eighty per cent. of the imports from Tibet consist of raw wool whilst borax accounts for another eight per cent., the only other imports of any size are of live animals and salt ; the exports are negligible.

Industrial Developmeat.
35. The following table, which refers ta the Punjab and Delli together

| Nature of employment. | Percentage of total. |  | Inoreaso per contr |
| :---: | :---: | :---: | :---: |
|  | 1011. | 1021. |  |
| Exploitation of animals and vegetables | 60.0 | 50.9 | -8.7 |
| Extraction of minerals - .. | 0.1 | $0 \cdot 1$ | $-36.2$ |
| . Industry .. | 20.3 | $10 \cdot 5$ | 1.4 |
| Transport .. .. | $2 \cdot 9$ | 20. | -27.0 |
| Trade - . | $6 \cdot 5$ | $7 \cdot 0$ | 13.5 |
| Public Forco and Administration | 1.7 | 1.7 | 5.7 |
| Libersl Arts and Professions | 2.5 | $2 \cdot 2$ | $-8.2$ |
| Domestic Sorvice | $2 \cdot 1$ | $2 \cdot 6$ | $30 \cdot 5$ |
| All others .. .. | $3 \cdot 9$ | 5.0 | $38 \cdot 2$ | and has been compiled from the occupational tables for '1.911 and 1921, shows that the number of persons dependent on industry has not increased so fast as the total population and that, in consequence, the proportion of the former to the latter has dropped from 203 to 195 per mille.

As the industrial community is largely composed of village artisans, who follow their hereditary occupations irrespective of the demand for their services, very little weight can be attached to the figures and, though it is clear that there has been no effective demand for increased industrial labour, it need not be concluded that the industrial life of the provinces has suffered a reverse.

On the other hand the figures for the number of factories and other industrial establishments employing twenty or more people show a considérable advance in the organised industry of the two provinces; in 1911 these numbered 443 and employed 49,324 operatives whilst by 1921 they had increased in number to 538 and were employing 62,424 persons. - The persons employed in these establishments mainly fall within the occupational groups "Extraction of minerals" and "Industry" in which there were 1,802,752 actual workers engaged in 1921 ; hence in these particular occupations there is only one man employed in these establishments to every twenty-nine who either work by themselves or in small groups of less than twenty; the advance in factory production, though considerable, is not such as to have any appreciable effect on the population in general or the industrial community in particular.

Communtcations.
36. Owing to the war and to financial stringency the decade has been one in which the communications of the province have undergone little extension. Railway requirements in Mesopotamia and other Eastern war areas were supplied almost entirely by the Indian Railways, which depleted their staff, plant and rolling stock and even tore up some of their permanent way in a magnificent effort to meet. the necessities of the military authorities.

Economic conditions led to serious strikes on several of the railway systems of the country including the North-Western Railway which had to reduce its. services of passenger traffic and entirely discontinue goods bookings for certain periods; a serious shortage of coal, due to strikes in the mining centres and to shortage of rolling stock required to import it into the Punjab caused even more serious interruptions in traffic facilities.

With their attention entirely devoted to supplying military demands and to maintaining their home services with as little interruption as possible, the authorities could not attempt to carry out any but the mōst urgent construction within the province, with the result that only 487 miles of new branch lines were opened during the decade, whilst in 1917 the Sutlej Valley Railway from Kasur to Lodhran with 208 miles of track was dismantled to provide permanent way material for military lines. The new lines, of which those affording increased
communications in the Ferozepore, Juillandur and Hoshiarpur Districts are the most important, are shown below :-


In addition to the construction of these 488 miles of new line, the Railway system was vastly improved by the doubling of the line from Ambala to Lahore and - from Lahore to Raewind which was completed during the decade.

Between 1911 and 1920 the mileage of metalled roads rose from 2,619 to 2,037 ; the whole of the increase was in roads maintained by local authorities and mainly consists of short stretches of road serving local markets and railway stations. Little has been done to extend the system of through road communications, but a great deal of improvement has been effected on the one great road of the province; as a result of the doubling of the railway line from Ambala to Lahore the old rail $=$ way bridges over the Sutlej and Beas were abandoned and these have been converted into road bridges; a road bridge has been constructed over the Ravi to replace the old bridge of boats, and another over the Chenab at Wazirabad was under construction at the time of the census and has since been opened for traffic; works of less magnitude have overcome the temporary dislocation of road traffic which used to occur as the result' of floods in seasonal torrents which cross. the road near Ambala and other places; the Grand Trunk Road now runs without a break right through the province and traffic on it suffers. no interruption'at any.time of year.

The length of unmetalled roads has risen from 20,857 to 22,106 miles in. the same period.

In spite of the financial stringency there has been much activity on public works not directly connected with communications, and the decade is maiked.by small beginnings in the introduction of electricity. The Simla Hydro-electric scheme which provides energy to Simla and also pumps water to that station from a distance of thirteen miles was commenced in 1908 and completed in 1914 ; Lahore has been provided with electric light and energy for fans by the Lahore Electric Supply Company which started distribution of current in 1912; in Mianwali District the construction of the Nammal Dam has provided irrigation to 18,000 acres df cultivable land and has marked a new development in the irrigation system of the province; in Lyallpur an experiment in agricultural economics has been initiated by the construction of a grain elevator on American lines; in Lahore much progress has been made in the extension and construction of public buildings including hospitals and a veterinary college, and a step forward in the system of treatment of criminals has been marked by the conversion of the old district jail into a Borstal Institution where youthful offenders are afforded a chance of reclamation.

## Section V.-The Movement of the Population, 1911-21.

37. The census showed an increase of $1,309,693$ and 74,741 persons in the Total variae Punjab and Delhi respectively, being increments of 5.5 and 18.8 per cent. on their $\begin{aligned} \text { tonnsab and } \\ \text { the the }\end{aligned}$ populations in 1911.

Taking the two provinces together the numbers of immigrants and emigrants have increased by 52,713 and 1,332 respectively resulting in a total gain by migration of only 51,381 persons which forms a negligible factor in the total increase. In the Punjab $2 \cdot 5$ per cent. of the total population, and in Delhi $38 \cdot 1$ per cent., consists of imnigrants ; hence the census statistics for the Punjab illustrate the natural increase in the countryside whilst those for Delhi do not.

Figures showing how the total increase is distributed between British and
 State territory, between town and country, and between the sexes are given in the margin. Immigration accounts for the increase in Delhi being so much greater than that in the Punjab; though this immigration was mainly caused by the creation of the new capital it is large in the rural as well as in the urban area. That the rate of increase has been larger in British Territory than in the Punjab States is entirely due to the fact that much of the State territory is situated in parts of the province where the increase has been smaller than .elsewhere, it is due to locality and has no traceable connection with any difference in administration.

* Vital statistics show a slower rate of natural increase in towns than in rural. areas, and that the actual increase in towns has been so much greater than in the country must be due to a movement of the rural population towards them. The increase in the Delhi urban area is exceptional and is fully accounted for by the creation of the capital, whilst the rapid increase in the rural area is also due to immigrants attracted by the vicinity of the city and illustrates the universal fact that the countryside can and does support a larger rural population in the vicinity of large towns than elsewhere. The greater rate of increase in urban than in

| Number of pepulation. |  |  |  |
| :---: | :---: | :---: | :---: |
|  |  | 1911. | 1021. |
| Punjab | - | 108 | 115 |
| Punjab, Eritish | . | 111 | 120 |
| Punjab States | . | 92 | 95 |
| Delhi |  | 1,583 | 1,657 | rural areas in the Punjab is an entirely new feature of census statistics, for the first time the proportion of the population living in towns has increased; this new feature is shown bothin British and State territory but far less in the latter, the difference is in reality greater than the figures indicate as part of the increase in the urban population of the states is due to a mere terminological change under which the headquarters of many States have been for the first time treated as towns in the census. statistics.

In the Punjab as a whole there are now 671,285 more females and 638,408
more males than in 1911 and, though the
Namber of females to 1,000 males.

|  |  | 191. | 1921. |
| :---: | :---: | :---: | :---: |
| Punjab ${ }^{\text {c }}$ |  | 817 | 828 |
| Punjab, Britiah | . | 818 | 830 |
| Punjab Statea | . | 814 | 820 |
| Panjab Urban Area | . | 739 | 719 |
| Panjab Rural Area | . | 826 | 841 |
| Delhi .. | - | 783 | 733 |
| Delhi Urban Area | . | 752 | 672 |
| Delhi Raral Area | . | 860 | 845 | difference between these numbers is small yet owing to the previous disparity between the sexes, this constitutes an increase of $\mathbf{6 \cdot 3}$ per cent. amongst females as against only $4 \cdot 9$ per cent. amongst males. This higher rate of increase amongst females has done much to remedy the evil results of the plague in the previous decade which by 1911 had left only 817 females to every 1,000 males, and the proportion has now risen to 828. In all urban areas, except those in the Punjab States, males have increased faster than females showing that the drain of the towns on the rural population has been largely confined to male workers. Amongst rural areas that of Delhi is the only one showing a rise in the proportion of males; this is quite possibly due to the fact that the stream of migration to this partially suburban area has affected the sex distribution in the same way as it has done in true urban areas.

The change in age distribution bas been almost as striking as that in the proportion of the sexes; whilst the increase in the total population of the Punjab and Delhi has been $5 \cdot 8$ per cent. there has been a decline in the number of persons between 15 and 40 years of age associated with a very large increase in the numbers of old people and young children.

The influenza epidemic of 1918 is responsible for this change in age distribution as can be seen from the marginal table in

Death-rate of 1918 difided by the mean donth-rate of the deoade.

| Age. |  | Male. | Fomale. |
| :---: | :---: | :---: | :---: |
| 0.1 | $\cdots$ | $1 \cdot 14$ | $1 \cdot 14$ |
| 14 | . | $1 \cdot 56$ | 1.53 |
| 8-0 | . | 2.53 | $2 \cdot 61$ |
| 10.14 | . | 3.00 | 3•17 |
| 16.10 | - | $3 \cdot 67$ | $3 \cdot 80$ |
| 20-20 | - | 3.69 | $3 \cdot 75$ |
| 30.38 | $\cdots$ | $3 \cdot 42$ | 3.37 |
| 40-40 | $\because$ | $2 \cdot 88$ | 3-12 |
| 100.69 | $\cdots$ | $2 \cdot 69$ | $2 \cdot 89$ |
| Over 60 | $\because$ | $1 \cdot 85$ | $2 \cdot 00$ |
| All egea | - | $2 \cdot 18$ | $2 \cdot 26$ | which the death-rate of 1918 is shown as a multiple of the mean death-rate for the decade; in that abnormal year the death-rate amongst young children was increased by less than 50 per cent. whilst it was quadrupled amongst young adults and only doubled amongst the aged.

The plague epidemics of 1901-11 lessened the reproductive power of the population by lowering the proportion of women, this defect has been remedied during the last decade but it has heen replaced by a decline in the numbers of persons of the procreative ages. The defect observed in 1911 was one that might have been permanent, that observable in 1921 is one which carries its own remedy and will be removed by the mere passage of time; on the other hand the immediate position is. worse than in 1911 for whereas in that year every 10,000 of the population included 152 women of child-bearing age ( 15 to 40 ) it now includes only 143.
38. Subsidiary Table III shows the increase per cent. in the population of varrations. each district and state recorded at each census since 1881 ; it should be noticed that ${ }_{\text {and }}$ in Pistriess increase per cent. in population andincrease per cent. in density are identical when on Resourres used with reference to a fixed area; omission to note this elementary fact has led to some curious remarks in past census reports.

It will be my object to discover what permanent features and conditions influence the increase of population and then to discuss the temporary or fortuitous conditions which have interfered with the influence of the former during the last decade. In paragraphs 17 and 18 the pressure of existing population on existing resources was discussed at length and the districts were collected in five groups according to the extent of that pressure. The discussion was based on the static conditions of the moment, but the conclusions' can now be compared with the actual movements of population in the past with a view to determining whether they account for those movements and, if not, whether they require modification.

The following lists of districts show them arranged within these groups according to the extent to which their population has varied during the last forty years and during the last decade :-

Peromntage of mabeasm in Total population.
1881 to 1921.
1911.to 1921.

| Group 5. |  | - | $97 \cdot 7$ | Group 5 |  | $15 \cdot 9$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lyallpur |  | .. | 2,313*7 | Montgomery |  | $1{ }^{16.9}$ |
| Montgomory |  | .. | 97.0 | Shoikhupura |  | 19.8 |
| Shahpur |  | -. | 87.6 | Lyallpur |  | $15 \cdot 6$ |
| Sheikhupure |  | .. | 81.6 | Lahore |  | 13.0 |
| Multan |  | . | $60 \cdot 1$ | Shahpur |  | 11.6 |
| Lahoro |  | - | $47 \cdot 1$ | Multan |  | 9.3 |
| Jhang |  | . | 46.0 | Jhang |  | 8.7 |
| Group 4 | , | - | $30 \cdot 2$ | Group 4 |  | 6-2 |
| Forozoporo |  | . | 46.9 | Ferozepore | -. | 14.4 |
| Minat |  | $\cdots$ | 21.5 | Hissar |  | 1.5 |
| Attook |  | . | $15 \cdot 3$ | Attock |  | -1.3 |
| Group 3 |  | - | . 18.2 | Group 3 |  |  |
| Mianwali |  | $\cdots$ | 36.6 | Mianwali |  | -2.1 |
| Muraffargarh |  | $\cdots$ | 28.8 | Muzaffargarh |  | 4.9 -0.2 |
| Dern Ghazi Khan |  | - | 28.4 | Dera Ghaii Khan |  | $=0.2$ -6.8 |
| Jholum . |  | .. | $-3.6$ | Jhelum . |  | -60 |
| Group 8 |  | - | 2.8 |  |  |  |
| Rawal pindi |  | $\cdots$ | $20 \cdot 8$ | Ludhiana | $\cdots$ | 4.0 8.7 |
| Gujranmala |  | . | $7 \cdot 6$ | Rohtak | . | 8.0 |
| Rohtak |  | $\cdots$ | 4.3 | Amritsar | - | $5 \cdot 5$ |
| Amritaer |  | - | $4 \cdot 2$ | Rowalpindi |  | 3.9 |
| Qurdespur |  | " | 50 | Karmal | . | $3 \cdot 4$ |
| Sialkot |  | $\because$ | 3.6 -0.3 | Gujranwals | - | $2 \cdot 9$ |
| Karas |  | $\because$ | -0.3 -3.2 | Julundur | . | 2.6 |
| Ludhiana |  | -. | $-8.8$ | Gurdaspur Sialkot | . | 18 |
| Oroup 1 |  |  |  |  | - | 0.7 -0.2 |
| Simla |  | -. | 28.6 | Simpla | - |  |
| Gujrat |  | - | 13.3 | Simia | - | 17.9 |
| Kangra |  | . | 48 | Hoshiarpur | - | 48 |
| Gurgeon |  | $\cdots$ | 2.9 -10.5 | Kangra | - | -0.6. |
| Ambals |  |  | -10.5 | Ambals | - | -1.4 |
| $\cdot \quad$. |  |  |  |  | * | B.6. |

An examination of the figures shows at once that the increase in population during the last forty years has been greatly influenced by the pressure on resources. In the first list the only districts which appear to be wrongly grouped are Ferozepore, Hissar, Attock, Jhelum, Rawalpindi, Simla, Gujrat, Kangra and Hoshiarpur ; and five out of these nine districts can at once be eliminated for special reasons :-

The misplacement of Ferozepore is too slight to be of any significance; the increase in population of Rawalpindi and Simla is largely due to the presence of growing towns, apart from the urban population the increase in these districts has been 11.8 and - 18.8 per cent. respectively; we have already seen that the people of Hoshiarpur and Kangra depend very largely on earnings of service outside their districts, and these earnings enable the population to increase in excess of the numbers which could be supported by the resources of the districts.

The list shows that in twenty-five out of twenty-nine districts the increase in population during the last forty years has been governed by the extent of pressure on resources. Everyone would expect that pressure on resources would affect the increase of population, but the figures go further and tend to show that this one factor has actually governed the increase to the exclusion of all others.

Cause and effect are so strikingly connected that we are at once led to question the grouping of the four districts which appear to form exceptions to the general rule, Hissar, Attock, Jhelum and Gujrat. Are we to recognise these as exceptions to a general rule proved by all other districts, or are we to argue in a circle and assume that they were wrongly grouped in paragraph 18 ? Hissar, Attock and Jhelum are all marked by two characteristics;-their dependence. on rain and the inferior quality of much of their soil ; the arguments in paragraph 18 were based on statistics extending over a term of years, and it was noted that in districts where crops suffered violent fluctuations they could not support such large numbers of people as in districts where they gave the same average outturn but were less liable to fluctuate from year to year; I am doubtful as to whether sufficient weight was given to this point and therefore whether these districts should not have each been placed in the group below that in which they are shown above. As regards Gujrat I can find no reason for modifying the conclusions drawn in paragraph 18.

The increase during the last decade does not show the same striking agreement with the arrangement of districts by groups though it shows some traces of the influence of the retarding force of pressure on resources ; the same is true of the increase in other decades and it is evident that a period of ten years is insufficient for this one factor to prevail over the other innumerable influences which affect increase.

The second list indicates that during the last decade the increase has been much less than might have been expected in Hissar, Attock, Muzaffargarh, Dera Ghazi Khan, Jhelum, Sialkot.and Gurgaon; whilst in a less degree Shahpur, Multan, Jhang, Mianwali and Gurdaspur exhibit the same feature of an unexpectedly slow rate of increase ; and, on the other hand, Ferozepore, Ludhiana, Rohtak and - Gujrat show an increase in population larger than that which might be expected from their natural advantages and their previous history.
 the the health of the decade has been uniformly good except for the epidemics of plague, fever and influenza in 1915, 1917 and 1918 respectively. Apart from these the death-rates of the various districts have been mainly governed by local conditions, but these epidemics spread over the province irrespective of conditions and the additional death-rate caused by them may be described as fortuitous; their influence was a chance feature of the decade quite independent of the permanent forces which affect growth
of population. The figures in the margin show. the extra death-rate caused by these diseases in the fifteen districts where their aggregate effect was greatest; the figures show the earuss of the plague and fever death-rates in 1915 and 1917 over the normal death-rates from those diseases, and the total death-rate from influenza in 1918 all of which was abnormal.

Of these fifteen districts which suffered most heavily, nine are amongst those mentioned in the previous paragraph as showing a smaller increase than expected, but on the other hand three of them are amongst those in which the increase was characterised as unexpectedly high. The exceptional epidemics of the decade do not go far in accounting for the abnormalities in increase of population noted in the last paragraph.
40. Migration will be discussed in detail in Chapter III but a few of the rteet of conclusions which will be found in that chapter must be mentioned here in Migration on order to explain some of the features of the recent changes in distribution of the ${ }_{\text {Districts. }}^{\text {varian }}$ population. Migration must not be regarded as a cause of the changes in district population but rather as the means through which such causes operate. It has already been shown that the changes in distribution over a long period have been almost entirely attributable to pressure on resources, and, as migration has always been taking place, it follows that it too is also governed in the long run by this pressure; it is therefore unnecessary to examine the normal trend of migration in this paragraph and attention will be confined to the abnormal or temporary migration that has occurred during the last decade, such migration whilst not in itself accounting for the abnormal changes in population noticed in paragraph 38 may throw considerable light on the causes which have produced them.

The main types of migration which will be noticed as peculiar to the last decade are that due to the establishment of the canal colonies and that due to the scarcity conditions which prevailed at the time of the census.

The statistics show that a canal colony passes through five stages in its evolution ;-before being irrigated it supports a small population living in widely scattered villages or else of a nomadic nature; immediately after irrigation it receives a great influx of colonists who include the government grantees and larger numbers of persons seeking employment as their tenants and'artisans ; the grantees are selected mainly from the most congested districts but also include persons from elsewhere who have particular claims, the tenants usually accompany the grantees and their composition shows the same characteristics; after the grantees have established themselves and the pioneer work is completed many of the tenants and labourers find that the keen demand for their services shows signs of abatement and large numbers return to their original homes or, if opportunity occurs, move on to another freshly colonised tract; those who leave the colony consist mainly of those who came originally not because of severe pressure in their own districts but because of attachment to grantees coming from districts which are not overcrowded; after this exodus of superfluous tenants and of the unsuccessful colonists the population settles down to permanent residence, immigrants continue to arrive in small numbers but the old immigrants die out and are replaced by their children so that even without any emigration the number of immigrants rapidly grows less; the final stage is reached when the original stock of immigrants have all died out and the colony is inhabited by persons born within its boundaries and in this stage it ceases to bear the distinctive marks of a colony and begins to rank with the old districts in its effect on migration. Each stage except the last is temporary and the migration which accompanies it is peculiar to the time and is not a permanent feature of provincial movements of population.

The exact operation of these processes is somewhat obscured by the fact that the different colonies are not coterminous with districts, for which alone census statistics are available. Montgomery and Sheikhupura contain much land colonised during the last decade but both also include some land which was irrigated and colonised before the decade had commenced ; separate statistics for Sheikhupura before the last census are not available and it has to be considered in conjunction with Gujranwala. These districts show the first stage in the process of colonisation ; in Montgomery the excess of immigrants from the nonoolony districts over the emigrants to them has risen from 10,433 to 84,491 in the decade and allowing for deaths since 1911 probably 76,141 of the present
immigrants have arrived during the decade ; in Gujranwala and Sheikhupura the excess has risen from 74,272 to 136,172 during the decade and probably 76,287 of the presentimmigrants are of recent arrival. Part of Multan has also been first colonised since 1911, but so much of it was previously irrigated that the figures are much less striking; in it the " balance of migration," from non-colony districts has risen from 26,498 to 42,032 during the decade and the actual immigration during the decade has resulted in the presence in 1921 of 20,834 new colonists.

The next stage in colonisation is illustrated by Shahpur ; part of this had already been colonised in the previous decade and the last ten years have witnessed the process of consolidation and the exodus of superfluous tenants and labourers. The full effect is obscured because a large part of the district is not colony land and the migration to and from that part follows different laws, even so the statistics give striking proof of the theory; the balance of migration in favour of this district from the non-colony districts has dropped from 83,762 in 1911 to 38,965 in 1921, this decline of 44,797 is partly accounted for by deaths amongst the old colonists but allowing for this it is still probable that actual emigration during the decade has resulted in the enumeration of 28,043 persons elsewhere in 1921 who were inside the district in 1911.

The colonisation of Lyallpur took place before the census of 1901 which naturally revealed an enormous increase in population entirely due to immigration; the census of 1911 showed a decrease in the number of immigrants far larger than could be caused by deaths and must have been partly attributable to actual emigration; the present census shows a drop in the balance of migration from 392,374 to 322,472 which is a decrease of no less than 69,902 , yet this decrease is more than accounted for by the normal mortality amongst old colonists and it is probable that actual immigration exceeded emigration during the decade by about 9,000 persons of whom 8,573 now survive.

These statistics illustrate the three intermediate stages in colonisation, but it must be noticed that the figures for the Jhang district do not fit in with the rules equnciated, this district is however exceptional in many ways and the migration between it and non-colony districts has been too small to form the basis of any conclusive arguments.

These remarks apply to the migration between the six true colony districts and the non-colony districts; the figures for migration between the six districts themselves are even more striking; during the decade Shahpur has lost large numbers to Gujranwala, Montgomery and Jhang, and a few to Multan, whilst practically no movement has taken place between it and Lyallpur; Lyallpur has lost to every district except Jhang ; Montgomery, Sheikhupura and Multan have all gained heavily from the older colonies whilst amongst themselves the only considerable movements have been from Montgomery to Sheikhupura and from Multan to Montgomery.

The actual figures for the gain in the population of 1921 due to the migration of the decade are as follows:-

|  |  |  |
| :--- | :---: | ---: | ---: | ---: | ---: | ---: | ---: |

It will be seen that Shahpur has lost both to colony and to non-colony areas, Jhang and Lyallpur have lost to colony areas but have gained from non-colony areas; and the three new colonies have gained both from colony and non-colony areas. The gain of each colony from non-colony areas indicates its present force of attraction, but the loss of one colony to another is the result of two attractions in opposition; roughly we can say that the migration away from Lyallpur, Jhang and Shahpur represented by the first column of figures is an
exceptional feature of the decade due to the formation of new colonies, whilst all other figures are normal for these three districts ; on the other hand all the figures for Montgomery, Sheikhupura, and Multan are abnormal features of the decade.

We can now turn to the effect of the canal tolonies on the non-colony districts ; in 1911 there was a balance of migration of 590,003 in favour of the former and by 1921 this had risen to 627,924 , this constitutes an increase of 37,451 but allowing for deaths amongst the old colonists it is probable that no less than $\mathbf{1 5 5 , 4 5 5}$ of the new balance in favour of the colonies is due to migra-

| Birth-place. | 1011. | 1821. | New Colonists. |
| :---: | :---: | :---: | :---: |
| Bialkot | 288 | 223 | 211 |
| Amritar | 168 | 148 | 116 |
| Jallundur | 127 | ,165 | 240 |
| Gurdenpur | 97 | , 97 | 98 |
| Oujrat | 97 | 49 | -06 |
| Honhiarpur | 82 | 09 | 150 |
| Ludhians | 51 | 40 | 8 |
| Lahoto | 36 | 40 | 75 |
| Jhelum | 32 | 35 | 40 |
| Ambela | 30 | 30 | 20 |
| Fcrozepore | 18 | 23 | 43 |
| Mianwali | 11. | 17. | 30 |
| Muzaffargarh | 9 | 10 | 18 |
| Hinnar | -0 | 8 | 13 |
| Kangra | 3 | 1 | ${ }^{-6}$ |
| Rohtak | 3 | 2 | 0 |
| Gurgeon | 3 |  | 7 |
| Rawaiptadi | 3 | 8 | 10 |
| Kamb | 3 | 1 | - |
| D. G, Khan | 2 | 1 | 4 |
| Attock | 2 | 6 | 10 |
| Simla | 0 | 0 | 0 | tion of the decade. The figures in the margin show the birth-place per mille of the balance in 1911 and in 1921 and of the new colonists who have come in during the decade. The figures in the first two columns are very similar in the case of most districts, showing that the sum itotal of the attraction of the colonies has operated on these districts in much the same way since 1911 as before that year; there are however exceptions and these are particularly noticeable on reference to the last column of figures which show that Amritsar, Gujrat, Ludhiana, Kangra, Karnal and Dera Ghazi Khan have sent a far smaller proportion of migrants to the colonies during the last ten years than before; of these the last three have always sent so few as to render the effect on their population practically negligible; on the other hand Jullundur, Hoshiarpur, Lahore, Jhelum, Ferozepore, Mianwali, Muzaffargarh, Hissar, Gurgaon, Rawalpindi and Attock have increased their contributions to the colonies.

The majority of these changes can be ascribed to onet reason which is the temporary migration which occurred at the end of the decade in consequence of the widespread failure of crops.

Taking the average matured area for the period 1910-11 to 1919-20 as a normal for the basis of comparison, the percentage of the normal area which was

Montgomery
Lyallpur
Jhang
Amrithar
Gurdaspur
Sheikhupura
Shahnur
Shathpur
Muzaffargar
Jullundur
Moltan
Ludhiana
Kangra
Lalhoro
Ambala
Gujrat
Binila
Hobhisrpur
Kamal
Rohtak
Gujranwala
D. O. Khan

Bialkot
Gurgaon
Frrozoporo
Mienwali
Rawalpindi
Attook.
Hisenr Jholum harvested in $1920-21$ is shown in the marginal list ; those districts which appear near the bottom of the list naturally supplied large numbers of temporary emigrants looking for employment, and out of the eleven districts which have supplied a greater number of colonists than usual seven appear at the very bottom of the list, the other four being Jullundur, Hoshiarpur, Lahore and Muzaffargarh. Residents of Jullundur, Hoshiarpur and Lahore have secured very large grants in the Montgomery district and this may aocount for the increase in emigration to the colonies though it is also possible that it has been temporarily increased owing to scarcity. The enhanced emigration from Muzaffargarh has been almost entirely towards the adjacent district of Multan, and, though the area cropped in each district bore much the same relation to the normal, yet it is quite certain that owing to failure of the inundation canals there was a certain amount of temporary emigration from the former to the latter.

Reference to a map will show that Ludhiana and Amritsar are situated amongst districts where the failure was greater than in themselves, this being 80 it is natural that the inhabitants should regard their position as favourable and would resort less than-usual to emigration; the falling off in emigration from Gujrat is clearly due to the fact of the introduction of new irrigation which caused
many persons who had previously sought more or less permanent labour in the colonies to return to their ancestral lands.

Summing up it is clear that Lyallpur, Jhang and Shahpur have lost many inhabitants and that Sheikhupura, Montgomery and Multan have gained many owing to the conditions peculiar to a decade which witnessed the colonisation of the latter three districts; and also that scarcity conditions in 1921 led to much temporary migration, from Jhelum, - Hissar, Attock, Rawalpindi, Mianwali, Ferozepore, Gurgaon and Muzaffargarh to the colonies ; whilst variations in the acuteness of the scarcity led to less migration than usual from Amritsar and Ludhiana.

Scarcity conditions have affected the migration between non-colony districts themselves as well as between them and the colonies; and in the case of districts near the boundaries of the Punjab States and of other provinces it has also affected migration across the border, but in these last cases it is impossible to trace its influence as we have not got the agricultural statistics for the states and extra-provincial districts. Comparison of the balance of migration (i.e., the number of immigrants minus the number of emigrants) in favour of each district in 1911 and 1921 gives an indication of the changes in the course of migration, and the effect of these changes on the population is best illustrated by giving this balance per mille of the 1911 population. For instance; in 1911 Hissar showed 136,396 immigrants and 116,814 emigrants and thus had a balance of migration of 19,582 in its favour but in 1921 the balance was 39,211 against it, so that the difference in the balance in the two years was- 58,793 which amounts to - 73 per mille of its population in 1911. Changes in the course of migration have therefore accounted for a change of $\mathbf{- 7 3}$ per mille in the population of the district since 1911.

The effect of changes in migration, calculated in this way, are shown in the following table which gives separate figures for migration with British districts of the Purjab; with Punjab States and with areas outside the province :-

Change in the balance of migration between 1911 and 1921 per mille of the total population of 1911.


The districts are arranged according to the figures in the first column, for it is only for British Territory that we have crop statistics which enable us to gauge the influence of the scarcity conditions. The position of the canal colonies in this statement has already been explained. Apart from these, and Simla, the migration from which is entirely artificial, and Gujrat which has been newly irrigated, it will be found that every district high on the list reaped
a higher percentage of a normal crop in 1921 than adjacent districts whilst the reverse is true of those districts low on the list. The only exception is found in Jullundur, which sent many grantees to Montgomery, and a few of the districts near the middle of the list in which the change in balance of migration with other districts has been very small. The table affords very striking proof of the fact that the main changes in the stream of migration in the two census years are due very largely to temporary migration resulting from the scarcity conditions which prevailed at the 1921 census.

Had we got figures showing the severity of the scarcity in the Punjab States and in districts of the surrounding provinces it is probable that reference to these and to a map would show that the figures in the second and third columns are as much due to variations in that scarcity as are those in the first column.
41. Turning to the second column of figures at the beginning of paragraph summary 38, which shows the percentage of increase in each district during the last decade, ${ }_{\text {Affecting }}^{\text {of }}$ canses we can now see the effect of the conclusions arrived at in the last two paragraphs. Variations in In the group of districts at the head of that list we have seen that Montgomery, Districts. : Sheikhupura and Multan owe a great deal of their increase to migration which is a feature peculiar to the decade which witnessed the first colonisation of large areas within them; on the other hand this same feature of the deeade has had an opposite effect on Lyallpur and Shahpur in which there would have otherwise been larger increases. Shahpur has been passing through the adjustment stage of colony growth and has lost many superfluous labourers and unsuccessful colonists, its rate of increase has therefore been less during the decade than before and in all probability less than it will be in the near future. Lahore's rate of increase has been checked by extensive migration to Montgomery, but on the other hand it will be shown in-Chapter II that it has been accelerāted by an influx of immigrants from other districts to Lahore City. Multan being yet in the early stages of colonisation is likely to show a far greater rate of increase in the near future. Jhang has been affected, like Lyallpur, by the drain on its population caused by the new.er colonies. In short, peculiar features bf the decade account for the great differences in the rate of increase in these seven districts and but for these they would have shown much less wide variations.

In the next group each of the three districts suffered from extremely bad harvests in 1921 and there was much temporary emigration from them all, but in the case of Ferozepore this was nullified by temporary immigration from adjacent parts of Rajputana which suffered even more severely; Hissar in particular suffered so severely that instead of exercising its normal attraction on the residents of Rajputana and the United Provinces it actually sent emigrants to them in large numbers.

In the next group Mianwali whilst losing by exceptional emigration to the canal colonies gained by temporary immigration from the country to the west which suffered more severely from scarcity than it did itself; Muzaffargarh and Jhelum lost large numbers by temporary emigration in 1921 and had it not been for this would almost certainly have shown considerable increases instead of losses in population. Dera Ghazi Khan, though this is not borne out by recorded statistics, had also a bad year and lost by temporary emigration; but the main reason for its small rate of increase is to be found in the attraction exercised on its population by extensive newly irrigated lands in Bahawalpur State.

The nine districts in the next group do not appear to have been affected very considerably by peculiar features of the decade, but the five which show the greatest increase certainly owe part of that increase to temporary immigration from neighbouring districts during the scarcity of 1921 ; increase in Jullundur was checked by the grant of lands in Montgomery to members of its congested population; Sialkot whilst sending large numbers of emigrants to the canal colonies did not exceed its previous records in that direction, but it lost considerably more emigrants than usual to non-colony districts.

In the last group Simla gained at an artificially high rate merely owing to the presence of the town of Simla, the March population of which exceeded that of 1911 by a very large amount owing to the innovation in various Government departments of remaining at the summer headquarters throughout the year. Gujrat gained exceptionally owing to new irrigation which brought back
numerous emigrants who had sought employment in the canal colonies at a time when their own lands were dry and comparatively unproductive. Ambala lost by increased emigration, whilst Gurgaon lost more than any other district by epidemics of disease.

It is thus seen that the temporary features attending the close of the decade,

Kangra
Hoahiarpur
Gujrat
Gurdaspur
Jullundur
Jholum
Sialkot
Lyallpur
Multan
Attock
Rawalpindi
Gujranwalh and Sheikhupura
Gurgaon
Muzaffargarh
Ambala
Míanwali
Hissar
Rohtak
Rohtak
Shahpur
Shahpur
Karnal
Ludhiana
D. G. Khan

Simla
Montgomery
Jhang
Lahore
Ferozepore
Amritsar

3,006
3,096
$\mathbf{2 , 8 5 0}$
2,850
2,610
2,810
1,892
1,892
1,685

| - 1,685 |
| :--- |
| 1,557 |

1,315
1,230
800
081
637

637

507 | 507 |
| :--- |
| 480 | 460

434
434 it
131 ge and the colonisation which occurred during the decade, all tend to account for the cases where, increase in population during the last decade does not appear to have been in accordance with that which would have been caused by pressure on resources acting alone. Unfortunately it is quite impossible to make any numerical estimate of that part of the migration of the decade which was temporary or due to changes in colonisation; were it possible to do so we could eliminate it and then. get further figures indicating where to look for further peculiar influences of the deoade; without it it is scarcely logical to look further as it in itself may be sufficient to account for all the peculiarities noticed in paragraph 38. It may perhaps be useful however to indicate how the increased attraction of the large towns has affected the population of the various districts. We have figures for immigrants to towns but not for emigrants from them; the marginal statement shows the excess of the immigrants recorded in 1921 over those recorded in 1911 to the cities and towns of Lahore, Amritsar, Multan, Rawalpindi, Ambala, Jullundur, Sialkot and Ferozepore ; immigrants from the districts in which each town is situated have not been included as they have no effect on the population of such districts. It is interesting to observe the rival influences of pressure on population and proximity to the towns which have operated to produce this change in the urban population, but detailed comments must be reserved for Chapter II.
42. The increase in density per square mile is indicated in the following

Variations in Desslty. map, the striking feature about which is that it shows that the changes in density during the last decade have been characterised by a great increase in the central parts of the province accompanied with little change or with actual decrease in the outlying districts:-


The actual change in the number of persons per square mile is a somewhat misleading guide to variations in population; for instance Montgomery, Sheikhu-pura, Lyallpur and Lahore have all gained over forty persons per square mile
during the decade but their populations have shown very different features in their increase; Montgomery had an extremely light population in 1911 and its gain of 46 persons to the mile has been caused by a very rapid increase and yet has still left the countryside sparsely inhabited; Lahore with a much denser population to start with has needed a comparatively small increasein it in order to give it 48 more persons to the mile; whilst Sheikhupura and Lyallpur show intermediate rates of increase. If however the change in density is shown as an increase per cent. on its initial amount it becomes synonymous with change in population. In the following marginal table the first and second columns of figures show the change in density expressed in these two ways and it will be noticed that the second column is identical with the statement given at the beginning of paragraph 38. The third and fourth columns show the change in density of the rural population per square mile of cultivated area; it is to a comparison of columns two and four that attention should be paid as the latter shows how far the

Changes in Density between 1911 and 1921.

| District. | Mean density per aquare milo. |  | $\begin{aligned} & \begin{array}{l} \text { Density of rural } \\ \text { population per } \\ \text { cultivatod equare } \\ \text { mile. } \end{array} \\ & \hline \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: |
|  | ${ }^{\text {Aotual. }}$ Per cent. |  | Actual. Per cent. |  |
| Montgomory | $\begin{aligned} & 46 \\ & 41 \\ & 40 \\ & 48 \\ & 17 \\ & 13 \\ & 13 \end{aligned}$ | $42 \cdot 3$ | -71 | -14 |
| Shaikhupura |  | 19.8 | -70021 | -r 0 |
| Latoro |  |  |  | ${ }_{29}^{5}$ |
| Sluahpur |  | 11.693 |  |  |
| Multan |  |  | -56 | -11 |
| Jhang |  | $8 \cdot 7$ |  |  |
| Forozeporo | $\begin{array}{r} 32 \\ 3 \\ -2 \end{array}$ | $\begin{gathered} 14 \cdot 4 \\ 1: 5 \\ -1: 3 \end{gathered}$ |  |  |
| Himat |  |  | - 7 |  |
| Attock |  |  |  | 4 |
| Mianwali |  | 4.0-0.2 | -20. |  |
| Muzaflargarh |  |  | $\begin{array}{r} 18 \\ 18 \\ 88 \\ \hline-8 \end{array}$ |  |
| D. G. Khan |  | $-0.6$ |  |  |
| Jholum |  |  |  | 21 |
| Ludhiana | 35 | $8 \cdot 7$ | 60 |  |
| Rohtak | 2030 |  | [581 | 178 |
| ${ }_{\text {Anritar }}$ |  | 8.05.93.9 |  |  |
| Ruwalpindl | 10. |  | 449 | 8 |
| Gujiranwale |  | $3 \cdot 4$ |  |  |
| Jullundur |  | $2 \cdot 9$ | 40 | 043 |
| Gurdaspur | 8  <br> 8 1.8 |  | 402719 |  |
| Slalkot | 4 | 0.7 |  |  |
| Simin | 6814 | $17 \cdot 9$ | $-41$ |  |
| Guirut |  |  |  |  |
| Hushiarpur | ${ }_{0}^{4}$ | - $\begin{array}{r}1.0 \\ -0.6\end{array}$ | 38 | 5 |
| Knigran |  | $\begin{aligned} & -1 \cdot 4 \\ & -8 \cdot 6 \end{aligned}$ | 6718-10 | 3 |
| Gurgaon | -28 |  |  |  | increase per cent. in mean density (orin population) is nullified by a corresponding or even greater increase in cultivation; for instance in Montgomery, Shahpur, Jhang, Mianwali and Gujrat whilst population and mean density have increased the incidence of the rural population on the cultivated area has actually decreased owing to an extension of cultivation which more than balances the increase. In Simla the apparent increase in mean density is entirely due to urban growth and beyond the limits of the one town the density of the population has decreased very considerably. The reverse conditions are observable in Attock, Dera Ghazi Khan, Ambala and Gurgaon in which the bad seasons of 1921 caused a restriction of cultivation so great that $a^{\circ}$ decline in population was accompanied by an increase in its incidence on the cultivated area; in these districts. it is clear that even though there was temporary emigration in 1921 it was insufficient to leave the remaining population with means of subsistence equal to that which they enjoyed in 1911 .

These cases are the most striking for in them an increase in mean density has been accompanied by a decrease in the incidence of the rural population on the cultivated area which provides its means of subsistence, or vice versa; but in a less degree every difference between the figures in the second and fourth columns shows the same facts; in Lyallpur increase in population did not keep pace with increase in cultivation, in Jhelum a decrease in cultivation was accompanied by a very far greater decrease in population, and in all the districts not yet mentioned the increase in population was not so great as the increased pressure on resources owing to those resources being less in 1921 than in 1911.
43. No profit can be derived from an attempt to forecast the future movements of anything so susceptible to innumerable and fortuitous influencesVartations as the population of districts, yet the whole course of observation and argument given in this section tends to show that, apart from temporary disturbing causes, there is a normal difference in the rates of increase in the different districts of the Punjab. In paragraph 18 the various districts were classified áccording to their apparent present capacity of supporting an increased population, in paragraph 38 it was shown that the past increase over a long period has been roughly in
accordance with that present capaeity, in paragraphs 39 to 42 the reason for the increases in population during the past decade not being in accordance with that capacity has been found in variousfacts such as epidemic disease, canal colonisation and scarcity at the time of the last census which were all peculiar features of the decade. It therefore appears reasonable to conclude that the variations in the next decade will also reflect the varying capacity to support increased population mentioned in paragraph 18, except in so far as peculiarities in conditions may operate to prevent that result. It is impossible to foretelf the chances and changes of the next ten years, but a few coming events have already cast their shadows before them and may be mentioned as influences likely to affect the future spread of population. In the canal colonies, Lyallpur is likely to experience little change in her rate of increase though it must inevitably diminish as pressure becomes felt; Shahpur having passed through the stage of consolidation and ejection of superfluous labour is likely to show a somewhat augmented rate of increase; Sheikhupura, now fully colonised, is likely to follow the example afforded by Shahpur in this last decade and to lose many of its immigrants and therefore to show a lessened rate of increase ; in Montgomery and Multan the present rapid increase is likely to continue for some years of the coming decade before being replaced by the slower rate which accompanies the stage of colonisation to which I have referred as consolidation.

Schemes for fresh irrigation from the Sutlej, if they are completed within the decade, should lead to great increases in Ferozepore and Bahawalpur ; and similarly if the Bakra Dam, which has so long been mooted, comesinto operation it will enable the south-eastern districts to support a larger population which will probably be brought into being by increased immigration from outside the province.

Increased industrialism is likely to lead to an increase of urban population, of which there are already a few tentative signs, and may lead to a movement of population towards Lahore, Amritsar and other large centres.

And finally the return of the temporary emigrants of 1921 should give an apparently accelerated rate of increase in all the districts which suffered most severely from the scarcity prevalent at the time that this census was taken.

## Section VI.-Houses and Families.

## Desoription

of Punjab
Hопиеs.
44. The types of buildings in which the various races of the Punjab reside
are so numerous and varied that it is extremely difficult to give a definition of the word "house" which will apply to even approximately the same unit in different parts of the country. Undefined, the word may be applied equally well to a collection of buildings inhabited by large numbers of persons connected by very indefinite social ties and only characterised as a separate unit by the existence of either a common courtyard or common approach, or to every individual room of one compact building. The main difficulty arises from the custom which obtains in many parts of the province of the various members of a family separating from each other in some particulars and not in others; such separation may he complete in every way and involve separate establishments housed in completely separate buildings and owning separate property, it may however involve the mere separation of feeding and cooking arrangements whilst the different members continue to use parts of the same ancestral building and to own their property jointly; the word "house" at once begins to be confused with the word "family" and both are extremely indefinite terms.

In the compact villages of the south-east it is usual to find a large number of branches of the same family occupying one ancestral group of buildings situated round a common courtyard, but that group may consist of perfectly distinct buildings and the lives of the branches residing in each maxy be entirely separate and independent; the group of buildings however represents whaf was once the house and common residence of a single simple family, and it is often impossible to draw the dividing line between a group of houses and a house formed of a group of buildings. In towns the difficulty is even greater, whole lines of buildings may open on to one common courtyard or on to a semi-public lane or alley possessing only one approach from the public streets; here any definition based on the possession of a common courtyard or entrance is manifestly absurd as both the buildings and the people inhabiting them may be entirely independent;
on the other hand a single compact building may be composed of flats and rooms having separate entrances from the public highway and inhabited by persons who have no relations with one another.

Definitions based entirely on structural features or entirely on the connection between the inhabitants are equally faulty, and, in connection with the census, it has always been recognised that it is impossible to lay down a definition which will be of any use in statistics; all attempt to define the house as a statistical unit has therefore been abandoned and the definition adopted has been devised with the sole purpose of ensuring that the enumerating staff should overlook no building likely to have inhabitants and should not include in one "house" a group of buildings so large as to make the complete enumeration of its inhabitants a matter of difficulty. The definition adopted will be discussed in the next paragraph, but before coming to it it is best to give a rough idea of the types of buildings which are met with in various parts of the province.

As a general rule the type of house follows the type of village; in the eastern plains, where compact villages sprang up on account of the necessity for mutual protection, the same consideration led to the various branches of a family hanging together and living round a common courtyard with a single entrance; the necessity of mutual protection has disappeared but the type of village has been fixed and lack of space obliges successive branches of the family to go on extending and enlarging the old buildings even though they may separate from eaoh other by the establishment of individual cooking arrangements.

In the west, where the villages are smaller and more scattered, family dissensions lead not only to the separation of cooking arrangements but to the erection of entirely separate buildings and a discontinuance of all mutual relations except perhaps in connection with the ownership and cultivation of land; here houses are smaller and more easily distinguishable, most have their own courtyard but the buildings are for joint use as much as courtyard.

In the hills, where people live in scattered hamlets, each little family builds its own house near its' fields and large groups of buildings inhabited by any but the closest relations are uncommon.

The actual structure of the houses has been fully described in previous census reports but has little bearing on the subjects to be dealt with in this report; suffice it to say that the material used depends on the locality; mud is the most common material and may be used in the form of unbaked bricks, unshaped clods, or roughly moulded slabs; wood and stone are largely used in the foothills; thatch and matting in the riverside areas of the plains. An interesting series of names for the previous types of, house common in the Montgomery District (before colonisation) is mentioned in Mr. Rose's report of 1901 asillustrating the varying extent to which those who used them were of nomadic habits, these are-kiotha built of mud walls and roof, khudi of mud walls and thatched roof, jhuti of walls of matting with thatched roof, chhann with both walls and roof of thatch, and pakhi which is a mere temporary shed of screens.

During the last decade there has not been a vast change in the type of houses built, but it is noticeable that burnt bricks are being increasingly employed and that buildings are becoming more and more commodious throughout the oanal colonies; in towns the burnt brick is becoming an almost universal building material and, though in walled towns lack of space has led to extensions in an upward direction and to the construction of more and more additional stories, there is a very marked tendency amongst the educated and more wealthy classes to resort to buildings of the European bungalow type outside the limits of the more congested areas.
45. "In 1881 the distinguishing feature insisted upon in the definition of a " house" was the possession of a common courtyard, a fact which led to the selection of inconveniently large units for enumeration in the south-eastern parts of the province ; in 1891 no rigid definition was attempted but the main points insisted on in a long series of instructions were:-the situation within a common enclosure, the existence of a common courtyard with express exception of lanes and semi-public spaces in towns, and the exception of outlying huts and shelters; in 1901 the definition was made even more wide and practically came to being "every place likely to be occupied" and the actual selection of individual units. was left largely to the discretion of the local census officers.

In 1911 a far more rigid definition was attempted and this has been followed at the present census and is contained in the instructions issued to the enumerating staff as follows :-

In rural tracts.-" House " means a structure occupied by one commensal family with its resident dependents, such as widows and servants. Such detached structures, as have no hearth, but are likely to- have one or more persons sleeping therein on the night of the final enumeration, should be treated as separate houses, so that no person may escape enumeration.

In towns and cities.-"House "means a structure intended for the exclusive residence of one or more commensal families apart from other residents of the street or lane, and includes serais, hotels and the like, when they are not large enough to form blocks ; shops, schools, and other institutions, having no hearth, but which may possibly have some one sleeping therein on the night of the final enumeration should be numbered as separate houses.

It will be seen thait, in rural tracts, the old method of treating all buildings with a common courtyard as one house has been abandoned in favour of the separation of each part of a group of buildings which has a separate chulha or'hearth. The possession of a separate chulha is universally recognised as the distinguishing mark of the partial separation of a branch of a family from the other branches and parent stem ; though the separation may be incomplete yet once it has taken place the branch is no longer a member of what is termed a confocal group and its interests and activities rapidly diverge from those of the other branches. Hence in rural areas the definition of house is based on thedegree of separation amongst the people residing in it and practically amounts to the residence of a separate family.

On the other hand such a definition would be impossible to apply in towns and cities and here the distinguishing mark of a house has been made to rest on the nature of the structure, though it also includes a modification based on nature of the inhabitants.

This definition has survived the test of two censuses and has been found to fulfil the two main requirements which are:-

That the definition should cover all buildings in which it is likely that people may be found on the census night.
That the inhabitants of the unit selected should be so closely connected
that their final enumeration can be completed by reference to oneman and without moving from place to place.
But there is one point in which the definition fails and that is that it leads, on account of unintelligent zeal on the part of enumerators, to the selection of large numbers of places as "houses" which are most unlikely to be inhabited on the census night. This fault not only leads to unnecessary labour in house-numbering and patrolling but, as the directions provide for the enumeration as if at his residence of a man who is temporarily absent guarding the crops or attending to his well, the treatment of shelters amongst the crops and at the wells as houses may lead to double enumeration.

| 1881 | .. | 25 |
| :--- | :--- | :--- |
| 1891 | .. | 27 |
| 1901 | .. | 30 |
| 1911 | . | 40 |
| 1021 | . | 41 | over those returned in 1911. Ta marginal figures show the average number of houses per square mile recorded at the average number of houses per square mile recorded at the 1891 . .. 27 last five censuses, but, owing to the chamge in definition 1911 .. 40 established except between the last two figures; the small 1021 .. 41 increase in the number of houses is shared unequally Subsidiary Table VII ; of these, the sparsely populated Himalayan tract naturally has the most widely separated houses and only has 17.5 houses to the square mile as opposed to 70 in the densely populated Sub-Himalayan districts. The changes in the natural divisions since 1911 require little comment, the slight decline in the number of houses in the Sub-Himalayan tract is so small as to be within the margin of error due to individual variations in the interpretation of the definition, and the only feature of note is that the increase in the North-West Dry Area with its large canal colonies hasbeen so small.

The towns of the Punjab contain on the average 3,174 houses as against 109 in the average sized vilfage ; in Delhi the city and its suburbs include no less
than 74,188 inhabited houses whilst the outlying villages contain an average of 129.

It is to be regretted that the enumerators treated so many places as houses which were not really likely to be occupied on the census night,-in the preliminary returns over eight million houses were entered and on the census night only 5.6 millions were inhabited; though the temporary migration due to the drought at the time of the census must have left many houses unoccupied it is impossible to gauge the number which were temporarily deserted owing to the inclusion of most unlikely places for human habitation in the preliminary. returns.
47. Throughout the two provinces the average number of residents in Average each house is remarkably constant, and amounts to 4.3 in Delhi and in the Sub- Rambertson in Himalayan tract, $4 \cdot 5$ in the Himalayan Districts, 4.6 in the Indo-Gangetic Plain a Honse. and 4.8 in the North-West Dry Area. As the definition of house in rural areas practically ensures that the residents will form one family these figures may also be taken as representing the size of normal families and they show at once how far removed the Punjab is from other parts of India in its family customs; in it the Hindu joint family system is practically non-existent and the enormous undivided families of Bengal and elsewhere are unknown, the family almost tallies with the European separate family of father, mother and children.

The remarkable constancy of the number of residents to a house is maintained amongst the individual districts; Lyallpur shows $5 \cdot 5$ persons to a house and Jhelum only 3.8 but every other district has an average of between four and five people to the house.

Another remarkable feature of the figures for houses is that, in spite of the difference in definition, the number of residents to a house in urban areas (4.4) is very near that in rural areas ( $4 \cdot 6$ ).
48. The constitution of families in the Punjab shows every possible grada- The Pamity: tion from the individualistic systems common in Europe, where every married man with his wife and young unmarried children form a separate family, to the true Hindu joint family system, in which all members of a family connected together by descent from a distant ancestor live together, opwn their property in common and pool all their individual earnings in the joint coffer for unchallenged administration by the head of the family; but, except in rare cases, the family resembles the former type far more closely than the latter.

In rural tracts, if the father's house is a small one, and it usually contains but one living room, the marriage of a son necessitates the immediate building of another room ; and, though he may continue to use the same courtyard and even the same hearth, it is generally found that within a short time the dissensions of the womenfolk, who have not been brought up from infancy amongst the family, make life inconvenient so that, sooner or later, a separate hearth is established or, more commonly, an entirely separate establishment is set up.

The result is that throughout the country the family using one hearth almost invariably consists of but father, mother and unmarried children with possibly a few dependents of a previous generation; but in the east, where village sites are compact and building space is very limited, such families have much more tendency to live in close association in one group of buildings than in the west, where there are fewer difficulties in the way of erecting separate houses.

Considerations of space do not form the only reason for variety in the degree of separation common from village to village and from district to district; as a rule the higher and more orthodox castes of Hindus tend to greater community in living than those whose traditions are less restrictive, and far more than Musalmans who live much more individualistic lives throughout the province ; this fact is partly due to the greater survival of ancient customs amongst the orthodox Hindus but is also largely. due to the fact that the proprieties observed by all civilised races discountenance close association between persons who are not prevented from marriage by ties of relationship, so that the existence of strict exogamous customs amongst high caste Hindus permits a wider circle of relations to live together than would be possible amongst peoples where even close relationship is no bar to marriage.

Whilst the large undivided family is practically unknown in the province, its influence can be seen in business relations and in the forms and conditions of
agricultural tenure ; but even the continuation of joint ownership and of joint endeavour in business and agriculture is more a matter of convenience than a result of the force of tradition.

In towns and cities, where the want of building space prevents the easy separations of rural life, Hindu families almost invariably show a far greater degree of the joint constitution; and, amongst trading classes, the existence of established business firms controlled entirely by the family has still further aided the survival of the ancient systems. But even amongst these old family firms the ties are beginning to change from those of a joint family, whose property and earnings are common and subject to the control of the head of the family, to those of mere partnership, where the capital is held in shares and the profits are subject to periodical distribution.
othapter I.


Norm-Figuros in column 9 bave been onloulatod from aurvey area figares, as given in Imperial Table 1. Figures in columns for States from figuros suppliod by Consuas Superintandonts. From areas given in the agrioultural statements for 1919-20, and those Diatriata and Statos, and is an avorapo for all tho Punjab, being avoragbs of those for units, is maaningless a reoord exists; rainfall figuree recorded for natural divisions and for noighbouring places :-

[^4]subsmiary tablead．－

## SUBSIDIARY TABLE II．

Distribution of the Population classified according to Density．

\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multirow[t]{3}{*}{Provisoa of Natural Division．} \& \multicolumn{12}{|c|}{Tahoils with a population per square mille of} <br>
\hline \& \multicolumn{2}{|l|}{Under 160.} \& \multicolumn{2}{|l|}{$$
\begin{aligned}
& 160-299 \\
& \text { (inolusive). }
\end{aligned}
$$} \& \multicolumn{2}{|l|}{$$
\begin{gathered}
300-449 \\
\text { (incluasive). }
\end{gathered}
$$} \& \multicolumn{2}{|l|}{$$
\begin{aligned}
& \text { 450- } 899 \\
& \text { (inolusive). }
\end{aligned}
$$} \& \multicolumn{2}{|l|}{$$
\begin{aligned}
& 600-749 \\
& \text { (inclusive). }
\end{aligned}
$$} \& \multicolumn{2}{|l|}{750 and over．} <br>
\hline \& 安 \&  \&  \&  \& 安． \&  \& 先 \&  \& $$
\frac{8}{8}
$$ \&  \& 雨 \&  <br>
\hline PONJAB \& 2
44,002
$(37 \cdot 99)$ \& $$
\begin{array}{|c|}
\hline 3 \\
3,430 \\
(18 \cdot 60)
\end{array}
$$ \& $$
\begin{array}{|c|}
\hline 4 \\
48,635 \\
\left(30^{\prime} 40\right)
\end{array}
$$ \& $$
\begin{gathered}
6 \\
10,388 \\
(4 \mathrm{i}-39)
\end{gathered}
$$ \& 6
18,591
$(16.05)$ \& 7

6,860

$(27 \cdot 37)$ \& $$
\begin{gathered}
8 \\
5,825 \\
(4-77)
\end{gathered}
$$ \& 0

2,882

$(11 \cdot 28)$ \& \[
$$
\begin{gathered}
10 \\
(75) \\
887
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
11 \\
2.45)^{615}
\end{gathered}
$$
\] \& 12

1,208
$.04)$ \& 13
$3.85)^{966}$ <br>

\hline 1．Indo－Gangetio Plain Weat \& $$
(4 \cdot 90)^{1,862}
$$ \& \[

(1 \cdot 77)^{202}

\] \& \[

$$
\begin{gathered}
22,301 \\
(58 \cdot 72)
\end{gathered}
$$

\] \& \[

\left|$$
\begin{array}{c}
5,291 \\
(46-22)
\end{array}
$$\right|

\] \& \[

\left\lvert\, $$
\begin{gathered}
10,504 \\
(27 \cdot 65)
\end{gathered}
$$\right.

\] \& \[

(33 \cdot 11)

\] \& \[

(4 \cdot 52)

\] \& \[

(7.83)^{908}

\] \& \[

(1.03)^{300}

\] \& \[

[2 \cdot 63)^{200}
\] \& $(3 \cdot 18)^{1,208}$ \& $(8 \cdot 44)^{886}$ <br>

\hline $\overline{I I}$ ．Himalsyan \& \& \[
(44.07)

\] \& ${ }_{(26.35)}^{4,200}$ \& \[

\left($$
\begin{array}{c}
927 \\
(03 \cdot 34)
\end{array}
$$\right.

\] \& \[

\left\lvert\,\left($$
\begin{array}{ll}
30
\end{array}
$$\right)^{32}\right.

\] \& \[

\left($$
\begin{array}{c}
108
\end{array}
$$\right.
\] \& . \& .. \& $\left.\cdot^{\cdot} 31\right)^{40}$ \& $(2.01)^{35}$ \&  \& <br>

\hline III \& $$
\left(\begin{array}{r}
3,5^{\circ} \\
(18 \cdot 60)
\end{array}\right.
$$ \& \[

(6 \cdot 80)^{338}

\] \& \[

(32 \cdot 15)

\] \& \[

4_{(23 \cdot 0)}^{1,3}

\] \& \[

3 $$
\begin{gathered}
5,222 \\
(27 \cdot 10)
\end{gathered}
$$

\] \& \[

2\left|$$
\begin{array}{c}
1,943 \\
(33 \cdot 28)
\end{array}
$$\right|

\] \& \[

3 $$
\begin{gathered}
3,800 \\
(19.83)
\end{gathered}
$$
\] \& $(32 \cdot 1,024$ \& $2 \cdot 23)^{428}$ \& $(4.97)^{290}$ \& $\cdots$ \& $\cdots$ <br>

\hline IV．North．Weat Dry Area \& $$
\left|\begin{array}{c}
26,011 \\
(63 \cdot 02)
\end{array}\right|
$$ \& \[

1 \underset{(34 \cdot 93)}{2,123}

\] \& \[

\left\{$$
\begin{array}{c}
12,960 \\
(30 \cdot 35)
\end{array}
$$\right.

\] \& \[

\left($$
\begin{array}{c}
2,828 \\
(46 \cdot 54)
\end{array}
$$\right.
\] \& ${ }_{(6 \cdot 63)}^{2,833}$ \& $\left(\begin{array}{c}18.123)\end{array}\right.$ \&  \&  \& － \& ＊ \& ＂． \&  <br>

\hline DELHI（Indo－Gangetic \& $\cdots$ \& $\cdots$ \& $\cdots$ \& $\cdots$ \& －$\quad \cdots$ \& $\cdots$ \& $\because$ \& $\cdots$ \& $\cdots$ \& $$
\because
$$ \& 00\％0）${ }^{503}$ \& $\left\lvert\, \begin{gathered}488 \\ (100.0)\end{gathered}\right.$ <br>

\hline
\end{tabular}

Norlu－The figures within brackets show the percontages of the total aros and population，
orarise I.

## SUBSDDIARY TABLE III.

Variation in relation to Density since 1881.



Nots.-Owing to ohangestin boundaries the figuras for 1011 and 1821 cannot be compared in the oases of Rohtak, Gurgann, Gujranmala, Sheikhupura and Dolhi.

CEAPTES I.
SUBSIDIARY TABLEE

(1). Vital atatistios for 1011 referred to the ofd distriot of Delhi and nons are available for Delhi for 1012 ; the figures for 1911 havo boon adjustod over Dolht, Gurgaon and Rohtak ; the averago for the years 1913 to 1020 baa been taken for the year 1912 in Delhi. (2). Figures for the cotual population of 1911 (oolumns 4, 5 and 8) are those given in Imperial Table II of 1921
lating columns 7 and 8 .
(4). Emigrants both of 1911 and 1921, born in unapooified parts of the Punjab have all been included vhen calculating the first ontry in column 7
( 0 . Further dotaila Fill bo found in Suboidiary Table $\overline{\mathrm{V}}$ of Ohapter VI; birthe and deaths registered in aantonmanta are not included in that Tablo as they ano not recorded by sex.
(0). This tablo indudos 38,078 birtha and 40,050 deaths registared in cantonmenta.
ohapter I．
BUBAIDLABY TABLE8．

|  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Natoral Divisios． | Decade． |  |  |  |  |  |  |  |
|  |  | Onder 150. | $\begin{gathered} 150-299 \\ \text { (inclugive). } \end{gathered}$ | $\begin{array}{r} 300-449 \\ \text { (inclusive). } \end{array}$ | $\begin{aligned} & 450-599 \\ & \text { (inclusive). } \end{aligned}$ | $\begin{gathered} 600-740 \\ \text { (inclusive). } \end{gathered}$ | $\begin{gathered} 750-800 \\ \text { (inoluaive). } \end{gathered}$ | $\begin{aligned} & 1,050 \\ & \text { and over. } \end{aligned}$ |
| PUNJAB $\ldots$ <br> Indo－Gangetic <br> Weat． $\ldots$ | $\begin{array}{cc} 2 & \\ \text { 1881-1801 } & \cdot \\ 181-101 & \cdot \\ 1901-1911 & \cdot \\ 1911-1921 & \cdot \\ 1881-1801 & . \end{array}$ |  | $\begin{gathered} 4 \\ -497,244 \\ +1,276,262 \\ +2,135,950 \\ +\quad 400,648 \\ +\quad 47,634 \end{gathered}$ | 5$+\quad 883,288$$+101,621$$+477,380$$+439,972$$+123,098$ |  |  | 8 <br> +80354 | $\left.\begin{array}{c} 9 \\ -33,008 \end{array}\right]$ |
|  |  | －144，582 |  |  | ＋ 575,600 <br> 2050,788 | $\begin{aligned} & +285,842 \\ & +246,485 \end{aligned}$ | ＋ 803,544 $+\quad 89,006$ |  |
|  |  | － 112,325 |  |  | － 265,788 $-918,830$ | $+246,485$ <br> 853,034 | $+\quad 89,006$ <br> 360,055 | $\ldots$ |
|  |  | ＋106，844 |  |  | ＋． 2,218 | －384，301 | ＋541，069 | $\cdots$ |
|  |  | －80，205 |  |  | $+\quad 237,927$ <br> 232020 | ＋ 196,810 | ＋327，017 | $\because$ |
|  | $\underset{\substack{1801-1901 \\ 1001-1911}}{ }$ | －392，642 | $+\quad 247,660$ $+1,090,534$ | $+835,628$ <br> $+447,364$ | 二 232,028 $-604,040$ | $\begin{array}{r}+1143,963 \\ +341,264 \\ \hline\end{array}$ | $\begin{array}{r}+3305,333 \\ \hline 309,055 \\ \hline\end{array}$ | $\cdots$ |
|  | 1011－1921 | －$\quad 164,424$ | $+1,000,034$ $-\quad 261,708$ | ＋${ }^{+} 8457,206$ | 耳 $\begin{array}{r}\text {＋} \\ \hline\end{array}$ | 二 341,264 | － 309,055 $+\quad 541,069$ |  |
|  | 1881－1891 ． | $\rightarrow \quad 44,351$ | － 200,100 | ＋288，217 | + 31，82 | －0，847 | ＋33，061 | －33，008 |
| Himalayan | 1801－1901 ．． | $+\quad 64,955$ $+\quad 6,218$ | $+\quad 237,458$ <br> $\quad 2,050$ | － 288,217 $+\quad 162$ | ${ }^{1} 1.183$ | － | －3，301 | $\cdots$ |
|  | 1901－1911 1911－1021 | ＋2，770 | －1，045 | ＋$\quad 1019$ | －27，593 | ＋35，003 |  |  |
| （ 1881－1801 $\cdots$ |  | ＋1，502 | －750，709 | ＋471，973 | ＋337，682 | ＋ 88,870 | ＋302，808 | ． |
| Sub－Himalayan | 1891－1901 ． | 6，523 $+\quad 1$ $+\quad 19,042$ | ＋ 201,794 | －245，700 | 二 23,157 | ＋102，522 | －302，806 | ．． |
|  | 1901－1911 ．． | $+\quad 44,042$ <br> $-\quad 19,145$ | $+\quad 112,163$ $+\quad 41,880$ | $+\quad 353,279$ $+\quad 0,746$ | － 313,587 $-\quad 2,012$ | ［r $\begin{array}{r} \\ \hline\end{array}$ | － | $\because$ |
| $\begin{gathered} \text { North-West } \\ \text { Area. } \end{gathered} \text { Dry }\{$ | 1881－1891 ．． | －15，708 | ＋405，931 | － | ． | b， | － |  |
|  | 1891－1901 ．． | $\begin{array}{r}+218,839 \\ \hline\end{array}$ | ＋ 588,352 |  | ．． | ． |  |  |
|  | 1901－1911 | $+720,725$ $+\quad 137,180$ | $+\quad 936,208$ $+\quad 012081$ | $\pm 571,313$ <br> 226461 | $\cdots$ | $\because$ | ． | － |
|  | 1911－1821 $\quad$. | ＋137，180 | ＋612，081 | －226，461 | ． | ＋11，745 | $\because$ | $\cdots$ |
| DELHI | 1881－1801 ．． | ．． | ． | ．． | ． | $+\quad 11,745$ $+\quad 75862$ | $\begin{gathered} \ddot{ } \\ +\ddot{448,188} \end{gathered}$ |  |
|  | 1891－1901 |  | ．． | $\cdots$ | $\because$ | $\begin{array}{r} 8,038 \\ +\quad 413,447 \end{array}$ |  | $\cdots$ |
| Indo－Gangetic PlainWest． | 1911－1921 ．． | － |  | $\because$ |  |  |  |  |
|  | 1881－1891 $\quad$. | ．． | $\cdots$ |  | $\cdots$ | （11，745 |  | $\cdots$ |
|  | 1891－1901 |  |  | $\cdots$ | $\because$ | $+\quad 75,862$ $+\quad 8,038$ | ．． | ．． |
|  | 1901－19］1 |  | $\cdots$ | ．． | ．． | ＋ 818,038 | ＋ 4888,188 | －． |

Note．－Figures for 1911 and 1921 are baved on those given in Provincial Table I， 1921 ：adjuated figures have been used for 1601. Adjustment of the figares of 1801 and 1881 （as given in the reports of those years）being impossible，they havo been taken without ohange．
（b）．PERCENTAGES OF VARLATION（BRITISH TERRITORY ONLY）．

| Natural Dimsion． | Decade． | Variation per ogit．in thehils with a foptlation per squabe amle at the con－ menomment of deoade oy |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Under 150. | $\begin{gathered} 150--290 \\ \text { (incluaive). } \end{gathered}$ | $\begin{gathered} 300-449 \\ \text { (inclusive). } \end{gathered}$ | $\begin{gathered} 450-599 \\ \text { (inclusive). } \end{gathered}$ | $\begin{array}{r} 600-748 \\ \text { (inclusive). } \end{array}$ | $\begin{gathered} 700-890 \\ \text { (inclusive). } \end{gathered}$ | $\begin{aligned} & 1,050 \text { and } \\ & \text { over. } \end{aligned}$ |
| PUNJAB | $\stackrel{2}{1881-1891}$ | ${ }^{3} 30$ | $4 \quad 109$ | 5 $+\quad 23.5$ | 6 $+\quad 170$ | 7 $+\quad 20 \cdot 7$ | 8 $+\quad 154$ | ${ }_{-}^{0} 1000$ |
|  | 1881－1891 | 3.8 <br> $-\quad 3.2$ | $\pm{ }^{+} \quad 31.3$ | $+\quad 23.2$ $+\quad 20$ | $+\quad 15$ $-\quad 25$ | $\begin{array}{r}\text {＋} \\ +\quad 148 \\ \hline\end{array}$ | $\begin{array}{r} \\ +\quad 81 \\ \hline\end{array}$ | ， |
|  | 1001－1011 | － 23.9 | ＋ 40.1 | P $+\quad 9.9$ $+\quad 8.3$ | $\square \quad 25.0$ | $=30.1$ $-\quad 38.5$ | ＋ 40.5 | $\cdots$ |
|  | 1911－1921 | $4 \cdot 0$ | ＋ 54 | 8.3 $+\quad 6.0$ | $+\quad 17$ | $\begin{array}{r}\text {－} \\ \hline \\ +\quad 28.5 \\ \hline\end{array}$ | +127. $+\quad 76.1$ | $\cdots$ |
|  | 1881－1891 | $9 \cdot 1$ | ＋ 28 | $+\quad 5.0$ $+\quad 25$ | $\pm .17 \cdot 1$ | ＋ 26.4 $+\quad 15.3$ | +761 $+\quad 62.2$ | $\cdots$ |
| Indo－Gangetic Plain West． | 1891－1901 ．． | $45 \cdot 3$ <br> 46 | （ $+\quad 14.0$ $+\quad 49.6$ | （ | － 14.3 $-\quad 43.2$ | $\begin{array}{r}1 \\ +\quad 16.3 \\ \hline \quad 32.3\end{array}$ | $\begin{array}{r}+62.2 \\ \hline-46 \%\end{array}$ |  |
|  | 1901－1911 19. | $-\quad 46.2$ $-\quad 4.9$ | $\begin{array}{r}+\quad 49^{\circ} \mathrm{B} \\ \hline\end{array}$ | $7 \quad 13.6$ $+\quad 23.2$ | － $\begin{array}{r} \\ -\quad 4.0 \\ \hline\end{array}$ | － 59.5 | $\pm 127.2$ | $\because$ |
|  | 1881－1891 ${ }^{\text {19，}}$ | － 40.7 | － $32 \cdot 2$ | ＊ |  | － 1000 | ＊ | $-100 \cdot 0$ |
| Himalayan | 1891－1901 | ＋ $85^{\circ} 0$ | ＋ 503 | － 1000 | $\cdots{ }^{-} \quad 4 \cdot 1$ |  |  |  |
|  | 1901－1911 | $+\quad 4.4$ $+\quad 24$ | －$\quad .5$ | $\pm \quad 1.5$ | 4.1 $-\quad 100 \%$ |  |  | $\ldots$ |
|  | 1911－1021 | － $2 \cdot 2$ | － 2 | － 48 | － 1000 | +1000 $+\quad 16.0$ | $\because$ | $\cdots$ |
|  | 1881－1801 | $+{ }^{\circ} \mathrm{6}$ | $\bigcirc \quad 44.3$ | $\begin{array}{r}\text {＋} \\ +\quad 36.4 \\ \hline\end{array}$ | ＋ 170 | +16. $+\quad 14$ | $-100 \cdot 0$ |  |
| Sab－Himalayan ．． | 1891－1901 | ＋ 217 | $+\quad 213$ $+\quad 94$ | $\begin{array}{r}+\quad 13.9 \\ +\quad 23.2 \\ \hline\end{array}$ | －14．1 | ＋ 1.4. | － 1000 | － |
|  | 1901－1011 | － $\begin{array}{r} \\ -\quad 53\end{array}$ | $+\quad 34$ <br> $+\quad 3.2$ | ＋ | － 1 | ＋ 2.5 | $\cdots$ | － |
| North－West Dry Aren $\{$ | 1881－1891 ． | －$\quad 7$ | ＋ 76.1 | $\cdots$ | $\cdots$ | ．． | $\cdots$ | $\cdots$ |
|  | 1891－1901 | $+\quad 9.6$ <br> 98.6 | $\begin{array}{r}+\quad 62.7 \\ +\quad 73.1 \\ \hline\end{array}$ |  |  | ．． | ．． | － |
|  | 1901－1911 |  <br> $+\quad 20.6$ <br> $+\quad 8.9$ | $+\quad 73 \cdot 1$ $+\quad 27 \cdot 6$ | a $\pm \quad 100.0$ $-\quad 39.0$ | $\because$ | ：${ }^{-}$ | － |  |
|  | $1911-1921$ $1881-1891$ | $+8.9$ | $+276$ | $-{ }^{-} 39$ | ． | $\because$ $+\quad 37$ |  |  |
| DELEI | 1881－1801 |  |  | $\cdots$ | ．． | ＋ 23.0 | ． | ． |
|  | 1901－1911 ． | ．． | ．． | － | ． | 1 $\pm \quad 1009$ | $\because 100.0$ | ． |
|  | 1911－1921 |  | $\cdots$ |  | ． | + $+\quad 37$ |  |  |
| $\begin{aligned} & \text { Indo-Gangetic Plain } \\ & \text { West. } \end{aligned}$ | 1881－1891 | $\cdots$ | $\because$ | ． | $\cdots$ | + + + |  | $\ldots$ |
|  | $1891-1901$ $1901-1911$ | $\cdots$ | $\ldots$ | $\cdots$ | －． | ＋ 1.8 | ＋100＇0 | $\cdots$ |
|  | 1911－1921 |  | － |  |  |  |  |  |

＊Nosa．－No ontrics in the previous decade of the two compared．
onapter 1.
subbidiary tablegs.


## CHAPTER II.

## Cities, Towns, and Villages.


#### Abstract

10. The defnition of village, town and oity. 50. Number of towus and citien and population. 51. Acoursoy of the censof fignres. 62. Comparison. of the orban and rural population. 63. General move ment of the population. b4. Roral popalation. 65. Distribution of population in villages and towns. 56 . Area of villages. 67. Number of persons per occupied houss in villages. 68. Inter-relationahip of pepplation per village, of area jer village, and of persons par ocoupied house. 69. Boandary and vilage site poritional eficionoy. 60. Namber of persons per bailding in selected towns and citien. 61. Namber of inbabitanta per room. 62. Reference to the etatistical tables.


The definl-

## tlon of village,

 townand dity, identical with that of an estate under section III-1 of the Puni R Pand Reme Act. Though this definition is based on the technique of the Punjab Land Revenue system, and is therefore suitable for use amongst a staff largely drawn from revenue officials, it will be desirable to explain its meaning to those unfamiliar with Punjab conditions. The definition is as follows:-"' Estate' means any area (a) for which a separate record of rights has been made; or (b) which has been separately assessed to land

- revenue or would have been assessed if the land revenue had not been released, compounded for, or redeemed; or (c) which the Local Government may, by general rule or special order, declare to be an estate."
It should be noticed that the definition applies to a demarcated area of land and not to a group of residential sites.

While, therefore, every distinct village will have a distinct area of land comprised in a single closed boundary, it not infrequently happens that a revenue "village" contains no residential site, the owners and cultivators residing in buildings on the residential site of another "village." In such cases the persons concerned are enumerated in the latter village and not in the former. As a general rule in the plains there is one residential site to each village with, here and there, a hamlet or a few temporarily occupied cottages built at a distance from the main village site for the protection of the outlying fields, or for the herding of cattle adjacent to a graing ground. In the Western Punjab, in tracts into which canal irrigation has not yet penetrated, the well is generally the nucleus of a few residential houses belonging to a single owner and his family, and this well is separated by a considerable distance from similar wells and groups of buildings. In the hills, again, the presence of large residential sites is exceptional, and the houses of the landowners lie scattered over the face of the countryside. Throughout the Fimalayan tract the accepted definition of a village renders it misleading as a basis of residential statistics. For example, in the 1868 census report the Kangra district was shown as including 7 towns with a population of over 5,000 persons whereas, as a matter of fact, not a single town existed. Each of these 7 places with over 5,000 inhabitants was an enormous tract of waste land interspersed with cultivation, and its inhabitants lived in small hamlets scattered about over its surface.

For all practical purposes a village in the plains may be thought of as a cluster of houses inhabited by people owning and cultivating the surrounding land; but the actual unit is included within the boundary of the land, whether cultivated, culturable or unculturable, and not merely within the limits of the residential buildings.

To a very large extent Punjab villages are self-supporting and independent, but, in the case of smaller villages it not infrequently happens that the agriculturist buys his seed, markets his produce and finances his more serious items of expenditure, such as those incurred at weddings or burials by recourse to a neighbouring and a larger village. The larger the village the greater is the probability of finding in it a more efficient doctor, carpenter, ironsmith, or pottery-maker, and with an increased demand for more skilled devices and for better appliances, the more will recourse to distant large villages from the smaller villages be encouraged. This tendency will hasten the transformation of a large village into a larger one and from a larger village into a town. In the Punjab the slowness with which towns have been formed indicates how little the rural population has had to learn hitherto from the urban population.

For census purposes a town has been defined as including-
(1) every manicipality,
(2) all civil lines not included within municipal limits,
(3) every cantonment,
(4) every continuous collection of houses inhabited by no less than 5,000 persons which the Provincial Superintendent may decide to treat as a town for census purposes,
(5) the capital of every State except the Minor Simla Hill States.

It is clear that this definition aims at a rapid dichotomy (certainly one of the features of a good definition), rather than at a scientific discrimination between towns and villages. A better criterion could probably be based, in the Punjab, on the relative proportion of persons engaged in agriculture to the total population or, on the percentage of persons born in the town or village resident in that town or village. The possibility of applying these tests will be glanced at later.

The census definition of town is the same as that adopted at the 1911 census, except for the addition of category 5 .

Of the places which have been treated as towns in the present census 51 are plares with less than 5,000 inhabitants. Of these 51 places 28 have necessarily been included by virtue of the first three clauses of the definition, whilst four come in under the fifth clause. The remaining 19 are included either, because at the time of selection their population was estimated at over 5,000 , or on account of special reasons, the chief of these being the presence of a bazaar.

The net result is that there are 187 towns included in the Punjab and Delhi at the present census. The figures in the margin show the number of places classed as towns or cities during the last 5 censuses. The figures prior to 1911 are swollen by the inclusion of all places of 5,000 inhabitants and over in the list of towns, and no deduction as to a change in economic conditions should be made from the crude numbers quoted. Allowance for the , varying classification will be made at a later stage.
50. As noted above, the places now treated as towns and cities in the Punjab are 187 in number, and have an citios and aggregate population of $2,901,098$ persons population. as against the 174 towns and cities with 2.567,282 inhabitants in 1911. The places which have been treated differently at the last two censuses are noted in the margin, and it would be wrong therefore, to speak of the change in the urban population as a rise from 2,567,282 to $2,901,098$ without consideration of the effect of the altered classification.


A truer basis of comparison for the changes in the urban population of the Punjab will be set out in para. 3 below.

The omission of Shahpur from the list of towns in 1921 needs special justification. At one time it was the Headquarters of the district, but these have been transferred to the more easily accessible and rapidly growing town of Sargodha. In 19113,131 inhabitants of the inhabitants of Shahpur lived in the civil lines, whilst the population of the town proper is only 5,608 , and has been declining rapidly during the last 10 years.

The other omissions need no special remark. They are all of places which

Places treated as towns in 1911 but not in 1921.

| Town. |  | District. | Population. |
| :---: | :---: | :---: | :---: |
| Shahpur | . | Shahpur | 8,739 |
| Garhahankar | . | Hoshiarpur | 4,923 |
| Miani | . | Hoshiarpur | 4,870 |
| Chawinda | $\cdots$ | Sialkot | 4,605 |
| Kalanaur | . | Gurdaspur | 4,606 |
| Anandpur | . | Hoshiarpur | 4,041 |
| Akalgarh | . | Gujranwala | 3,943 |
| Dabuye | - | Hoshiarpur. | 3,597 |
| Khanna | . | Ludbiana | 3,319 |
| Farakhnagar | . | Gurgaon | 3,158 |
| Khudian | . | Lahore | 2,992 |
| Total | 11.. |  | 48,883 |

had a population of less than 5,000 in 1911, and all have been declining rapidly since 1901. The new inclusions comprise 13 towns with a population of less than 5,000 , but three of these are the capitals of States, and one the headquarters of a district. All the others are rapidly growing places of markedly urban characteristics, and the majority of them are in the canal colony areas where a town, once successfully established, usually exhibits a mushroom growth.

No formal definition of "city" was adopted for census purposes, but . for administrative convenience Government has decided that Delhi, Lahore, Amritsar, and Multan should be classed as cities in this report. Rawalpindi, with'a population of over 100,000 , which owes a very large part of that population to the existence of Cantonments, and is not an industrial centre, has not been classed as a city. On the other hand, Multan has been ranked as a city although its population is recorded at the census as only 84,806 , its normal population being temporarily reduced owing to its partial desertion at the time of the census on account of a severe epidemic of plague.
Aceuracy of the consus data collected at a census to have a clear idea of the probable accuracy of the aguren. enumeration and classification, a few remarks on this subject are here interpolated. So far as the present writer has been able to discover no systematic objective test of the accuracy of the census figures has been applied to them, and each Provincial Superintendent has formed his own subjective estimate, which naturally varies with his belief in his own thoroughness and the degree of reliance that he places in the enumerators and supervising staff. While no doubt each Superintendent is perfectly entitled to have his own opinion on the accuracy of the census work, at the same time this opinion will have only a slight scientific weight unless it is supported by theinternal evidence of the figures, or by a corroborative independent test. In this matter of the enumeration of the tahsil, district or provincial population by sexes and religions it is impossible to do more at the present stage than to guess at the amount of error. At the same time I must confess to scepticism as to the high degree of accuracy which has been claimed for the figures by many Census Superintendents. Familiarity with the inaccuracies of the statistical data collected in India from similar sources as those on which the census figures are based, emphasises the need of caution. In the Punjab I have found gross errors in price statistics, in the revenue records, and even in the recorded areas of crops, which are reputed to be as accurate as any in the world, and in the estimates of yield on which the final outturn of the crops is computed. Vital statistics too are known to be very unreliable. A. priori, therefore, there is good ground for doubting that the census figures possess the extreme accuracy which is claimed for them.

The weight of high authority is against the view taken above, and it is only with extreme diffidence taht I venture to differ from the opinions hitherto expressed on this subject. Thus Sir Denzil Ibbetson in his report on the 1881 census writes-"I believe that the results of the census, so far as regards the actual enumeration of the people by sexes, are wonderfully accurate . . . . ....The probability of the concealment of females, the only direction in which any suspicion of material error can arise is discussed on the chapter of sex." Sir Edward Maclagan, present Governor of the Punjab, says on page 28 of the census report of 1891 , "there is very little doubt, that, as far as actual enumeration goes, the census of 1881 was carried out with remarkable accuracy, and almost every district officer is of opinion that the present census also was extremely accurate." Sir Edward Maclagan remarks however that "as regards the absolute value of the figures (of births and deaths), I believe them to be utterly unreliable."

Mr. H. A. Rose, in his report on the 1901 census seems to have entertained no doubts as to the absolute accuracy of his figures.

Rai Bahadur Pandit Hari Kishen Kaul on page 197 of Part I of the report of the census of 1911 says, "no statistics compiled at an Indian Census are
probably more removed from the actual facts as those of "age." He then summarises the various causes which led to a preference for grouping children under one age rather than another; but, he does not appear to have doubted the accaracy of his totals independently of the age grouping.

Mr. Middleton in an interesting examination of the errors in the vital statistics of the province based his calculation on the assumption of absolute accuracy in the census totals at the two decades 1911 and 1921. The line of reasoning adopted is open to criticism,* but the point here insisted on is the assumption of complete accuracy in the census figures.

Mr. Thompson in his report on the present 1921 census of Bengal, reaches the conclusion that the Bengal census figures have a high degree of accuracy, and that possibilities of excess enumeration would be likely to counterbalance the probabilities of omissions. .He says "it may be considered very unlikely that the census total is out as much as 1 per mille and it is probable that it is very much more accurate."

Practically the only dissentient view is expressed in the Actuarial Report of Mr. Acland (Chapter 5, Government of India Census Report, 1911, page 158, volume I, part I) when, after describing the fitting of the provincial age data by a graduation formula, he says "in the case of the Punjab the figures were not found amenable to treatment by this method, and this was one of the many indications that the figures in this province are not complete or reliable;" and, again, on page 168 "I was ultimately driven, reluctantly, to the conclusion that no useful purpose could be served by publishing the mortality table for female lives in the Punjab, and have thus had to follow, in this respect, the course adopted by Mr. Hardy, in his report on the 1901 census."

Mr. Gait in paras. 264-267 of volume I, part I, of the Government of India Census Report of 1911, has dissented very vigorously from Mr. Acland's views.

At this stage I would have preferred myself not to express any opinion, but, as some measure of the inaccuracy of the data has to be implicit in all the arguments that may be advanced as to the spatial or temparal variation of the population, it is necessary to adopt a conventional standard of the probable inaccuracy. As a working hypothesis, therefore, I have assiumed that the mean error for the totals by religions and sexes by each territorial division is 1 per cent. This figure has been adopted because, on one hand, most, if not all, Census Superintendents regard the figures as considerably more accurate than this, and, on the other hand, because all the Punjab statistics that I have yet come across in 17 years' experience have average errors in excess rather in defect of this amount; and partly also because as a District Officer in Jullundur the concealment of the existence of female children was a matter of continual report and observation. Lastly, even the most cursory examination of the age distribution figures indicates that there must be an enormous number of omissions of children under the age of 5. In 28 out of 29 districts in British Territory in the Punjab there is an excess of persons in the age group 5-9 over that in the group 0-4 years of age, and this oan only be accounted for in five ways-
(1) By an excess of immigrants who in March 1921 would be between the ages of 5 and 9 , or an excess of emigrants who would in March 1921 be of the ages of 0-4.
(2) By a great excess in the number of the births in the years 19111914 as compared with the birth in the years 1915-1920.
(3) By a differential death-rate adversely affecting the children ${ }^{-}$born in the quinquennium 1915-1920.
(4) By the transfer of children from the 0-4 age group to the 5-9 age group by misstatement or misclassification.
(5) By the actual omission of children below the age of 5 .

In the first place it should be noted that the discrepancy in the numbers of the two age groups occurs for male as well as for female children and, therefore, no explanation is valid by reference to mere concealment of female births.

As to the first possibility, it may be said that there is no reason to suppose that Punjab families during 1915-1920 emigrated when the bulk of their children were between the ages of $0-4$, as compared with the numbers that emigrated when the ohildren were aged $5-9$; nor, on the other hand that families from outside the

[^5]province particularly selected that period to emigrate at which their children were between the ages of $5-10$. It seems probable indeed that those tribes which are essentially nomadic in their habits such as the Odh, Purbia or Gadaria travel with equal facility whatever the age of their children. The discrepancy between the numbers in the age groups can, therefore, not be explained from this cause.*

As to possibility (2) a complete test can only be applied after allowance for the number of deaths among the children born during the decade 1911-1921. This test was not applicable owing to the fact that deaths are not recorded in the annual Sanitary Reports for each year of age, and all that is now possible to do is to point out that the number of births during the two quinquennia of the decade 1911-1920 (inclusive) were as follows:-

| Quinquennia. |  | Males. | Females. | Total. |
| :---: | :---: | :---: | :---: | :---: |
| $1911-1915$ | $\ldots$ | $2,269,989$ | $2,070,721$ | $4,340,710$ |
| $1916-1920$ | $\cdots$ | $2,175,653$ | $1,956,743$ | $4,132,396$ |

It will thus be seen that there has been an excess in the number of births in the quinquennium 1911-1915 which will however explain $\dagger$ less than 5 per cent. of the excess in the numbers of age group 5-9 over that in the age $0-4$ at the census of 1921.

As to possibility (4) namely, the transfer from age group 0-4 to age group 5-9 owing to the misstatement, Pandit Hari Kishen Kaul makes some valuable observations in para. 288 ( $a$ ) of his Punjab Census Report for 1911, but the net result of the various influences leading to misstatement of children's ages would not appear to be any inflation of the age group 5-9. In fact as Pandit Hari Kishen Kaul points out there would be a considerable incentive to exaggerate the ages of male children between the ages of 5 and 10, in order to allow of their employment without infringing the provisions of the Factory Act. Such exaggerations .will often be ludicrous in the extreme, the age of a boy of 8 or 9 often being stated at about double that figure. Any depression of a girl's age from over to under 10 years, helping to swell the age group 5-9, will therefore be more than offset by exaggerations in the ages of male children. The discrepancy in the age groups cannot be accounted for on this basis. While, therefore, it is not asserted that the above qualitative analysis is complete, it suggests that some part of the discrepancies in the first two age groups is due to the omission of children between the ages of 0 and 4 years of age. According to the tables by Mr. Acland for the 1911 census the age group 0-4 should contain 317,742 males as against 256,778 females in the age group 5-9. These figures apply of course to a stationary population, but if we use them as approximately valid to the Punjab population figures we find that the age group $0-4$ should be 23.7 per cent. in excess of the age group $5-9$, and not, as we find, anything up to 14 per cent. in defect.

Evidence as to the unreliability of the census of the number of inhabitants per building carried out in Lahore, Amritsar, Rawalpindi and Jullundur, though, of course, the accuracy to be expected is much less than that of the census proper, is afforded by the statistics themselves. Thus by adding up the number of buildings with the specified number of inhabitants per building, it is found that in the case of wards 1-6 of Lahore City, there must be no less than 117,140 inhabitants as against 92,533 enumerated in the census. The difference of over 24,000 cannot be accounted for except by the inaccuracy of one.or the other of the enumerations. In the case of ward 3 of Rawalpindi City the discrepancy is even more marked. $\ddagger$

Summing up, therefore, an average inaccuracy of one per cent. would appear not to be an unreasonable working figure for the totals by religion and sex. In the absence of proof to the contrary the assumption of greater accuracy would be extremely unwise, and the possibility of even greater errors in particular classifications must be borne in mind in all the succeeding chapters.
Comparison of the Urban 52. Owing to the differences of definition and the consequent changes in the Population. of the percentage of the urban population at various epochs is not possible.

[^6]The actusl percentage of the urban on the total population, adopting the actual classification of towns used at each of the

|  | Censw. | Percentage of the arban population of tho Panjab exclading Delhi. |
| :---: | :---: | :---: |
| 1891 | ** | $10 \cdot 7$ |
| 1001 | .. | $10 \cdot 6$ |
| 1011 | . | $8 \cdot 8$ |
| 1921 | . | 103 | censuses, is shown in the margin. Roughly speaking therefore, the urban population of the Punjab can be putat 10 per cent. of the whole, and there is no sign of a marked tendency for persons to flock into the towns and cities. Further details will be found in the subsidiary Table $V$ attached to this chapter, which gives also the figures for Delhi Province, where the urban population is now $62 \cdot 4$ per cent. of the whole.

Another way of looking at the changes in the urban population, which avoids one of the pitfalls of classification, is to consider the changes of population of only those towns which have been classed as towns at all $\cdot 5$ censuses since 1881. This mode of comparison is open of course to the objection that it omits from later censuses those towns which have sprung up in recent years: for example, in the Lower Chenab, Lower Jhelum and Lower Bari Doab Colonies, and also it omits from the earlier censuses those places which were properly classed as towns in 1881 or 1891, but have since ceased to have distinctively urban characteristics. With this warning in mind, reference may now be made to subsidiary Tables VII and VIII, which give the actual population of 157 towns and cities classed as towns and cities at all 5

Punjab Towne which have risen steaclily in population sinco 1881.

| Lahove. | Bathinds. | Jajtu. |
| :---: | :---: | :---: |
| Jullandur. | Montgomery. | Pathankot. |
| Bialkot. | Kot Kıpurs. | Jampur. |
| (lujranwala. | Fazilka. | Bhakkar. |
| Kourf. | Faridkot. | Mursfargarh. |
| Jbang Maghiana. | Muktear. | Karor. |
| Simin. | Mianwali. | Delhi. |
| Mohtak. | Lojah. | Compbellpur. | censuses since 1881 inclusive, and also the changes in population whether positive or negative in each of the 4 inter-censal decades. Table VIII is instructive in this respect as it shows that since 1881 only 24 towns and cities have made uninterrupted progress throughout the last 40 years. These towns are noted in the margin. On the other hand 9 towns have been uninterruptedly on the down grade during

 the last 40 years. These towns are noted in the margin in order of population. Of these steadily decaying towns the Ambala District contributes 2, the Gurdaspur District 3, and Jhelum, Jullundur, Gurgaon and Simla 1 apiece.

In both marginal lists the towns are shown in descending order of population as found at the 1921 census.

Adopting the same classification, viz., counting the urban population as the number of persons residing in the 158 places classed as towns or cities at each of the last 5 censuses, the percentage of urban on total population is as noted in

|  |  |  | Porgentage <br> of urban <br> on total po |
| :---: | :---: | :---: | :---: |
| pulation. |  |  |  | the margin. These figures are lower than the percentage of the urban population given previously, the reason for this being, of course, that some towns have been excluded in the latter classification, owing to their not having been treated as towns at each of the 5 censuses. Both sets of figures, however, show the same general trend, namely, that of a fall in the urban population in 1901 and 1911, and a subsequent rise in 1921. Those in favour of the industrialisation of the Punjab will deplore, while those who desire the maintenance of agriculture in its premier position may approve of the absence of any marked tendency of the population to congregate in towns.

53. In respect of urbanisation the truth of the matter is that, up to the present, the movement of the population of the Punjab has been towards occupying the desert spaces which canal irrigation has rendered fertile, when this process has been completed and the mond it is ony tion. state of flux that crystalisation in the shape of towns will take place. The general movement of the population has been ably discussed by Mr. Middleto in chapter I; but, as it is relevant to the subject in hand a different presentation
of the data is proposed. For this purpose reference is made to the diagrams Nos. 17, 18, 19 and 20 showing the isopleths of population density for the 4 censuses from 1891-1921, inclusive. These diagrams show very clearly what the movement of the population has been. Thus, before the introduction of canals it is clear that the lines of equal density of population ran roughly parallel to the lines of equal annual rainfall, the most densely occupied area being that lying between $20^{\prime \prime}$ and $35^{\prime \prime}$ of annual rainfall. With the introduction of the colony canals the lines of equal population density, which ran originally very close to each other, have in the recent decades moved towards the south-west. No more than 20 years ago a comparatively small area of land round Multan formed a population oasis. In 1891 the contour line of a 100 persons per square mile, which enclosed the oasis of Multan, was distant no less than 160 miles from the general contour line of density 100. Since 1891 however, owing to the development of the Lower Jhelum, Lower Chenab and Lower Bari Doab Colonies the general 100 density line has advanced towards Multan at an average rate of about 10 miles per annum, and in 1911 Multan had been turned, from the point of view of population, from an island into a narrow-necked peninsula. The whole trend of events, as to which a great deal more might be said, in particular about the shape and changes in the isopleths round Amballa and Delbi, is very clearly brought out in the diagrams.

With the construction of the Sutlej Valley Canal, the Bhakra Dam and the Sindh-Sagar Canal there will be a tendency for the population isopleths to resume their original parallelism with the lines of equal rainfall, the reason for this being that in the Punjab, whether wholly unirrigated or wholly irrigated, the density of population must depend on the differential advantage conferred by the rainfall. So long as the Punjab was, and is, only partially irrigated by perennial canals, the canals and not the rainfall will be the dominating factor in deciding the shape of the density isopleths. It should be noted that while the isopleths of lower population density have moved out rapidly in a south-westerly direction in the last 30 years, the isopleths of higher population density have moved at a less rapid rate. Thus between 1891-1921 the isopleths of 200 persons per square mile have moved in a south-westerly direction from Lahore to an extent of about 70 miles, viz., at a rate of $2 \cdot 3$ miles per annum as compared with the annual rate of movement of 10 miles per annum of the 100 density line, while the 300 density isopleths have only moved during the same interval at a rate of a little over 1 mile per annum. It seems probable that the movements of the isopleths will continue in the same direction for some years to come, with a tendency, as suggested above, to a greater parallelism with the isohyets, provided of course there is no untoward interruption of the Punjab's colony development.

As noted, therefore, the population of the Punjab has, of recent years, been too much in a state of flux towards sparsely populated areas for the formation of towns to have taken place. It may be possible to hazard a guess that when the movement of population becomes very slow, or ceases, the process of formation of towns is likely to be accelerated. At any rate so much may be asserted that the cultivator in the canal colonies is beginning to appreciate the fact that in order to be a successful farmer he must sell his produce successfully, as well as grow it successfully, and he is, therefore, desirous of more and betfer organised markets close to the areas on which he raises his crop; and though something has been done in the past to provide these facilities, no one would venture to assert that he has at present either adequate markets or adequate means of reaching them. When means of communication have been improved there is likely to be a rapid growth of the numbers and extent of Punjab towns. Want of good roads and railways are undoubtedly the limiting factors in preventing villages turning into towns with more readiness than they have done in the past.
hural poo the gen. The diagrams which have been printed in the foregoing sections give pulation. towns general population density, viz., the density based on the population in both sils, without which detail it would be impossible to draw the isopleth curves
s. was not available for all the Punjab censuses. Apart from this fact, howers, the general population density has a value of its own. For the purposes of discussion of the purely rural population, reference may be made to diagram 21 which shows the rural population density per square mile. The figures required for
drawing this diagram were obtained-
(1) by excluding from each tahsil the population of the towns of that tahsil, and
(2) by excluding from the area of the tahsils the so-called revenue area of the towns situated in that tahsil.
It was by no means easy at this stage to obtain reliable figures of the revenue area attached to towns, as it involved reference to all the districts of the Punjab. Where, however, there was a clear error in the return sent in, a further reference was made to the revenue authority concerned, and the figures finally used may be accepted as approximately correct. The, aforesaid revenue area includes a good deal more than the mere sites of the towns concerned and the adjoining waste, and in some cases the arable land included in the revenue area exceeds the area under buildings and roads in the town itself.


Similarity between diagram 21 of the density of rural population with that of diagram 20 of the general population density is evident. The three islands of high density round Jullundur, Amritsar and Sialkot are shown in both diagrams, while, as was to be expected, the border density curve of a 100 persons per square
mile is almost identical in both cases. On the advancing population in both cases. On the other hand, the projections of advancing population in the Lower Jhelum and Lower Chenab Canal Colonies are even more marked than before. It is rather unsafe to argue from lines of equal density based on tahsil figures only, but, as it stands, diagram 21 shows that
the maximum population density gradient lies between Daska and Gujranwala. A diagram of population density based on a smaller division of area, say an assessment circle or a zail, would be considerably more accurate than the diagram now presented ; but time forbids its preparation.

## Dtstribution of population In villages and

 towns.55. The actual distribution of $t$

Frequency of towns and villages with a populatio between the limits named. Britisin Territory only.

| Frequency of towns and villages with a population between the limits named. Britisin Territory only. |  |  |  |
| :---: | :---: | :---: | :---: |
| Population limits. | Frequency. | Fopalation limits. | Frequenty. |
| 0-490 | 21,058 | 10,500-10,999 | 3 |
| 500-990 | 7,528 | 11,000-11,409 .. | 5 |
| 1,000-1,409 .. | 2,577 | 11,500-11,999 .. | 1 |
| 1,500-1,899 .. | 106 | 12,000-12,499 .. | 3 |
| 2,000-2,499 .. | 406 | 12,500-12,999 | 1 |
| 2,500-2,909 .. | 244 | 13,000-13,499 | I |
| 3,000-3,499 .. |  | 13,500-13,899 | 0 |
| 3,500-3,909 .. |  | 14,000-14,499 .. | 2 |
| 4,000-4,499 .. | 57 | 14,500-14,999 .. |  |
| 4,500-4,909 .. |  | 15,000-15,499 .. | 2 |
| 5,000-5,499 .. |  | 15,500-15,989 .. | 0 |
| 5,500-5,999 .. |  | 16,000-16,499 | 1 |
| 6,000-6,499 .. |  | 16,500-16,999 | 0 |
| 6,500-6,999 .. | 11 | 17,000-17,499 |  |
| 7,000-7,499 .. |  | 17,500-17,999 :- | 2 |
| 7,500-7,009 . |  | 18,000-18,499 .. | 1 |
| 8,000-8,400 |  | 18,500-18,999 .. | 0 |
| 8,500-8,999 | 6 | 10,000-19,499 | 0 |
| 9,900- 11,400 |  | 19,500-19,990 | 0 |
| 9,500-9,909 .. | 4 | Over 20,000 | 24 |
| 10,00-10,490.. |  |  |  | population in towns and villages for each group of $500^{\circ}$ persons is given in the margin.

This distribution could be fitted with a Pearsonian curve of type J,* but is extremely doubtful whether it really represents the facts as it is certain that the frequency of villages with a very small population decreases as the population diminishes, the modal population being probably between about 3 to 5 hundred persons per village.

The mean population per village for British Districts is 546 , and for the areal distribution of the various sizes of villages diagram 22 may be referred to. This diagram is a remarkable one because it shows that, with the exception of Multan, the location of villages with a population of 800 persons and over constitutes a well-defined series of knolls, running roughly parallel to the Himalayas, but distinctly further away from them than the area of greatest density of population. This fact is conformable with (but not necessarily explicable by) the South-westerly movement of the population, which has resulted, apparently, in people who are emigrating to a new territory preferring to attach themselves to villages already built rather than to build new ones. The inevitable dependence of the old Pumjab on the rainfall is very clearly shown by the line of 500 persons

[^7]

per village, this line being roughly concarrent with the isohyets of $25^{\prime \prime}$ of annual rainfall.


This line demarcates the submontane area of villages with alow population The only other area with a small population per village is in the Lower Bari Doab Colony between Khanewal and Chunian. The villages in this area should tend to increase in size in future years, though the rate of their doing.so will be restricted unless the peculiar deflocculated condition of the soil particles which renders the soil of large tracts in this colony * practically unculturable, can be remedied.
56. Closely associated with the population of each village is the area of land comprised within the revenue limits of each. The averages is the area of Area of vitpurposes of diagram 23 are based on the of each. The averages worked out for ${ }^{\text {lages. }}$ section 6, namely, the area of a tahsil less the so-called areas as those used in towns within the tahsil. For details subsidiare so-called revenue area of the As was to be expected the correspond subsidiary Table $X$ may be referred to. being represented by the co-efficient 0.572 , a relationship which is correlation

[^8]diminished when the effect of the number of persons per house has been eliminated. This point is discussed in paragraph 58.


Number of persons par 57. While we have seen that the population density, the average size of ${ }_{\text {ococupied }}{ }^{\text {persen }}$ villages in each tahsil and the average area of each village by tahsils have a house in vill variation in magnitude which is an obvious function of the population drift, of climatic conditions, and irrigational faculties, it is interesting to note a relative constancy represented by a co-efficient of variation of 8 per cent., in the habits of the rural population, and that is in respect of the average number of persons per occupied house. Diagram 24 shows the territorial variation of the number of persons per occupied house, the isopleths being again drawn from the tahsil figures which are reproduced in subsidiary Table XI. The average number of persons per occupied house for the whole of the Punjab, excluding Delhi, is 4.5 persons, and it will be observed that the number of persons per occupied house never rises above 5.7 for Samundri tahsil of the Lyallpur District, and never falls below 3.6, its value for the Chakwal tahsil of the Jhelum District. In the Punjabstates the same constancy is noticeable, the only exception being Malerkotla, which has the remarkably small figure of 2.7 persons per occupied house. The explanation suggested to me by a high official familiar with the local conditions, is that the tigure 2.7 represents the smallness of the families in Malerkotla, consequent on the inferior economic conditions of this tract. This explanation has no doubt considerable weight, but it hardly bridges the enormous
gap between themumber of persons per house in Malerkotla and the rest of the Punjab.


As the point is of considerable interest from an economic point of view, a closer statistical analysis will be desirable.

| Pergons por houge. | Froquenoy. | Porsons por houso. | $\begin{gathered} \text { Fro- } \\ \text { quenoy. } \end{gathered}$ |
| :---: | :---: | :---: | :---: |
| 3.6 .. | 1 | 47 | 10 |
| 37. | 1 | 48. | 18 |
| 388 | 0 | $4 \cdot 0$ | 8 |
| $3 \cdot 0$.. | 9 | 500 | 5 |
| 40. | 5 | 011 $\quad$. | 9 |
| 41 | 10 | $5 \cdot 2$ |  |
| 42 | 0 | 6\%3 $\quad \cdots$ | 1 |
| 4 | 11 | 54.4 | 3 |
| 4 | 13 | 6.5 | 3 |
| 40 |  | 50 | 0 |
| 40 | 19 | $5 \cdot 7$ | 1 |

Excluding Malerkotla, the observed frequencies of Tahsils or States in the Punjab, which have a given number of persons per occupied house, is as noted in the margin.

This frequency distribution gives the following values for the moments about the mean, the. mean itself being at $4: 546$ persons per occupied

$$
\begin{aligned}
& \mu_{8}=0.1313 \\
& \mu_{3}=0.0165 \\
& \mu_{4}=0.0656
\end{aligned}
$$

From which we obtain-

$$
\begin{aligned}
& \hat{\beta}_{2}=0.12 \pm 0.16 \\
& \beta_{2}=3.81 \pm 1.17
\end{aligned}
$$

Thus both $\beta_{1}$ and $\beta_{2}-3$ differ from zero by less than their probable errors arising from random sampling, and therefore the distribution is of the Gaussian type. The appropriate curve to fit the data has the equation

$$
\mathbf{Y}=14 \cdot 423 \mathrm{e} \frac{-(x-4.046)!}{2026},
$$

referred to zero persons per house as origin.

Now if the social and economic conditions of Malerkota are continuous with those of the Punjab generally in respect of the number of persons per house, we can calculate the probability that it forms a part of the aforesaid Gaussian distribution. Malerkotla has 2.7 persons per occupied house, and that differs from the mean by 5.07 times the standard deviation. As the area of the Gaussian curve to the left of this is $1.987 \times 10^{-7}$ of the whole, the probability that out of 132 states and tahsils, one should have only 2.7 persons per occupied house is $2.63 \times 10^{-5}$ or about 1 in 38,000 . A dispassionate statistician, therefore, examining the figures from a distance, might justifiably lay odds of nearly 38,000 to 1 against Malerkotla being in the Punjab !

As Malerkotla is in the Punjab, and is very centrally situated at that, the only conclusions we can come to seem to be either,
(1) that the economic and social life of Malerkotla are most abnormal, the explanation being probably that suggested by the official referred to above, or
(2) that the enumeration of persons or houses, is incorrect, the inaccuracy vitiating the conclusion as to the 'normal' character of the general Punjab distribution, or, that there is a particularly large inaccuracy in the Malerkotla census.
As to alternative (2) the enumeration in Malerkotla gave 80,322 persons and 30,096 occupied houses, so that an error of 3,322 in the number of occupied houses, or of 9,996 in the number of persons would be required to bring the number of persons per occupied house to $3 \cdot 0$, which even then would form a very marked outlier from the general Punjab distribution: Both these are errors of over 10 per cent., and this is more than we ought to expect ; but that there is some error of enumeration seems an unavoidable deduction from the argument, unless we invoke the aforesaid rare hazard of a 1 in 38,000 chance.

The average number of persons per house for the Punjab States is $4 \cdot 5$, exactly the figure for British Districts only.
58. For a full examination of the effect of the area of villages, and of the population number of persons per occupied house, on the population, it would be necessary popuation
per vilage, of to take each village separately. This would entail an amount of labour disproarea par vill portionate to the issue, until such time as Government ceases to require that lage, and of
persons
per Reports shall consist of soporific literature only.

Herein, therefore, only the correlations of these associated conditions have been calculated for tahsil-averages only : and, further, to secure homogenity, certain tahsils, which have special populations or areas, owing to their proximity to the frontiers of the Province, have been omitted. These tahsils are Kulu, Hamirpur, Khushab, Pindigheb, Talagang, Mianwali, Bhakhar, Isakhel, Sanawan, Leiah and the Biloch Trans-Frontier. This leaves 103 tahsils and Delhi Province, or 104 units in all, for comparison.

The following crude correlations resuit :-
Correlation of population and village.. $\quad . \quad=572 \pm \cdot 045$
Correlation of population and number of persons
per occupied house .. .. $=337 \pm .059$
Correlation of area of village and number of persons per occupied house ... ... $={ }^{\prime} 282 \pm{ }^{\prime} 061$
All these correlations are over 4 times their probable errors, and, were the matter to be left there, one might suppose that there was an association between the average area of villages and the average number of persons per occupied house.

The suggested dependence, however, would be erroneous, as further exami nation will show. For convenience the population of a village will be called" $P$ ', its 'revenue' area ' $A$ ', and the number of persons per occupied house ' $H$ '. The letters all denote tahsil averages. The full results are then as follows :-

|  |  |  |  |  | Mean. | Standard deviation. | Co-fficient of variation. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Population | - | .. | - | . | 580 persons | $261 \cdot 46$ | 43.4 \% |
| Ares | $\cdots$ | -• | - | . $\cdot$ | 2.5 aq. miles | 1.474 | $50.0 \%$ |
| Pornons por house | $\cdots$ | ** | $\cdots$ | $\cdots$ | 4.5 persons | 81 | 85\% |

The partial correlation co-efficients which represent the association of any two of the variables, when the effects of association with the third variable have been eliminated, are-

$$
\begin{aligned}
& \text { Popalation and area } \quad \text {.. } r_{\text {A. . в. }}=528 \pm .048 \\
& \text { Popalation and number of persons per house .. r } \boldsymbol{r}_{\text {н. P. } A}=224 \pm .050 \\
& \text { Area of village and number of persons per bouse .. } r_{\text {A. } H . \text { P. }}=115 \pm \cdot 065
\end{aligned}
$$

Thus, we see that $r_{\wedge}$ ur r is less than double its probable error, and there is no true association between the area of the village and the number of persons per occupied house.

The conclusions we may draw tentatively (subject always to the limitation imposed by averaging Tahsil figures) are that the villages with the larger area have the larger population, and that the villages with the larger population have the greater number of persons per house : but, we are definitely not entitled to conclude that the villages with the larger area have the greater number of persons per occupied house:*

We finally reach the following equations expressing the probable population average of the villages of a Tahsil in terms of the average area and the number of persons per house, with similar expressions for the average area, and for the persons per house-

$$
\begin{aligned}
& \mathrm{P}=88 \cdot 372 \mathrm{~A}+126 \cdot 479 \mathrm{H}-219 \cdot 086 \\
& \mathrm{~A}=.003 \mathrm{P}+\cdot 388 \mathrm{H}+986 \\
& \mathrm{H}=.034 \mathrm{~A}+\cdot 0004 \mathrm{P}+4 \cdot 183
\end{aligned}
$$

If we call $\cdot \Delta P, \Delta A$, and $\Delta H$ the proportional departures of $P, \ddot{A}$ and $H$ relative to their standard deviations the above equations reduce to -

$$
\begin{aligned}
& \Delta P=\cdot 018 \Delta A+\cdot 192 \Delta H \\
& \Delta A=\cdot 682 \Delta P+100 \Delta \dot{H} \\
& \Delta H=132 \Delta A+\cdot 264 \Delta P
\end{aligned}
$$

Thus the Tahsil average population of a village is increased $5 \%$ for a $10 \%$ increase of average area, but is increased less than $2 \%$ for a $10 \%$ increase in the number of persans per occupied house.

Similar results may be deduced for the effect of vatriations of population per village, and of persons per house, on the probable area of the village. From a sociological point of view, however, probably the last equation is the most important, as it shows that $10 \%$ changes in the area of villages, or in the population, produce changes of only 1.3 and $2.6 \%$ respectively in the number of persons per house. This result is consistent with the conclusion that the number of persons per house is practically uninfluenced by the changes in population, or by the changes in the average areas of villages from Tahsil to Tahsil.
69. Frequently as important as, sometimes even more important than Boundarythe area of a village available for cultivation, is the position of the village site in and pite posillonat that area, and the form of the boundary. . The point to be considered is that a efficiency. cultivator in order to plough lis land has to reach it, and must, unless he builds a special cottage near his own fields-an exceptional occurrence in the Punjabwalk daily to and from his house to the fields, taking with him his plough and bullocks. His womenfolk, too, unless they are high caste Mohammedans, will have to travel an equal distance to bring the cultivator his midday meal.

The consequence is that in addition to the 15 miles of soil which the cultivator and bullocks have to cover in order to plough a single acre of land, there is added the double distance from the village site to the cultivator's fields. . This is not a matter of which the mere consolidation of holdings, however, efficiently carried out can be a complete remedy. There is an irreducible minimum of distance which has to be travelled by the cultivator, independently of the proximity of his fields one to another, and this irreducible minimum I propose to call "the mean scalar distance." This mean scalar distance is thus a mathematical concept, a full expression for which, and the calculation of its values in certain theoretical and practical cases is considered in greater detail in Appendix 3 to this Report.

Clearly the most efficient boundary-shape of the village area, and the most efficient precinots of the village site will be those for which the mean scalar distance is a minimum, There are thus two possibilities.

[^9]Firstly, that the village boundary should be altered so as to make its shape approximate to its most efficient form.

Secondly, that the village site should be in a position in which the mean scalar distance is a minimum for the particular boundary.

Thus, in regard to shape it is clear that a circular boundary with the village site in the centre makes the mean scalar distance less than for any other boundary or position. As, however, it is impossible for all villages to have a circular boundary without leaving a lot of intervening waste-ground, the most efficient boundary for a number of villages of equal area is hexagonal. So long as villages have the same area there are only 3 possible regular figures which can represent their contours. These are the Hexagon, Square, and Equilateral Triangle, and the following results have been obtained for their mean scalar distances from their respective centres :-


If therefore we take a village of 2.7 square miles in area, which is the average size of a village in the Punjab, we find that the cultivator has to travel, on an average, $1 \frac{1}{4}$ miles each working day in simply going to and from his fields. This is the most favourable case of a village with an hexagonal boundary, with the village site in the centre. All this distance may be regarded as wasted effort, and this fact, no doubt, has limited practically the size of Punjab villages.

As regards the position of the village site in relation to the boundary this is even more important, as entailing wasted time and labour in travelling to and from the fields, than is the shape of the boundary. For example, we have the following values for the mean scalar distance from the vertex of the triangle :-

| Figure. | Mean Scalar Distance from the Vertox. |
| :---: | :---: |
| Equilateral Triangle .. | -923940 $\times$ square root of ares. |
| Isosceles right-angled triangle from the vertex containing the right angle | '765196 $\times$ square root of ares. |
| Iroscelos Triangle from the vertex with an angle of $120^{\circ}$ | -699137 $\times$ square root of area. |

These values show how enormously the mean scalar distance is increased as the village site departs from its central position.

The practical calculation of the scalar mean distance for some actual villages with irregular boundaries is given in Appendix 3. The concept will repay full mathematical examination.

Namber of Persons per Rutiling in
selected towns and dlles.
60. A special building census was held in February 1921 in Lahore City, Lahore Civil Station, Amritsar City, Jullundur City and Rawalpindi City and the results obtained, which are exhibited in Subsidiary Table XII, might have been extremely valuable but for the fact that they appear to 'be vitiated by serious Lahore City and we take columns 10-18 of Subsidiary Table XII for wards 1-6 of the as and calculate from it the number of inhabitants in those wards on hat themption that the centroid of the frequency of group $1-5$ inhabitants is at 2 , find that centroid of the frequency of grous in wards 1-6 works out at 117,140 as against a census figure of only 92,533 . This excess of nearly 25,000 persons cannot De expiained by the difference in date of only one month between the building census and the census proper, and the only conclusion appears to be is that in the
building census figures the recorded number of inhabitants per occupied building represents the total family whether some members of the family happened to be residing elsewhere or not. The same uncertainty does not attach to the figures for the number of persons per occupied house (with the exception of Malerkotla State) quoted in paragraph 8 above, and it is possible, therefore, that the greater number of persons per building in the towns somewhat exaggerates the reiative congestion in towns as compared to villages.

For purposes of the building census the following definition was adopted :-
"Every building which is entirely separate from, or has no internal means of communication with, the adjoining buildings, constitutes a separate building, for the purposes of this schedule. Any building with one common entrance constitutes one building only, no matter how it is divided up internally. For instance a serai forms one building: a haveli built round a courtyard forms one building: but if a row of houses is all built adjoining each other, but have separate entrances from the street and no internal means of communication with one another, they form separate buildings."
The following figures of the number of inhabitants per inhabited building may now be noted :-


The figures for ward 3 of Rawalpindi City suffer from some serious inaccuracies of which the Rawalpindi Municipality has no explanation to offer, arising most probably from doubt as to the ward boundaries, a doubt which exists even in respect of Lahore, Capital City though it is.
61. From the point of view of health, so far as this $\cdot$ is affected by Number of congestion, the number of inhabitants per room is even more important than the thabitants number of persons perinhabited building.* The required information is given in columns 20-30 of Subsidiary Table XII, which shows the frequency of the number of buildings, with the number of persons per inhabited room, between stated limits. For statistical purposes the limits adopted in the building census are not fine enough for accurate curve-fitting ; but in the case of Amritsar City, for which the original sohedules were available, I was able to get a slightly finer grouping at the beginming of the range. A frequency curve of type III has been fitted to the data of division 11 (the most congested division of Amritsar City), and to the whole of Amritsar City comprised in divisions 9, 10 and 11. The results are shown

[^10]
graphically in diagrams 25 and 26 . It should be noted that for the whole of Amritsar City the mean number of inhabitants per.inhabited roomi.is $1 \cdot 779$, while for division 11 it is 2.036 inhabitants. In division 11 again the modal, or the most commonly occurring case is to find 1.021 persons per inhabited room, while in the whole of Amritsar the most commonly occurring case is that for 713 persons per inhabited room. Thus in the whole of Amritsar City the most usual condition is to find rather more than one room per' person; while in congested division 11 the most frequent occurrence is to find just under one room per person. It is interesting to observe that in the case of division 11 the beginning of the range of the fitted curve is at 149 , corresponding to 6.7 rooms per person, while in the case of the whole of Amritsar City the range begins at 0154 corresponding to 65 rooms per person. Whether in fact in Amritsar there is a plutocrat living solitarily in some vast mansion with this number of rooms, I am unable to say, but the conclusion is suggested by the above calculations, and it is not inconsistent with the largeness of Amritsar's population, and the known wealth of its Khatri traders.
Teilerence to the Statistical Tables.
62. It has not been possible to do more at this stage of the Census than attempt here and there descriptions, in as precise a-mathematical form as may be, of the salient features of the distribution of the population in rooms, houses, villages, towns and cities. The broad outlines of such distributions have been described again and again, and it will serve no purpose to re-iterate the commonplaces as to the conditions of Punjab urban and rural life. The discussion of the inter-relationship of the various factors, which govern such distributions, is, no doubt, fascinating. But we must
(1) be sure of our facts, and
(2) express them in precise quantitative form
before attempting to examine the causal nexus which binds them.' Disregard of these two important points has led to much premature, and, at times, valueless speculation. Keplerian description (parvis componere magnis) must precede Newtonian theory, and to attempt to reverse the order of discovery has led to vast waste of paper and print.

[^11]CHAPTER II.
sumbidlary tables


ORAPTE䓝 I .

## SUBSIDIARY TABLE II:

Number por mille of the total population of each main religion who live in towns.


SUBSIDIARY TABLE III.
Towns classified by population.

| Clase of Towns. | Number <br> of Towns. | Proportion to total urban population. | Number of females for 1,000 majes. | Ingerase per oent. in the population or plajes Classed as towns at tere porner of the two Censuges in bach SUB-COLUMN. |  |  |  | Incriase per cest. in the drban population of bach class broal 1881-1921. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 1911-1021. | 1001-1011. | 1891-1901. | 1881-1891. | (a). In places classed as towns in 1881. | (b). In the total of each class in 1921, as compared with the corresponding total in 1881 |
| 1 | 2 | 8 | 4 | 6 | 6 | 7 | 8 | 9 | 10 |
| PUNJAB INCLUDING |  |  |  |  |  |  |  |  |  |
| PUNJAB STATES | 186 | - 21 | 718 | +73 | $-2.8$ | $4 \cdot 7$ +4.5 | $+7.5$ | $+21^{0}$ | + $4 \cdot 8$ |
| 11.- ${ }^{1,00,000-1,00,000}$ | 0 | $\cdot 18$ | 714 | +16.8 +1.6 | + | +16.5 +5.9 | +4.1 +18.6 | +467 +20.1 | - $+80 \cdot 3$ |
| 111.-20,000- 60,000 | 10 | -19 | 734 | +922 | $\pm 3.0$ | + 6 | +186 +83 | +281 +16 | +387 +316 |
| IV.- 10,000-20,000 | 30 | $\cdot 16$ | 753 | $+12 \cdot 8$ | -78 | + $3 \cdot 4$ | + 83 | +123 | + 8 |
| V.- $8,000-10,000$ | 77 | -21 | 824 | +3.3 | $-8.1$ | $+3 \cdot 1$ | +4.1 | +6.3 | $-22 \cdot 9$ |
| VI,-Under 5,000 | 51 | '07 | 781 | $-4.2$ | $-2 \cdot 8$ | $+16$ | $+6.6$ | $+40.6$ | $-53 \cdot 1$ |
| DELFII - .. | 1 | 1 | 672 | $+307$ |  | $+83$ | +11-1 | $+75 \cdot 5$ | $+75 \cdot 6$ |
| I, $-1,00,000$ and over | 1 | 1 | 072 | $+307$ | $+11.6$ | +8.3 | +1111 | $+75.5$ | $+75$ |

Notrs,-Tho table is of slight value owing to tho ohanges of definition of the term 'town', and the variations in the number of town in ach olase in the difforent consusog. SUBSIDIARY TABLE IV.

## Cities and Selected Towns.

| City or Selcotod Town, | Population in 1821. | Number of persons per square mile. | Number of fomales to 1,000 males. | Population of foreign born per mille. | - Prrorntage of variamon. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | 1911-1021. | 1001-1911. | 1891-1901. | 1881-1891. | $\begin{gathered} \text { Total } \\ 1881-1921 . \end{gathered}$ |
| 1 | 2 | 5 | 4 | 0 | 0 | 7 | 8 | 9 | 10 |
| Lahnm Oity . . | 281,781 | 6,715 | 571 |  | +23.2 |  |  |  |  |
| Amritar City .. | 100,218 | 10,534 | 685 | 646 $\mathbf{9 2 1}$ | +23.2 <br> +4.9 | +127 -6.0 | +14.8 +18.8 | $\pm 12.4$ | +79.1 <br> +6.0 |
| Multan City ${ }^{\text {Rawnlpindi Town }}$ | 84,808 101.142 | 0,404 11.808 | 760 | $\begin{array}{r}265 \\ \hline 685\end{array}$ |  | -6.0 +13.6 | +188 +17.2 | -10.0 +8.6 | $+5 \cdot 5$ $+23 \cdot 5$ |
| Ambala Town | 101,142 76,326 | 11,802 4,549 | 441 | 637 | +16.0 | $-1.4$ | +18.8 | +39.3 | $+90.9$ |
| Jullundur Town | 76,326 71.008 | 4,048 | 667 749 | 448 | $\pm \begin{aligned} & 4.7 \\ & +8.4\end{aligned}$ | $+1.9$ | - 8 | $+17 \cdot 5$ | $+13 \cdot 1$ |
| Sinlkot Town ... | 70,010 | 8,084 | 748 | 347 <br> 355 <br> 1 | + 2.4 +8.8 | +23 +11.9 | +23 +5.2 | +27.0 +20.4 | $\underline{+36.2}$ |
| Sbramopore Thwn | 54,351 | 4,041 | 668 | 620 | +888 +8.8 | +119 +3.0 | + | $+20 \cdot 4$ +27 | +54.3 -+37.3 |
| Dolli City . | 304,480 | 4,678 | 672 | 479 | +307 | $+11.6$ | +83 | $+11 \cdot 1$ | - |

## SUBSIDIARY TABLE V．

Distribution of population in groups of places according to size，and in Rural Territory 1891 to 1921.

| Class of place． | 1921. |  | ． 1911. |  | 1901. |  | 1801. |  | Per cent．of total population． |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | $\begin{aligned} & \text { 品 } \\ & \text { 0 } \\ & \text { E } \\ & 0 \end{aligned}$ |  | $\begin{aligned} & \text { 品 } \\ & \text { B } \\ & \text { 品 } \\ & \text { م } \end{aligned}$ |  |  | 1921. | 1011. | 1801. | 1891. |
| 1 | 2 | 3 | 4 | 5 | 0 | 7 | 8 | 0 | 10 | 11 |  | 13 |
| Total population of the Punjab | 45，408 | 25，101，060 |  | 23，701，367 |  | 24，366，625 | ．． | 22，915，482 | $100 \cdot 0$ | 100.0 | 100．0 | $100 \cdot$ |
| Urban Territory | 188 | 2，508，678 | 173 | 2，334，445 | 224 | 2，580，788 | 220 | 2，444，183 | $10 \cdot 3$ | $0 \cdot 8$ |  | $10 \%$ |
| 1．－Towns of 10,000 and over ．． | 3 | 643，141 | 2 | $\cdots 381,443$ | 2 | 365，393 | 2 | 313，620 | $2 \cdot 2$ |  |  |  |
| II．－Towns of 50,000 to 100,000 | 6 | 408，990 | 8 | 450，880 | 6 | 432，056 | 7 | 455，233 | 1.6 | 1.9 | $1 \cdot 8$ | 2.0 |
| III．－Towns of 20,000 to 50,000 | 19 | 510，687 | 13 | 367，517 | 13 | 379，844 | 13 | 340，204 | $2 \cdot 0$ | $1 \cdot 5$ | $1 \cdot 6$ | 1.6 |
| IV．－Towns of 10,000 to 20,000 | 31 | 415，553 | ． 30 | 432，155 | 34 | 490，124 | 32 | 440，826 | 1.7 | 1.8 | 2.0 | 1. |
| V．－Towns of 5,000 to $\mathbf{1 0 , 0 0 0}$ | 70 | 538，279 | 77 | 539，802 | 99 | 679，439 | 97 | 658，667 | $2 \cdot 1$ | $2 \cdot 3$ | $2 \cdot 8$ | 2 |
| VI．－Towns of under 5,000 | 51 | 170，028 | 45 | 162，558 | 70 | 233，042 | 69 | 226，633 | $\cdot 7$ |  |  | 2 |
| Raral Territory＊．． | 45，222 | 22，504，382 |  | 21，456，022 | ． | －21，785，827 |  | 20，471，290 | 897 | $90 \cdot 2$ | $89 \cdot 4$ | $89 \cdot 3$ |
| Total population of Delhi Province． | 310 | 488，188 | ． | 413，447 | ．． | 405，400 |  | 372，766 | $100 \cdot 0$ | $100 \cdot 0$ | 100.0 | 100.0 |
| Urban Territory $\quad$ ． | 1 | 304.420 | 1 | 232，837 | 1 | 208，575 | 1 | 102，570 | 62.4 | 58.3 | 51.4 | 517 |
| I．－Town of 100，060 and over ．． | ． 1 | 304，420 | 1. | 232，837 | 1 | 208，575 | 1 | －$-102,579$ | 62．4 | 58.3 | $1 \cdot 4$ | 17 |
| Rural Territory | 314 | 188，768 | ．$\cdot$ | 180，010 | ． | 196，834 |  | 180，187 | $37 \cdot 6$ |  | $48 \cdot 6$ | $8 \cdot 3$ |

SUBSIDIARY TABLE VI．
Population of Urban Classes and of rural territory as constituted in 1921 with increase．


Foot－note．－The towns entered against＂b＂were nat treated as towns in 1911，and their population in that year cannot be obtained．
subismiary tables.
ORAPTRR $n$.

## SUBSIDIARY TABLE VII.

Places classed as Towns in each of the last five Censuses, according to the population classes in 1921.


SUBSIDIARY TABLE VII.
Places classed as Towns in each of the lant five Consuses according to the population elasses in 1924.


## SUBSIDIARY TABLE YII.

Places classed as Towns in each of the last five Censuses according to the population classes in 1921.


OHAPTER 14.


OHAPTER II.
.SUBSIDIARY TABLE IX.

- Hural Density. Census 1921.


chaptze $\mathrm{II}_{0}$
sUBgmLixy TABLEB

\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{12}{|c|}{SUBSIDIARY TABLE IX： Rural Density．Census 1921.} \\
\hline \& \multicolumn{2}{|l|}{Pinoos clastod as towns in osch of the leat fivo consuros．} \& \multirow[t]{2}{*}{Total aroa lows
rovenvo area of column 3. （Squars
miles）．} \& \multicolumn{2}{|l|}{Ropulation of tahsil} \& \multicolumn{2}{|l|}{Urban population} \& \multicolumn{2}{|l|}{Raral population．} \& \multicolumn{2}{|l|}{\(|\)\begin{tabular}{l} 
Number of \\
rural popu： \\
lstion per \\
square milo \\
of rural area
\end{tabular}} \\
\hline | \& \[
\begin{aligned}
\& \dot{!} \\
\& 8 \\
\& 8 \\
\& \text { 兑 }
\end{aligned}
\] \& Namo． \& \& 1921. \& 1011. \& 1821. \& 1011. \& 1921： \& 191. \& 192 \& 911： \\
\hline  \& \[
\begin{gathered}
2 \\
78 \\
74 \\
78 \\
70
\end{gathered}
\] \& \begin{tabular}{l}
8 \\
Sialkot Tahail \\
Bialkot \\
Pustur Tahsil \\
Pasar \\
Zafarmal Tahail \\
Raya Tahsil \\
Danks Tahal \\
Sambrial \\
Hardo Daske．
\end{tabular} \& \[
\begin{gathered}
4 \\
418 \\
\because_{282} \\
{ }^{4} 307 \\
484 \\
276 \\
\because \\
\because
\end{gathered}
\] \& \[
\begin{gathered}
{ }^{6} \\
290,460 \\
\ddot{140,788} \\
\ddot{158,983} \\
196,936 \\
150,694 \\
\vdots
\end{gathered}
\] \& \begin{tabular}{l}
6 \\
288，488 \\
\(\ddot{148,758}\) \\
\(\ddot{166,030}\) 194，207 \\
147，78
\end{tabular} \& \[
\begin{aligned}
\& 7 \\
\& 70,618 \\
\& 70,619 \\
\& 6,909 \\
\& .6,909 \\
\& \because: \\
\& \hline 9,607 \\
\& 3,234 \\
\& 6,283
\end{aligned}
\] \& \begin{tabular}{c|}
\hline 8 \\
64,869 \\
64,86 \\
7,564 \\
7,664 \\
\(\because\) \\
\(\because 2,331\) \\
6,285 \\
6,046
\end{tabular} \&  \& 10
218,620
\(\because 141,194\)
186,830
194,207
135,466
\(\because\)
\(\because\) \&  \& \[
\begin{gathered}
12 \\
526 \\
\hline 601 \\
001 \\
\hline 511 \\
401 \\
491 \\
\because .
\end{gathered}
\] \\
\hline  \& 77
78
70
80 \&  \& \[
\begin{aligned}
\& { }^{920} \\
\& \because \\
\& \because 440 \\
\& \because \\
\& \because 908
\end{aligned}
\] \& \[
\begin{gathered}
294,567 \\
\because \\
\ddot{146,248} \\
\because \\
182,766
\end{gathered}
\] \& \[
\begin{gathered}
286,066 \\
\ddot{\square} \\
\ddot{148,908} \\
\because \\
189,028
\end{gathered}
\] \& \[
\begin{aligned}
\& 43,703 \\
\& 37887 \\
\& 5,816 \\
\& 23,277 \\
\& 18,465 \\
\& 4,632 \\
\& . .
\end{aligned}
\] \& \[
\begin{aligned}
\& 35,833 \\
\& 30,307 \\
\& 6,566 \\
\& 22,402 \\
\& 17,146 \\
\& 5,266 \\
\& .
\end{aligned}
\] \& \[
\begin{gathered}
250,864 \\
\because \\
\because \\
123,971 \\
\because \\
\ddot{8} 2,760
\end{gathered}
\] \& \[
\begin{aligned}
\& 230,823 \\
\& \ddot{\because} \\
\& 126,596 \\
\& \ddot{189} \\
\& \ddot{8}, 928
\end{aligned}
\] \& 271
\(\therefore\)
\(\because 278\)
\(\square\)
\(\because\)
\(\square\)
201 \& 248
\(\because\)
288

208 <br>

\hline  \& 81 \& | Khangah Dogran Tahail | . |
| :--- | :--- |
| Slarakpur Tabail | . |
| Sharakpur | ． | \& \[

$$
\begin{array}{r}
880 \\
1,022 \\
\ldots
\end{array}
$$

\] \& \[

$$
\begin{array}{c|}
287,074 \\
255,461 \\
. .
\end{array}
$$
\] \& 222,635

213,828
.. \& $\bullet$
4,127

4,127 \& | $*$ |
| :--- |
| 4,482 |
| 4,482 | \& \[

$$
\begin{aligned}
& 207,071 \\
& 281,334
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 222,535 \\
& 209,446
\end{aligned}
$$
\] \& 48 \& 253

205
$\because$ <br>

\hline  \& \[
$$
\begin{aligned}
& 82 \\
& 83 \\
& 84 \\
& 85
\end{aligned}
$$

\] \& | Gujrat Tahnil |
| :--- |
| Gujrat |
| Kinjah |
| Jalnlpur Jnttan |
| Kharian＇Tabsill |
| Dinga |
| Phalia Tahsil | \& \[

$$
\begin{aligned}
& \quad 657 \\
& \because \\
& \because \\
& \because 684 \\
& \ddot{i}, 087
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 296,551 \\
& \because \\
& \because \\
& 200,201 \\
& 278,294 \\
& 27
\end{aligned}
$$

\] \& \[

$$
\begin{gathered}
304,778 \\
\because \ddot{~} \\
2665,268 \\
217,053 \\
\hline
\end{gathered}
$$

\] \& \[

$$
\begin{aligned}
& 40,008 \\
& 21,974 \\
& 7,240 \\
& 10,702 \\
& 10,7014 \\
& 6,014 \\
& \therefore \quad \therefore \\
& \hline
\end{aligned}
$$

\] \& \[

$$
\begin{array}{r}
137,795 \\
19,090 \\
7,090 \\
11,015 \\
. \\
\hline 6,351 \\
5,351 \\
. \quad \\
\hline
\end{array}
$$

\] \& \[

$$
\begin{aligned}
& 265,545 \\
& \because \\
& \ddot{244}, 187 \\
& 2 \ddot{278,294}
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 268,983 \\
& \because \\
& \because \\
& 269,917 \\
& 217,953
\end{aligned}
$$
\] \&  \&  <br>

\hline  \& \[
$$
\begin{gathered}
88 \\
87 \\
88 \\
88 \\
88
\end{gathered}
$$

\] \& | Shahpur Tahull |
| :--- |
| Sabiwal |
| Khushab Tahnil |
| Kluushab |
| Bhalwal Tahzil |
| Bhora |
| Miani |
| Sargodha Tolall | \& \[

$$
\begin{gathered}
608 \\
\ddot{8}, 619 \\
\because 818 \\
\because \\
\because 884
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
137,898 \\
\ddot{188,718} \\
\ddot{200,051} \\
\ddot{192,350} \\
\hline
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
141,883 \\
\ddot{1} \ddot{7}, 824 \\
\ddot{8} 4,726 \\
\ddot{4}, \ddot{142,768}
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
6,582 \\
6,582 \\
10,009 \\
10,009 \\
22,0092 \\
17,027 \\
6,985 \\
\therefore . \\
\hline
\end{gathered}
$$

\] \& \[

$$
\begin{array}{r}
7,658 \\
7,658 \\
10,168 \\
10,150 \\
21,1621 \\
15,202 \\
6,818 \\
\cdots
\end{array}
$$

\] \& \[

$$
\begin{aligned}
& 131,317 \\
& \ddot{1} 88,700 \\
& \ddot{g} 9,050 \\
& \ddot{1} \\
& \ddot{102}, 350
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 134,025 \\
& \ddot{1} 55,665 \\
& \ddot{163,705} \\
& \ddot{142,768}
\end{aligned}
$$

\] \& 231 \& | 224 |
| :---: |
| $\cdots 68$ |
| $\cdots 201$ |
| 01 |
| $\square$ |
| 171 | <br>

\hline $$
\begin{aligned}
& \text { 首 } \\
& \text { 易 } \\
& \text { 号 } \\
& \text { s. }
\end{aligned}
$$ \& \[

$$
\begin{aligned}
& 00 \\
& 01 \\
& 02
\end{aligned}
$$

\] \&  \& \[

$$
\begin{aligned}
& 888 \\
& { }^{88} 848 \\
& \text { " }_{897} \\
& . . \\
& \hline
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 173,122 \\
& \ddot{143,338} \\
& \ddot{60}, 608 \\
& \cdot \\
& \hline
\end{aligned}
$$

\] \& \[

$$
\begin{gathered}
180,034 \\
1660,305 \\
\ddot{176,236} \\
\cdots \\
\hline
\end{gathered}
$$

\] \& \[

$$
\begin{array}{r}
18,060 \\
18,000 \\
9,919 \\
9,99 \\
7,425 \\
7,425 \\
\hline
\end{array}
$$

\] \& | 19,678 |
| ---: |
| 19,678 |
| 10,590 |
| 10,590 |
| 6,400 |
| 6,900 | \& \[

$$
\begin{gathered}
156,062 \\
\ddot{133}, 419 \\
\ddot{163}, 183
\end{gathered}
$$

\] \& \[

$$
\begin{aligned}
& 160,356 \\
& \ddot{145}, 715 \\
& \ddot{168}, 836
\end{aligned}
$$
\] \& 167

-15
$\cdots$ \& 181
-172
$\cdots 168$
$\therefore-$ <br>

\hline  \& 031 \& | Rawalpindi Tahstl Rawalpiad Gujar Khan Tahail Marroo＇Taball Murtoo |
| :--- |
| Kahute Tabail | \&  \& \[

$$
\begin{gathered}
\hline 282,656 \\
\ddot{148,887} \\
60,908 \\
\ddot{90}, 762
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
249,833 \\
148,576 \\
60,670 \\
\ddot{92,849}
\end{gathered}
$$

\] \& \[

$$
\begin{gathered}
101,142 \\
10,142 \\
\cdots \\
3,222 \\
3,292 \\
. .
\end{gathered}
$$

\] \& \[

$$
\begin{aligned}
& 86,483 \\
& 86,483 \\
& \therefore 1,705 \\
& 1,705 \\
& \therefore \\
& \because
\end{aligned}
$$

\] \& \[

$$
\begin{array}{r}
161,514 \\
148,837 \\
67,677 \\
\ddot{96}, 762
\end{array}
$$

\] \& \[

$$
\begin{array}{r}
163,350 \\
\ddot{148,575} \\
64,865 \\
\ddot{92}, 848
\end{array}
$$

\] \& | 212 |
| :--- |
| 262 |
| 234 |
| 214 | \& | 215 |
| :---: |
| 261 |
| 223 |
| 205 |
| 208 | <br>

\hline  \& $$
\begin{aligned}
& 08 \\
& 08 \\
& 08 \\
& 08 \\
& 08 \\
& 00
\end{aligned}
$$ \&  \& \[

$$
\begin{aligned}
& 640 \\
& \because \\
& \because \\
& \because, 486 \\
& \because, 187 \\
& \because 863
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 173,472 \\
& \because \\
& \ddot{\ddot{2} 0,097} \\
& \ddot{108}, 501 \\
& \ddot{1} 0,170
\end{aligned}
$$

\] \& \[

$$
\begin{aligned}
& 161,351 \\
& \because \\
& \ddot{126}, 300 \\
& \ddot{11}, 418 \\
& \ddot{10} 6,204
\end{aligned}
$$

\] \& \[

$$
\begin{array}{r}
18,428 \\
8,408 \\
9,1750 \\
1740 \\
9,418 \\
9,19 \\
6,438 \\
0,438
\end{array}
$$

\] \& \[

$$
\begin{array}{r}
14,602 \\
9,950 \\
4,022 \\
630 \\
8,045 \\
9,045 \\
9,045 \\
\hline, 746 \\
8,746
\end{array}
$$

\] \& \[

$$
\begin{aligned}
& 155,044 \\
& \because \\
& \because \\
& \ddot{10}, 078 \\
& \ddot{102}, 063 \\
& \ddot{10}, 179
\end{aligned}
$$

\] \& \[

$$
\begin{array}{c|}
146,748 \\
\because \ddot{ } \\
\ddot{\ddot{1} 7,255} \\
\ddot{\ddot{0} 8,672} \\
\ddot{116}, 204
\end{array}
$$

\] \&  \& | 227 |
| :--- |
| $\because$ |
| $\because$ |
| $\because 78$ |
| $\square$ |
| 138 |
| 135 | <br>

\hline  \& $$
\begin{aligned}
& 100 \\
& 101 \\
& 108 \\
& 103
\end{aligned}
$$ \&  \& \[

$$
\begin{aligned}
& 1,620 \\
& \ddot{8,128} \\
& \because 608 \\
& \because \because
\end{aligned}
$$
\] \& 147,068

$\ddot{147,181}$
$\ddot{63} 3081$
$\because$
$\therefore$ \& 138,380
$\ddot{136,127}$
$\ddot{67} 870$
$\ddot{\square}$

$\square$ \& \[
$$
\begin{array}{r|}
9,116 \\
8,118 \\
8,188 \\
6,189 \\
14,627 \\
8,172 \\
8,455
\end{array}
$$

\] \& \[

$$
\begin{array}{r}
7,064 \\
7,064 \\
60,384 \\
6,388 \\
\hline 13,58 \\
68,888 \\
6,654
\end{array}
$$
\] \& 138,488

$\ddot{140,828}$
$\ddot{48,904}$

$\ddot{\square}$ \& $$
\begin{aligned}
& 131,316 \\
& \ddot{29}, 738 \\
& \ddot{3} \ddot{4}, 348 \\
& \ddot{\square}
\end{aligned}
$$ \&  \& 88

$\because 48$
$\because 78$
$\because$
$\square$ <br>
\hline
\end{tabular}


chapres 1

## SUBSIDIARY TABLE X.

Statement showing average population and area por Yillage in Tahsil. Consus 1921.


bubsidiaby tableb.

## SUBSIDIARY TABLE XI.

Statement showing average number of persons per house (in Tahsil or State). Census 1921.


GEAPTRR H.

sugstilary tables.

TABLE XII.
Bailding Consus held in Pobruary 1921.


# CHAPTER III. 

## Birth-Place.


#### Abstract

83. Generalisation. 64. Imaigration and Emigration' Streams, Extra-Provinoinl. 65. Immigration and Emigration Streame, Intra-Provincial. 66. Trafily returns and the Intra-Provinaial flarea of birth-place. 67. Further analygir of Railway statistica, and their, application to Census date of migration. 68. Trafic peturna and Extra-Provinoial Agures of birth-place. 69. Some difientiea of interpretation. 70. Maja or Atman $\}$ 71. Graphic presentation of the data. 72. Comparision of the statistics with those of 1911.7 73. Immi. gration from and Emigration to other capuntries 74. Reference to tables.


## Genoral.

 fistlon,63. The present chapter with the title of "Birth-place" replaces the chapter on "Migration" of the Censua Report of 1911. The new title is more appropriate than the old, in that it more accurately describes the actual entry in the Census Schedules, which defines the district of birth iof each person enumerated. For every person, then, actually in the Punjab between sunset and sunrise on the 18th March 1921, we are able to state more or less correctly in which district he or she was born. The working assumption has already been adopted that the chance that a given person will be included in the Census Schedules is $0^{\circ} 99$. The next question that arises is, what is the chance that a person having been entered in the Census Schedules, should have his or her district of birth correctly entered?

Now, of $20,685,024$ persons enumerated in British Territory in the Punjab, $17,850,279$ represented themselves as born in the districts in which they were enumerated : while in the Punjab States out of $4,416,036$ persons enumerated, 3,730,163 persons are classed as having been born in the State in which they were enumerated. Thus 86 and 84 per cent. respectively of persons found in British Districts and Punjab States, affirmed that they were born in the self-same district or State in which they were enumerated; or, taking the Punjab as a whole 86 per cent. of the persons resident in British Districts and States, claimed to be born in the very district or State in which they were enumerated. It seems unlikely that there were many people who erroneously: stated that they were born in a district or State other than that in which they were resident, whereas, there may have been many misstatements, in all good faith, by persons who, having come to reside in a district or State when quite young, were under the impression that they were born in that district or State. Further, sentiment in Indian village life is intensively consorvative and the term "pardesi" (hailing from another country) is one that every immigrant is usually anxious to divest himself of. This may not be true of the Canal Colonies where the percentage of immigrants is very high, and where, so far, there exists no temptation for a man to class himself as one of the indigenous " Jangli" inhabitants ; but it is certainly the case in the old-established districts of the Punjab, and it is probable that the number of persons ${ }^{t}$ residing on the 18th March 1921 in the districts in which they were born, was less rather than greater than the escertained figure of 86 per cent. of the total population.

Then, again, there seem to be possibilities of misstatement in respect of the birth-places of married women, particularly af Hindu and Sikh married women, who are frequently introduced to their prospective husbands by middlemen, who may find it desirable to conceal a woman's antecedents. In the Central Punjab misrepresentations both of a woman's caste and birth-place have often been the subject of litigation, and the number of cases which appear in the courts must be but a small fraction of the cases in -which the husband has been successfully deceived.

All the latter class of cases would involve false entries in respect of birthplace in the Census Schedules. Lastly, a small number of fugitives from justice, if enumerated at all, would be almost certain to give false replies to all the scheduled questions.

In consequence, it is not likely that we should be carrying caution too far in adjudging that the probability of an error in the recorded entry of birth-place is 1 in 100. If this figure is tentatively accepted, the chance that any one individual is recorded in the schedules, and has a correct entry in respect of place of
birth, will be $0.09 \times 0.99=0.98$ very nearly. This we may conclude that there in an average error of 2 per cent. (on the true numbers) in the numbers ohown. ai born in any district or State.
64. Now it has been possible to give only a very general conclusion as to the accuracy of the Censas figures in respect of place of birth, and as it is based on a variety of assumptions, it must be guardedly applied.

According to the Census figures the number of persons born in the Punjab Extrapro. and residing outaide it, and the number of persons born outside the Punjab and residing in it, on March 18, 1921, were 549,386 and 627,137 - respectively; while the corresponding figures for the 10th March 1911 were 516,612 and 660,219 respectively.

Now if we adopt the approximate assumptions made by Mr. Middleton in para. 25 of Chapter I, viz.-
(i) that the annual streams of immigration and emigration have been constant throughout the decade,
(ii) that the annual death-rate among immigrants and emigrants can be represented as a definite annual decrement of 20 per mille; we find that the annual numbers of emigrants from, and.immigrants into the Punjab during 1911-1921 were, in round nambers, 14,000 and 11,000 respec:tively. The figures arrived at above, exclude, however, the number of persons who may have left the Punjab and returned to it, or who may have entered the Punjab and left it during the decade. This omission, which no appeal to the Census figures can possibly rectify, may account for ten times as many emigrants from, and immigrants into, the Punjab each year, as the 25,000 persons who are calculated to cross the provincial boundary each year, As about 800,000 persons are born each year in the Punjab, of whom 45 per cent.* reach their 16 th birthday, it may be said that 14,000 out of 360,000 adult persons, or, say just under 4 per cent., emigrate, in the restricted meaning of the word, which implies that theystay away from the Punjab long enough to affect the Census returns.
65. Using the same assumptions as those denoted (i) and (ii) in the above Immgraparagraph, the annual number of persons moving from one district to another, Emigration and staying long enough to affect the Census returns, has been calculated, and the streams, results are tabulated in Subsidiary Table V to this Chapter: The table has beenc vincialt calculated from Mr. Middleton's formula, which can be most conveniently expressed in the following notation:-

Let $(A+B)$ denote the number of persons born in district $A$, who moved annually between the years 1911 and 1921 into district $B$, and did not return prior to the 18th March 1921.

Let (A B) denote the number of persons born in district $A$ and enumerat:-: od in District B in the Census year " $n$ ".
Then we have

$$
(A+B)=\frac{1}{46}\left[5(A B)_{\operatorname{con}}-4(A B)_{100}\right]
$$

and, -imilarly,

$$
(\mathrm{B}+\mathrm{A})=\frac{1}{4}\left[5(\mathrm{BA})_{12 n}-4(\mathrm{BA})_{10 n 1}\right]
$$

Now the application of the formula to the 812 possible reciprocal paths between the 29 districts of the Punjab, results, as will be seen in Subsidiary Table $V$, in no less than 225 negative values for the number of travellers annually of the type $(\mathrm{A}+\mathrm{B})$, between 2 districts. The most probable explanations of these negative values are, firstly, that a number of persons residing in 1911 in a district other than the one in which they were born, left the district before 1921, or that the death-rate among emigrants was greater than the assumed rate of 20 per mille. While recognising, therefore, that Mr. Middleton's formula is the outoome of a logical attempt to solve the very difficult problem of :migration Kinematios from Census Statics, it does not seem to me to have succeeded, as the number of cases in which the formula breaks down, and gives a negative result; throws doubt on the numerical accuracy of the positive results. Having said so much in criticism, however, it is only fair to add that, qualitatively, théstreams of intra-provincial emigration seem to be correctly : indicated by Table $\bar{\nabla}$, and it may be taken to show the direction and relative strength of the inter-district

[^12]currents of migration. What the absolute strength of the currents is can only be formed by direct observation, or by building up equations of far greater complexity than any which have been applied, at any rate, to Indian Census data.

As examples of the results of the inter-district migration which are con-

District to or from which the annual
streams of migration aro greateat.

| From. | Calculated persons loaving district cach year. |
| :---: | :---: |
| Jullundur | 6,837 |
| Amritsar | 8,645 |
| Sialkot | 5,514 |
| Hoshiarpur | 8,238 |
| Guiranwala | -4,909 |
| Lahore | 4,592 |
| Gordaspur <br> Liyallpur | 4,301. |
| Lyallpur | 4,179 |
| $\because$ To | Caloulated persons reaching district each year. |
| Sheikhupurs | 21,690 |
| Montgomery | 10,242 |
| Lyallpur | 5,225 |
| Labore | 4,776 |
| Maltan | 3,652 |
| Gujrat | 3,072 |
| Amritsar | 2,357 |
| Ferozepors | 2,339 |

Largest inter-district atreams of migration.

| From Distarict. | To District. | Colculated annaal changes of residence. |
| :---: | :---: | :---: |
| Jullandar | Montgomery | 2,089 |
| Lyallpur | Montgomery | 1,487 |
| Lahore | Montgomery | 1,423 |
| - Amritsar | Lyallpar | 1,282 |
| Hissar | Ferozepora | 1,258 |
| Jullundur | Lyallpur | 1,081 |
| Jhang | Lyallpur | 991 |
| 'Hoshiarpar | Jullundur | 896 | sentaneous with one's independent belief as to the facts, one may instance the large annual currents which exist to and from the districts named in the margin. The dietricts named are those for which the calculated streams of population are greatest.

It will be observed that of the 8 districts which have the greatest annual number of persons arriving and leaving each year,* Lyallpur, Lahore and Amritsar appear in both categories, a fact which is in conformity with the greater volume of business transacted in these cities, and in the case of Lahore of its importance as the headquarters of Government, both of which facts involve lengthy periods of changes of residence. Excluding the newly formed district of Sheikhupura, the districts between which there has been the largest calculated migration are those noted in the margin.

Besides the clearly-marked population drift towards the Colony areas of Montgomery and Lyallpur, it is apparent that there are considerable movements of people from Hissar to Ferozepore, and from Hoshiarpur to Jullundur. As Jullundur herself is pouring out her population towards the colonies it is striking that her numbers should be so strongly reinforced from the neighbouring district of Hoshiarpur. $\dagger$
Between many districts of the Punjab the streams of migration are of course, sluggish, or practically stationary. Thus, naturally, relatively very few persons go each year from the plains districts to the hills, the Musalman of the North-West does not readily migrate to the Hindu-populated areas of the South, whilst the Sikh, favourably situated in the Central Punjab, is too ardent of gain to journey often beyond his district except to the canal colonies, or to Australia and America. Thus from Lahore to Kangra, from Attock to Rohtak, and from Jullundur to Karnal or Mianwali, to mention only a few instances, the annual movement of persons is, so far as the Census returns go, practically negligible.
66. So far we have dealt only with those movements of the population which reflect themselves in the Census statistics : but it is now necessary to emphasize what a small fraction of the total volume of circulation these censusI reflected movements represent, and, how difficult is the interpretation of the censius figures of birth-place.

As a rule in Census Reports the number of persons enumerated in Area B, having been born in Area A, are spoken of simply as the emigrants from Area A, or the immigrants into Area B. If this use were equivalent to definitions of the terms " emigrant" and "immigrant", no exception could be taken to the practice on logical grounds. It so happens, however, that the terms "emigrant" and "immigrant" have connotations which differ from the " birth-place" definition, and a good deal of confusion of thought arises in consequence. Thus Mr. Gait (Vol. I, Part I of the Census of India Report for 1911, pages 89 and 90 ) distinguishes five classes of migration, viz., casual, temporary, periodic, semi-permanent, and permanent. In the last class alone, apparently, is there a change of domicile.

[^13]The distinguishing characteristics of the various types of migration are clearly given, bat nowhere is the important point explicitly stated that the census figures necessarily give only a partial measure of the volume of permanent and semipermanent migration, and a wholly inadequate measure of the temporary and casual forms of migration.* This point, namely the extent to which all kinds of migrations are repeated in the Census figures of birth-place, must now be examined, though without any refinement of analysis.

To come down to bed-rock, it is clear that a full solution of the migration problem would involve a knowledge of every movement of every single human being from the place in which he or she was born, from birth till death. Clearly the census schedules do not give us this information, and this at once forces us from the physical to the statistical plane. What are the elements of a full statistical solution? The answer is that it involves a description of the frequency distribution of the number of persons who leave their homes for (a) all the possible varying lengths of time and (b) for all possible lengths of journeys.

Then the broad classifications could be sub-divided minutely according to age (both at departure and return), sex, religion, caste, and finally according to the objects of the migration; but, in the beginning, if we could get any idea of the number leaving their homes for a day, a week, a month, a year or several years, a step towards a grasp of the fundamental problem would have been made.

In the Punjab practically the only material we have for forming any conclusions as to the journeys made by persons in the Punjab, are contained in the traffic statistics of the North-Western Railway.

The figures for the total number of passengers carried of all classes,

Pamongors carriod by the North-Weetern Railway.

|  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | both ordinary and military, for the last decade are as shown in the margin. These figures are swollen by the large numbers of troops entrained during the war years from 1914-15 to 1917-18; but the traffic since the close of the war has ${ }_{1,}$ exceeded anything obtaining before, so that by taking an average of the last 10 years, we shall not be exaggerating the present volume of passengers carried: The total mileage of the NorthWestern Railway system is (October 1922) 5,719 miles ( 5,308 broad-gauge and 411 narrow-gauge), out of which 2,072 miles lie in the North-West Frontier Province, Sindh, Baluchistan and the United Provinces: so that 3,647 miles of the North-Western Railway lie in the Punjab, to which must be added a few hundred miles of foreign lines also in the Punjab. We shall not, therefore, be far wrong in assuming that 2/3rd of the marginally noted numbers of passengers travelled in the Punjab. We may, therefore, conclude that in the decade 1911-1921, about 46,000,000 passengers travelled annually by rail in the Punjab. As the geometric mean of the populations of the Punjab and Delhi in $1911(24,187,750)$ and $1921(25,589,248)$ is $24,878,630$ we may put the average number of railway journeys made in the Punjab each year as very nearly 2, for each man, woman and child.

Now we have already estimated in paragraph 64 that the total number of persons travelling each year, and staying away from their birth-place long enough to affect the census returns is approximately 25,000 for extra-and 70,000 for intra-provincial migration, so that the journeys made by these persons are far too fow sensibly to affect the 46 million journeys made each year in the Punjab, and our estimate of roughly 2 journeys per caput of population per annum may be provisionally accepted. As going and returning count as 2 journeys, on the average each person in the Punjab makes one trip away from his home each year.

[^14]To this number must be added, if we are to determine the inter-district traffic, all the persons who travel by road, and subtracted all journeys made within the confines of a single district (we may tentatively assume the equality of these two numbers), leaving us still with one trip per annum of each individual in the Punjab and Delhi, from one district to another. This estimate of one trip per annum per person is based on the assumption that the whole population contributes to the 46 million journeys made annually. If, however, we were to exclude the stay-at-homes, that is the persons who do not go outside the limits of their district from one year's end to another's, who would probably form about onethird of the population, the trips per head of the travelling population would amount to $1 \frac{1}{2}$, annually, instead of one.

The question now arises " can we form any estimate of the length of time that persons generally spend away from their native district?" A caltivator may leave his home in Jullundur and Hoshiarpur in early youth and settle, until he feels death approaching 50 years later, in one of the canal colonies, a Government servant may spend 30 years of his life in district after district other than the one in which he was born, a woman may live with her husband for the great part of her married life returning to her parents after $10,15,20$ or more years, a student may spend 4 or 5 years in a University town, a merchant may leave his home for a few weeks to fix up a business deal, a marriage party may be away for a few days, and countless litigants will make a single day's journey to put in an appearance on behalf of a relation who has been "entangled "in a case in another district, or to prosecute their own suits on appeal.

As 14 persons out of 100 of the population of the Punjab were absent from their native districts at the time of the census, if we assume that the amount of travelling, and visiting, and settling being done at the census was normal, it follows that the average time spent away from his or her home district by each inhabitant of the Punjab is about 51 days. Since the average number of trips(to and fro journeys) is one per head of the total population, it appears that the average duration of each trip is practically 7 weeks, and the time spent outside the limits of the district by each member of the travelling public is (on the same assumption as before regarding the proportion of the stay-at-homes) is about $2 \frac{3}{4}$ months in the year. This represents the total average time spent outside the district of birth on each journey completed either by return to the point of departure or by death.

We reach, therefore, the conclusion that while the 14 per cent. of persons emmerated in 1921 in Punjab Districts other than their district of birth, is made up of groups of persons, staying some a few days, some a ferw weeks, some a few months and some for a few or several years, the average duration of absence being $2 \frac{3}{4}$ months for each trip abroad, we are quite unable to specify from the census figures, what proportion of this period is contributed by persons staying away from their home districts for short or long periods. In particular it appears to be unjustifiable to assume, as is comunonly done, that the greater portion of the 14 per cent. of persons found in other than their native districts at the time of the census, is composed of long-term settlers. This being so the indiscriminate use of the expression "emigrant" or " immigrant" to the persons absent from their district of birth, at the moment of the census enumeration, is to be deprecated.* ;
67. It is obvious that in general there will be an association between the dis-

Purther analysis or Ralway 3 statistles, and their ap plication to Consses data of migration: tance to which a man departs from his birth-place and the time which he spends away. Thus a man might go to a neighbouring district for a few hours, but he is hardly likely to go from the Punjab to Assam, Burma or America for less than several months. On the other hand there must be many cases in which a woman only moves from one district to the adjoining one on marriage and then stays in her husband's house for the greater part of the rest of her life. As again the
*Tho basic iden whioh it has boen sought to express, though simple, appears to travo been neglected in In.ian Ccisus literaturo, so far as I heve had accoss to it, and it will be well to express the argument in dofinito algobraid form. Lot $n_{x} \delta_{x}$ be the number of porsons who stay away from their district of births for $x$ to $(x+\delta x)$ days in the year. Then, the ahance that one of these persons will bo enamersted at the census in a district other than his own will be $x / y$ where $y$ is the number of days in tho year, so that the total number of porsons onamernted away from their homos will be $\int_{0}^{y} n_{x} d x$. It is olear that $n x$ is much greater for values of $x$ loss than 1 month, than
it is for longer periods, and it is probable, theroforo, that, 3 months


Unless, theroforo, wo are propared to apply the term "emigrant" to pursons making visite of 3 months and undor, it might be wrong to apply tho torm to more than a fraction of of the numbers enumerated in places other than their native district.
longest migrations (in time) made by Punjabis will be mostly composed of colony settlers, so that the duration of a visit (using the phrase to cover all journeys whatsoever) will first increase, and then finally decrease with the distance. Onf this subject the Railway statistics afford us some precise information of a limited type.* Thus the statement below shows the average lead of 1st, 2nd, inter and 3rd class passengers on the North-Western Railway since 1911 -


Taking from the table the distance travelīed by each class of passengers in the year ending the 31st March 1922 and multiplying the figures by the relative numbers of passengers we have approximately-


The average distance travelled by all passengens, which is the quotient of the sum of the relative passenger-miles divided by the sum of the relative num: bet of passengers, is thus found to be 45 miles. These distances may be compared with those for the year ending 31st December 1912; which are-

|  | Relative number of passengers. |  | Distance travelled. | Relativ passenger |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Miles. |  |
| 1 lst class | - | 1 | 127 | 127. |
| 2nd class | .. | 4 | 98 | 392 |
| Inter class | $\cdots$ | 22 | 54 | 1,188 |
| 3rd class | .. | 563 | 40 | 22,520 |
| Sam |  | 690 |  | 24,227 |

Thus the average distance travelled by all passengers on the North-Western Railway in 1912 was 41 miles, so that the mean distance per passenger has increass ed by 4 miles during the decade. Seeing that with this increase the speed of travel has decreased from 20.36 miles per hour for passenger trains and 14.27 for mized trains in 1911, to $19 \cdot 41$ and 13.05 miles per hour respectively in 1922, the

[^15]approximate average time spent on railway journeys by passengers in passenger trains from station to station, has increased from 2.01 hours to 2.32 hours. If we include, say, 10 to 15 minutes as the average time spent in the train by passengers at the terminal stations, the average time spent on journeys will be about $2 \frac{1}{2}$ hours. We might have anticipated therefore that about one-three-hundredth of the population would be enumerated in Railway trains, that is to say, 8,000 persons.

As a matter of fact 69 trains with a total of something less than 14,500 passengers were enumerated on the census night*, so that the census figures are in sensible agreement with the calculation made from the known volume of passenger traffic, and the known average lead and speed of transit. $\dagger$

The ascertained mean length of journeys by rail in the Punjab has been seen to be a little over 45 miles for each passenger. The modal (or most usual) - length of journey will also be less than 45 miles, and the conclusion reached is that the majority $\ddagger$ of the journeys made by rail on the North-Western Railway are less than 45 miles in length. This implies that a very considerable proportion possibly 50 per cent. of the rail journeys made are between adjacent districts or between two different points of the same district, and, as we have seen, the duration of the visits so made will on an average be below $2 \frac{3}{4}$ months so that the term " migration" in the restricted sense cannot be applied te them. §

Finally, then we may say, in general, that the census \&gures showing the percentage of those born outside the confines of a particular district and enumerated in it, are made up of two parts, namely-
(i) immigrants proper, as defined by Sir Denzil Ibbetson for the Punjab (vide para. 134, page 58 of vol. 1 of the Punjab Census of 1891, a classification followed by Sir Edward Maclagan in Chapter X, page 273 of the Punjab Report for 1901), or by Mr. Gait (vide para. 134, pages 89 and 90, Part I, vol. 1 of the Government of India Report for 1911),
(ii) the circulating population, made up mostly of persons who are making short trips on business, or for social ceremonies.
To interpret the whole, or even in the greater part of the birth-place figures as the outcome of migration, except to and from places at great distances, and especially for foreign countries, as any form of migration, is to fail to recognise the true meaning of the census returns.

Traflio returns, and oxtra-Provinclal figures of birth-place.
68. Of the $25,101,060$ persons enumerated in the Punjab 627,137 or 2.5 per

Emigrants outaide India.

| Province where enumerated. | Punjab, Persons. | Dolhi, Persons. |
| :---: | :---: | :---: |
| Hong Kong | 1,192 | - |
| Konya .. | 4,823 | - |
| Sudan | 16 | -. |
| Nyasaland | ${ }^{20}$ | - 2 |
| Tanganyika Territory | 326 | 2 |
| Straits Sottloments | 1,877 | .. |
| Federated Malay States | 7,789 1373 | $\cdots$ |
| Unfederated Malay States | 1,373 | 21 |
| Coylon $\quad$ - | 174 | 2 |
| Cyprus $\quad . \cdot$ | 122 | $\because$ |
| Southern Rhodesia | 125 | . |
| Somaliland Protectorate | 125 |  |
| South Africa .. | 188 |  |
| Fiji $\quad$ - |  | . |
| Grand Total | 18,487 | 23 | cent. were born outside the Punjab. the other hand 549,386 persons born in the Punjab were enumerated outside the Province, of whom 530,899 were enumerated in other parts of India. The details of the persons born outside India (so far as they have been reported) are given in the margin.

In paragraph 64 of this chapter we have found the annual emigration and 1 immigration from and into the Punjab to be approximately 14,000 and 11,000 persons respectively, and we may now compare these figures with the traffic returns of the North-Western Railway showing persons crossing the boundary of the Punjab and Delhi. The figures may

[^16]contain a certain amount of overlap, as, while the exact number of passengers reaching and leaving the Punjab between the following stations is known :-

> Sarsawa and Kalananr
> Attock and Khairabad Mari Indus and Kalabagh Taxilla and Usman Khatar Khushalgarb and Nak Band Dhandi and Reti
.. For the United Provinces,
For the North-West Frontier Province,

For Bimla and Baluchistan,
yet these mayinclude some of the through passengers received from foreign lines at Delhi and Bhatinda.

The traffic figures of passengers to and from the Punjab and Delhi of

Pamonger traffio entoring and lesting the Punjab from and to the Provincea named, in 1922.

| Provinco, | Entering Punjab. | Loaving Punjab. |
| :---: | :---: | :---: |
| Onitod Provinces .. | 750,338 | 813,309 |
| North. Wost Frontior Provinco | 777,302 | 719.038 |
| 8indh $\quad . \quad$ - | 278,870 | 302,593 |
| Other Provincee via Delhi .. | 132,210 | 78,231 |
| Othor Provincon via Bhatinds | 132,837 | 155,644 |
| Totals . . | 2,078,648 | 2,088,716 | all classes, for 1922, are those noted in the margin, from which it will be observed that a total of over 4 million persons pass annually across the Punjab borders by rail as compared with the 25,000 whose movements are ascertained from the census returns.

Following the same lines of reasoning as in the preceding paragraph dealing with the internal movements of the population of the Punjab, we conclude that the average duration of stay outaide the Province of persons crossing the border is $\frac{060.040}{2.000 .000} \times \frac{3}{2} \times 12=5$ months. Thus the trips made outside the Puajab last, on the whole, nearly double the time that intra-provincial trips do. Here again it becomes largely a question of an appropriate definition of migration, but if we adopt 3 months as the dichotomic period below which a visit to another province, or abroad, is not classed as a migration, we find that a very considerable portion of the percentage of Punjabis enumerated elsewhere must be put down as due to the circulation of short-term visitors, and not to migration proper. As journeys by road have been excluded;" and as these would swell the figures of trans-frontier railway traffic, the figures for the average duration of a visit must be correspondingly reduced. We may, therefore, provisionally estimate the duration of extra-provincial joumeys as about 5 months. If this figure seems lower than it ought to be compared with the $2 \frac{3}{4}$ months' duration of intra-provincial journeys, we must remember that, on the one hand, it includes an enormous number of visits, between adjoining districts which happen to lie in different provinces, and, on the other, that the number of permanent settlers in other provinces from among persons born in the Punjab is very very small. Both these causes will tend to depress the average duration below expectation, the tendency being to associate extra-provincial migration only with long period visits made to Bombay, Bengal, Burma, Kenya, the Malay States, England or America.
69. It is, so far as the speedy completion of their work is concerned, a great advantage which some writers enjoy, that they are prepared to disregard the existance of logical fallacies so long as the facts advanced are supported by figures. To a writer of this type the fact that 11.5 per cent. of the population is recorded as having been born outside the district in the case of Multan, $14 \cdot 6$ per cent. in the case of Rawalpindi, and 32.8 per cent. in the case of the Kalsia State, is proof that there is a relatively larger number of immigrants into Ravalpindi than into Multan, and into Kalsia than into either of the other places. One possible fallacy, arising from the necessary inclusion of movements which I have classed under the term "circulation," has been dealt with in paragraphs 68 and 69, but it seems possible that an even subtiler fallacy may lurk behind the apparent simplicity of the data. It might take months, or even years, to analyse down to its elements the concept which I shall attempt to expound, and only a preliminary examination of the principle will

Some dimcultes of in. coines of in-
terpretation.

[^17]be set forth. . In its extreme forms the principle is simple and indeed obvious, and we may start by examining the figures shown in the margin.
wing the percentage of pernons born in a given area who
were (or would be) enumerated in that area. .

| Area. |  |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  |  |  |

The entries in rows 1 to 4 will doubtless be accepted as indicating that with the diminution of extension, the percentage of natives must decrease, or the percentage of foreign-born must increase. The entry in row 5 is an obvious deduction from the assumption of $a b$ initio mobility of the organism."

Actually the percentage of foreign-born in every area will never be a singlevalued function of the area itself or of the population; but for our present purpose we may say that, in general, the percentage of foreign-born in any region increases as the area or population of the region diminishes. This is not a humano-sociological or economic law, but a law of animal movement in relation to the properties of space. Now, just as there is an increase in the percentage of foreign-born down from the world ( 0 ) to the average of a Punjab district or State (13.9), so it seems indisputable that the percentage of foreign-born must increase continuously (though as a multiple-valued $\dagger$ function of the area) as the districts or States considered diminish in area or population. Though it is clear that the law is true as a generalisation covering wide variations of area, it is important to see to what extent it holds for the variations in size which occur in the different districts and States of the Punjab. If it does hold we can predict that there will probably be a negative correlation between the population of a district and the percentage of foreignborn. Actually we find a correlation of $-24 \pm 098$ subsisting between the two variables, and the law therefore is applicable'even within a comparatively limited range of variation of area. $\ddagger$

The equation expressing the percentage of foreign-born (F) in a district or State in terms of the population (P) of the district or State, is

$$
\mathrm{F}_{=16 \cdot 0-5.57 \times 10^{-6} \mathrm{P}}
$$

We have thus reached the important conclusion that it is idle to make deductions from the percentage of immigrants into a district or State till the crude percentage has been corrected for the size or population of the district or State concerned. An approximate correction would be to subtract from the crude-percentage of foreign-born the number deduced from the above regression equation. What the full correction would be, were an exact investigation of this point carried out, must be left to future discovery. §

In closing this section I will merely put before the reader a question, which will pointedly show the importance of the foregoing discussion, in preventing the formation of hasty and fallacious judgments on the problem of migration.

The following percentages of persons foreign-born to the areas named and enumerated in the self-same areas are recorded for the 1921 Census:-

| Area. |  | Population. | Percentage of forcign-born. |
| :---: | :---: | :---: | :---: |
|  |  | 772,272 | $12 \cdot 3$ |
| Rohtak District | $\cdots$ | 25,833 | 26.3 |
| Dujana State | $\cdots$ | 822,544 | - 10.9 |
| Julandar Kapurtbala State | $\cdots$ | 284,275 | 171 |

[^18]Dujana State is in the Rohtak District. Kapurthala State and tife Jufiundur District adjoin. Is the percentage excess of foreign-born in the two Punjab States to be attributed to political, sociological and economic causes?. I leave the reader to ponder the question for himself in the light of the arguments adduced in this paragraph, and to admit that but for these arguments his answer would have been'" an immediate, but unjustified affirmative.*

Should the reader desire, in spite of all that has been said, to compare the percentage of foreign-born persons in one district with that of another which differs widely from it in population, he may, provisionally, apply the corrections. in the following table, which will reduce all districts to a standard population of 500,000.

Table giving the correction to be applied to the observed percentage of: foreign-borm in any district, to reduce it to the common basis of a district of a population of 500,000 .

The correction must be subtracted from the observed percentage when it is negative, and added when it is positive.

70. Any one who has followed with any degree of attention the reason- mâa ing of this and of the preceding chapter; will have perceived that more cantion is deairable in drawing conclusions from statistical material than has been customary in the past. One is, in fact, almost tempted to assert that knowledge based on direct appeal to statistics is the "Mâyâ", or "great illusion" of the old Vedantic philosophy, and that though the substance can be resolved from the shadow, it is only by steadfast vision aided by the crystal lenses of mathematics shaped by such master minds as those of Laplace, Gauss, Francis Galton and Karl Pearson.

To flaunt unanalysed figures on printed pages is, perchance, but to increase the number of dancing shadows, making the perception of truth more, rather than less difficult than before. $\dagger$
71. With the warnings emphasized in the preceding paragraphs in mind graptle the data of birth-place summarised in graphic form for the whole of the Punjab of the data. will now be presented. Once, again; the most appropriate form of presentation appears to be that of systems of isopleths drawn on a small scale map of the Punjab, showing the most prominent features of the place-to-place variation of the birthplace statistics. The isopleths in each oase are drawn from the tahsil figures. Now the census schedules do not record the numbers of persons enumerated in each tahsil who were born in that particular tahsil, but only the percentage of persons born in the district in which the tahsil was situated and enumerated in the tahsil. Naturally, the proportion of persons born in a given district and enumerated in a tahsil in that district, will be greater than the number of persons born and enumerated in the same tahsil. Thus, at the outset the percentage figures of foreign-born persons in each tahsil will be greater (though how much greater it would only be possible to calculate by elaborate mathematical reasoning) than. the figures adopted for the purpose of the diagrams.

[^19]The diagrams consist of -
Diagram 27, isopleths of percentage numbers born in each district and enumerated in each tahsil or state;

Diagram 28, isopleths of percentage of persons enumerated in each tahsil or district and born in a contiguous district or state;

Diagram 29, isopleths of percentage of persons enumerated in each tahsil, but born outside the Punjab.

As regards diagram 27, the modification just noticed must be applied, and, if we may lapse for a moment into an interpretation, with all the examples of statistical fallacies confronting us, we may conclude that the Lyallpur and Montgomery colonies contain the largest number of emigrants ! Also the greater proportion of the stay-at-home population of the Punjab is included in the Rawalpindi and Multan Divisions (excluding the colonies) and in the Himalayan and Sub-Himalayan tracts. The reader will, doubtless, observe impatiently thatthese conclusions could have been reached without any elaborate refinements of analysis. Very possibly this is so, but if he supposes that a cursory glance of the figures will throw light on the relative amount of migration into the various districts within these wide limits, then he will fall into a grievous error due to one or other of the fallacies previously examined.


Diagram 28 shows the percentage number of persons in each tahsil who were born in contiguous districts, contiguous that is, not necessarily to the tahsil itself, but to the district in which the particular tahsil is situated. These figures must be interpreted in the light of the remarks regarding the circulation of the population, and, where there are areas within which the percentage of persons born in contiguous districts is high, say over 10 per cent., the characteristic must be attributed as due in part to the great daily movement of the population, and not as wholly due to immigration proper. These figures are particularly in need of correction for the rapidity of the population circulation, for the length of the boundary line between each district and its neighbours, and for the presence or absence of natural barriers of inter-communication.


Lastly, diagram 29 which shows the percentage of persons enumerated in each Punjab tahsil and State and born outside the Panjab, the figures at first sight seem to be perfectly straightforward, and it might appear as if there were no obstacles to an appreciation of the shape of the isopleths. We observe, for instance, that the regions of. high percentage numbers of foreign-born, say, above 5 per cent., are included in three narrow strips, one along the Jumna adjoining the United Provinces, the next in the areas of Ferozepore and Hissar which adjoin Rajputana, and the third in two narrow pieces of territory belonging to the Murree and Sialkot tahsils adjacent to Kashmir. For the rest, the percentage of persons born outside the Punjab, enumerated in the various Punjab tahsils is very small, and there are large tracts comprising the central districts of the Punjab, and a long narrow region running parallel to the course of the Chenab from Chiniot in the Lyallpur district to Rajanpur in the Dera Ghazi Khan district, together with the tahsils of Pindigheb, Talagang, Khushab, Chakwal and Fatehjang, in which the percentage of persons born outside the Punjab does not exceed 0.5 per cent. The long strip lying along the Chenab referred to above includes Jhang, and grazes Lyallpur, and it is clear that the canal colonies have not become the happy hunting ground of the speculator from outside the Punjab, though this is less true of Montgomery ( 3 per cent.) and Khanewal ( 2 per cent.) than it is of Lyallpur ( $l^{\prime 1}$ per cent.), Sargodha ( 1.7 per cent.) and Shahpur ( 5 per cent.).

72. The figure for some of the salient birth-place statistivs will now be comparson

17 umber of perwas born in the operifited locillies and anenareted mithin the Proaince.

| Bare ${ }^{\text {m }}$ | Inamereted in | 1001. | 1911. | Fert. |
| :---: | :---: | :---: | :---: | :---: |
| Punjab District or Stato | Samo Diatrict or 8tate | 876 | 94 | 881 |
| Conliguoun Distriot .. | District | 19 | 41 | 75 |
| Hon-contigroun Distrlot | District | 6 | 16 | 39 |
| Outaido the Proviace .. | Tha Provinco | $\cdots$ | $\cdots$ | 25 | given in comparative form for tilas with 1921 and for previous consases, those of 1912. though mostly without any attempt to solve the many difficult problems of interpretation which they present. Thus the table in the margin shows the change in the number of persons per mille enumerated in the districts of birth, in contiguous districts, and in other districts of the Province, since 1901.

The extent to which the other Provinces of India contribute to the foreign-born population of the Punjab is shown in the following table :-

Inmigration from other Provinces to Pinjab and Delhi.

| Provinoe or State. | 1021. | 1911. | Provinue or 8tate. | 1921. | 1911. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Reifr. 'sus Agoncy | 257,716 | 248,152 | Mysore ... .. | 504 | 273 |
| Unitod Provincos | 269,230 | 210,913 | Baroda .. | 119 | 225 |
| Kashmir | 75,344 | 72,365 | Andaman-Nicobar | 72 | 109 |
| North-Weat Prontlar Province | 34,888 | 35,271 | Asesm | 496 |  |
| Bombay | 11,223 | 10,583 | Bihar and Orisa | 1,140 | - $\cdot$ |
| Benpal .. | 5,950 | 6,136 | Gwalior | 3,250 |  |
| Remporn Bongel -. |  | 483 | Coahin | 36 |  |
| Baluchintan .. | 3,009 | 3,704 | Travancore | 9 |  |
| Contral Indis Agenoy | 913 | 3,630 | India, unspecified | 1,806 | 1,155 |
| Burms ${ }^{\text {a }}$ - $\quad \cdots$ | 1,607 | 1,650 | Freach and Partugrase Settle- | 188 | 100 |
| Guntral Provincas and Boras | 2,844 | 1,500 | monts |  |  |
| Madran ${ }^{\text {a }}$ - | 2,136 | 1,140 |  |  |  |
| Lydorabad | 1.460 | 680 | Total | 674,395 | 605,952 |

Although in 1921 a great number of persons from Gujrat emigrated to

|  | Distriota. | Emigranta to Burma. | $\left\{\begin{array}{c} \text { rimigrante } \\ \text { from } \\ \text { Burma. } \end{array}\right.$ |
| :---: | :---: | :---: | :---: |
| Amritaser | - | 2,388 | 211 |
| Lahore | $\ldots$ | 1,659 | 203 |
| Jhalum | . | 867 | 70 |
| Patiala | . | 607 | 116 |
| Rawalpied | . | 956 | 72 |
| Ludhiana | -. | 805 | 301 |
| Jullundur | . | 085 | 26 |
| Qujret | - | 1,074 | 55 |
| Unuperiliod | - | L4,837 | 803 | Burma, as in $1911^{4}$ the districts of Lahore and Ludhiana contained the greatest number of immigrants from Burma. Of course a certain number of the recorded immigrants from Burma are not Burmese at all, but merely the children of Punjabi emigrants born while their parents were residing in Burma. Further details are given in the marginal table.

The variation in the proportion of females to 100 males enumerated outside

Proportion of fomoles to tens'en of Pungib and Delli

| Minciat. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Immiprantu. |  | Emigrants. |  |
|  | 1011. | 1921. | 1911. | 1921. |
| Hindo. |  |  |  |  |
| Sange | 128 | 42 | 146 | 159 |
| Ambiala | 184 | 192 | 150 | 157 |
| Rohtak | 331 | 354 | 234 | 329 |
| Karmal | 103 | 243 | 198 | 240 |
| Ilimax | 178 | 263 | 188 | 157 |
| Jind | 208 | 218 | 250 | 336 |
| Avwego mosar | 202 | 339 | 106 | 240 |
| Athock | 199 |  |  |  |
| Dres Chadi Khim | 128 | 61 | 94 | 74 |
| Jhelum | 167 | 6 | 71 | 5 |
| Rawelpindi | 8 | 168 | 84 | 78 |
| Qajrst | 8 | 68 | 148 | 138 |
| Muzaliargarh .. | 78. | 88 | ${ }^{96}$ | 108 |
| Mianwalt $\because$ | 78 | 78 | 72 | 74 |
| Avacage | 110 | 0 | 8 | 88 |
| Deld | \% |  |  |  | their district or State of birth since 1911 is shown in the marginal table. I am very loath to believe that the differences between the 1911 and 1921 figures is the result of any change in the fundamental -customs of the country, and that Hindus are more inclined than ever to cheose their wives from distant districts, or that Musalmans tend to go less further afield for their brides than in 1911. The decrease of the relative number of foreignborn females in Delhi from 214 per cent. to 129 per cent. is rather more than one could wisely attribrte to the result of random sampling. A very full adhoc enquiry would be necessary in order to decide whether the Delhi Hindus were relying on the locally bom women as their brides more than they did 10 yeass ago. The truth probably is that in the course

of the last decade there has been a vast influx of foreign-born male labourers who have not brought their female relatives with them at all, and, until these males either settle down in Delhi, or depart from the Province, the comparative smallness of the number of foreign-born females will continue. When the Delbi Province emerges from its position of unstable economic equilibrium it seems probable that the percentage of foreign-born females to males will revert to about its old figure of 200 , provided, of course, that the composition of the Hindu popalation is not materially altered by the formation of the new Province.
 toreign countries and enumerated in 38,537 of whom 35,252 were enumerated in the Punjab and 3,285 in the Delhi Province as compared with the total of 54,267 enumerated in 1911. The details are given in the marginal table. The corresponding figures for 1901 were 39,504, and Rai Bahadur Pandit Hari Kishen Kaul in comparing the 1911 and 1901 figures attributes the increase largely to the development of commerce and industry. If this explanation is accepted the decrease in the number of foreigners in 1921, to about the same numbers as in 1901, would be explained by the setback to commercial relations caused by the war. Most of the decrease it will be observed is due to a falling off of more than 10,000 persons born in Asiatic countries other
 than India. The decrease in the number of Europeans in the Punjab is possibly to be explained by the reduction of the British Army; but on this point I have no exact information. The details of the emigration from Asiatic countries is shown in the marginal table.
The details of immigrants from European countries is shown in the marginal table. The most notable difference between the 1911 and 1921 figures is the reduction in the number of Germans from 76 in 1911 to 7 in 1921. Belgians have decreasied from 61 to 35 and Maltese from 60 to 7. I am surprised to see that only 5 Greeks were enumerated in the Punjab in 1921 as the Firm of Messrs. Ralli Brothers alone would supply that number.

Of immigrants from the British Isles of whom the details are given in the marginal table, the Irish alone appear nearly to hold their own, having decreased only from 2,915 in 1911 to 2,883 in 1921, whereas the Scots have fallen from 1,790 in 1911 to 1,306 in 1921, while the English and Welsh have fallen from 18,596 to 14,714 . Possibly in ? its present condition Irishmen find their native country less pleasant to return to than does the Scotsman, Englishman, or Welshman. The details of emigration from the Punjab and Delhi to places outside are given in Subsidiary Table VI, but this
table is very incomplete, and contains no record of the number of Punjabis in Europe or America.
74. The chief figures as regard birth-place are given in Table XI, Part A,

## Baforence

 which gives the detail for Districts and States, Table XI, Part B, which gives details for cities and selected towns, and Table XI, Part C, which gives details for Delhi Province and Delhi City. A word of warning is necessary as regards the entries in the first row "Punjab" of Table XI, Part A, as this does not mean that the figore entered opposite the row, and onder any particular column, gives the number of persons enumerated in the particular district who were born in the Punjab. It simply means the total number of persons enumerated in the particular district. The actual number of persons enumerated in any district and born within the Province is shown in row 3 of Table XI, Part A. Provincial Table XI gives the birth-place of immigrants into various canal colonies according to caste, age and occupation ; part I applies to the Lower Chenab Colony, II to the Lower Jhelum Colony and III to the Upper Bari Doab Colony. In addition to the Imperial and Provincial tables 7 subsidiary tables are printed as appendices to the present chapter.Subsidiary Table I gives details of birth-place by natural divisions, that is to say, according to the grouping of districts and states into Indo-Gangetic Plain West, Himalayan, Sub-Himalayan and North-West Dry Area.

Subsidiary Table II gives a classification of emigration on the same basis of natural divisions.

Subsidiary Table III compares the figures of birth-place by natural divisions for 1911 with those of 1921 for both the Punjab and Delhi.

Subsidiary Table IV gives the details of migration between the Provinces of the Punjab and Delhi and the other parts of India, the other parts of India being named in alphabetical order under the classes British Territory and Federated States separately.

Subsidiary Table $\mathbf{V}$ gives the calculated number of persons travelling between districts of the Punjab during the decade 1911-1921 as determined solely from the Census figures of birth-place.

Subsidiary Table VI gives the details of persons enumerated outside the Punjab and Delhi. So far as the figures relate to persons enumerated in other parts of India, this table may be accepted as being as correct as any of the Punjab figures, but, as has been already noted, the figures are very incomplete in respect of countries outside India, and, in particular, of places in Europe and America.

Subsidiary Table VII is one specially prepared by Mr. Middleton to show the effect of what he calls the "ibalance of migration," which phrase Mr. Middleton defines as equal to the number of immigrants minus the number of emigrants. Actually as we have seen, the number of immigrants and emigrants to any particular district or State in the Punjab is not known to any great degree of approximation, and to use the crude figures of birth-place without any correction for the "circulation" nor for the effect of area and population seems to me likely to be a fertile source of fallacious inference.

Subsidiary Table VIII shows the birth-place of persons according to ther Tahsil or State of enumeration.

> Subsidiary Table IX gives the percentages based on Sabsidiary VIII. Table VIII.

[^20]L. Showinz birth.pinco of persoas enumersted in osoh distriot and 8tato of the Panjab. II. showinz piace of onamerition of porzons bora in each district or Buts of the Punjab. IIL. Bhowing birthoplace by nutaral divitions, IV Phowing birth-place

 VI. Showing the details of emigrant enamerated ous-ido the Paojab and Dalhi Vif wis to every other diuric: in th. Pupjal.
 based on Subsidiary Table VIIL.

SUBSIDIARY TABLE 1.
Immigration (aciual figures).


GUBSDTABY TABLEE
CHAPTER UL



## sUBSIDIARX TABLE IV.'

Migration between the Provinees of the Punjab and Dolhi and other parts of India.

Nors.-This tablo is divided into 3 parts-
(i) Showing the total figures of immigration to and emigration from the whole of the Punjab and Delhi Provinces (with of British Torritory and Pmjab States) taking all the other Provincea of India together. detaile of British Torniory and Pajabion botween the Punjab and Delhi Province (British Territory and Punjab, States) and the (ii) Containing cach of the other Prorince

Britinh Tarritory of cach of the othor Provinces,
(iii) Giving similar detajls of migration betwean the Punjab and Delhi Province (British Territory and Panjab States) and the Pendatory States of tho other Provinces.


## SUBSIDIARX TABLE IV.

Migration between the Provinces of the Punjab and Delhi and other parts of Indis-continued


SUBSTDLART TABLES:
G.VPLS 14.

## SUBSIDIARI TABLE IV.

Migration betwean tha Provinces of the Punjab and Dolhi and othor parts of India-comtinuced.


## SUBSIDIARY TABLE IV.

Migration between the Provinces of the Punjab and Delhi and other parts of India-concluded.


## SUBSIDIARY TABLE $V$

Showing calculated annual number of porsons travelling between districts in the Punjab in the Decade 1911-1921, as afiecting the number of foreign born in each Distriet, i. e., of persons who made the journey one way only.




Nor:-1,032 omigrantu from the Punjab were roported an having embarked at Calontta during the decado 1911-1920.




- These figures repreeant persons born in the districts where they were enumorated,


SUBSIDIARY TABLE VII-continued.
Showing the Birth-place of persons according to Tahsil or State of Enumaration.


CAAPTEB HIT
gumsmidey rablisg.

*Thene figuren roparenil parioas born in the atatein whore thoy were enomerated.


CEAPTER IIJ.


| Statre | SUBSIDIART TABLE IX.Showing the percontages hased on Subuidiary Table VIII, |  |  |  |  |  |  |  |  |  |  | - |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Prbsons borm in |  |  |  | Btate. |  |  | Pzrsona morit mid |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 2 | 8 | 4 | 8 | 6 |  | 1 |  | 2 | 3 | 4 | 5 | 6 |
| PUNJAB STATES .. | . . . |  |  |  | 2.4 |  |  |  |  |  |  |  |
| Dujana | - 100 | $73 \cdot 67$ | $18 \cdot 41$ | 4 | 3.15 | Bilaypur |  | .. 100 | 89.82 | 7.69 | $2 \cdot 4$ | . 08 |
| Pataudi | -. 100 | $68 \cdot 31$ | 1938 | $3 \cdot 38$ | 8.82 | Mandi | - | $\cdots 100$ | 94.83 | $3 \cdot 96$ |  | $\cdot 51$ |
| Kahia | .. 100 | 67.25 | 25.56 | 3.84 | 3.38 | Buket | - | .. 100 | 97.07 | $1 \cdot 93$ | $\stackrel{8}{8}$ | 118 |
| Baghahr | - 100 | 04.25 | $5 \cdot 28$ |  | 1 | Kapurthala |  | .. 100 | 82.91 | $15 \cdot 34$ | 130 | 3.30 |
| Nalagarh -. | .. 100 | 89.97 | 7.92 | 2.03 | 08 | Malerkotls | -. | .. 100 | 81.70 | $15 \cdot 47$ | 2.36 | 44 |
| Konnthal .. | -. 100 | 46.08 | 49.08 | $1 \cdot 71$ | 3:13 | Faridkot | $\cdots$ | $\therefore 100$ | 71.80 | $20 \cdot 87$ | 5.35 | 1.08 |
| Bagbal - .. | .. 100 | $93 \cdot 84$ | 4.48 | 1.83 | $\cdot 14$ | Chambe | -. | .. 100 | 98.35 | 125 | '30 | 180 |
| Jubbal | $\cdots 100$ | $86 \cdot 4$ | 11-11 | -93 | $1 \cdot 53$ | Patials | $\cdots$ | . 100 | $84 \cdot 40$ | 12.2 | -89 | $2 \cdot 46$ |
| Other Simle Fill | .. 100 | 87.97 | $8 \cdot 13$ | $2 \cdot 87$ | -93 | Jind | - | .. 100 | 75.41 | $19 \cdot 64$ | 181 | 3.14 |
| Loharu - . | .. 100 | 92.43 80.64 | $2 \cdot 88$ | 1.33 | $3 \cdot 36$ 1 | Nabhs |  | .. 100 | $75 \cdot 86$ | 18.51 | 1.86 | 3.77 |
| Nshan .. | -. 100 | $89^{\prime} 64$ | 5.75 | $2 \cdot 84$ | 1.77 | Bahawalpar | :- | $\cdots 100$ | 89'25 | 3.08 | $2 \cdot 91$ | 388 |

# CHAPTER IV. <br> Religion. 

bection l-akneral distribution by religions and meaning of figures.
75. Reference to statintios. 76. Meaning of Ggares. 77. Genoral distribation of population by religions. 78. Iooal distribution * . - 79. Variation general,

gECTION II-MUBALMANS.

80. Hotaing of Inlam. 81. Esentiala of Ihlam. 82. Local distribotion. 83. Variation. 84. The promh of ceots in Ilam. 85. Clestification of the entries of secte. 88. Strength of secto. 87. Fariation in Brout.

## SECTION ML-HINDUS.

88. Menning of the term "Einda". 89. Definition of Findrism. 90. Definition adopted for Consus parpace 91. Local distribution, 92. Variation. 93. The growth nf Hindu secta. 94. The strength of poots, 96 . Variation in wocts. 96. Aryas. 87. Brahmos. 88. Deviamaj.

## BECIION IV.-SIKHS.

9. Meaning of the torm "Bikh". 100. Local diatribution. 101. Variation. 102. The growth of Sikh cootr. 108. Strongth of seotu. 104. Variation in mects.

GECIION V.-CERISIIANS.
105. Local distribation. 106. Variation. 107. Strength of socte. 108. Variation in secte.

BECIION VI.-MANOR RELIGIONS.
109. Jaing, 110. Buddhints. 111. Parais. 112. Jews. 113. Indefinito beliefs.

## Section 1.-General Distribution by Religions and Meaning of Figures.

75. The numerical strength of each religion returned is given in Imperial Referance Table VI for each district and State. Imperial Table XV gives the Christian to statisties. population by sect and race, and Imperial Table XVI which is divided into two parts, the age distribution of Europeans and Allied races and Anglo-Indians.

In addition to these tables, Table VI-A, printed in Part III as an appendix to the Imperial Table VI, contains details of sects of Findus, Musalmans, Jains and Sikhs. The distribution of the population of tahsils by principal religions is shown in Provincial Table II.

At the end of this chapter will be found the following subsidiary tables in. which the most prominent features of the statistics are exhibited by means of proportionate and comparative figures :-

Subsidiary Table I.-General distribution of the population by religions.
Subsidiary Table II.-Distribution by districts of the main religions.
Subsidiary Table III.-Christians, Number and Variation.
Subsidiary Table IV.-Religion of Urban and Rural population.
76. In 1911 the instructions issued to enumerators for filling in column meanng 4 (a) of the census schedule required that the religion to which a person claimed of agurea to belong must be accepted, and in view of the unwillingness of large number of Jains and Sikhs to be classed separately from Hindus, permission was given to record such persons as Jain-Hindus or Sikh-Hindus. The same instructions were repeated at the present census with the modification that the use of the terms Jain-Hindu and Sikh-Hindu was to be avoided as far as possible. Jainism is indigonous to India, but its tenets are totally different from those of Hinduism, while Sikhism is a religion with a very distinct worship of its own, and having attained a position of independence is fully entitled to rank as a separate religion. Thus, at the present censusit was intended to ascertain the true number of Jains and Sikhs, which could not be done if some of them were returned under the general head "Hindus." In the case of the depressed classes, such as Chuhras, Sansis, etc., it was laid down that they should be returned as Hindus if they did not profess to belong to any recognised religion, and the scruples of Hindu enumerators in returning Chuhras as Hindus, or the claims of Chuhras to be registered as belonging to a separate religion, were not allowed to override these instructions. 30,073 persons belonging to these classes were entered under the name of their caste or tribe, and they were treated as Hindus in the course of tabulation. The detail will be found on the title page of Table VI. No alteration was made in the significance of the terms denoting other religions, except that persons recorded under "Indefinite beliefs" were excluded from "Christians" and shown under』 separate heading "Others" in Table VI.

## General datibation of popaiatlon

77. The marginal table shows the general strength of the different reli-
 gions which make up the total population of both the provinces of the Punjab and Delhi. The Musalmans, Hindus and Sikhs taken together constitute nearly 98 per cent. of the population, Musalmans alone contributing more than 50 per cent. Of the remaining 2 per cent., the number of Christians

Local distribution.
is greater than all the minor religions put together. in the natural divisions is shown in the margin. Musalmans preponderate in the North-West Dry Areaand their proportion is smallest in the Himalayan Division. Hindus on the other hand abound in the IndoGangetic Plain West but are weakest in the North-West Dry Area. Sikhs. and Christians are strongest in the Indo-Gangetic Plain West, while $\begin{array}{lllllllll}\text { North-West Dry Aroa } & 1,875 & 338 & 134 & 27 & . . & \cdots \\ \text { Buddhists appear only in the Himalayan Tract. }\end{array}$

The relative strength of the main religions in each natural division has been worked out in Subsidiary Table II. Its examination shows that in the IndoGangetic Plain West the Hindus outnumber the Musalmans, and the Sikhs are less than half the latter in number. In the Himalayan Division Hindus form the major portion of the population, and the number of the followers of other religions is insignificant. In the Sub-Himalayan Area Musalmans are more numerous than Hindus and form 61 per cent. of the population, the number of Hindus and Sikhs being 27 and 10 per cent. respectively. The North-West Dry Area is mainly populated by Musalmans; Hindus, Sikhs and Jains taken together being 21 per cent. of the population.

The diagram No. 30 illustrates the distribution of the main religions by districts and States. The length of the strips opposite each unit indicates the total population, and the different shades the proportionate strength of the religions followed.

| N0.30. ${ }^{\text {² }}$ |  |  |
| :---: | :---: | :---: |
|  |  |  |
| Punats. attook. | ANIV | Punyob |
| Jhalum, |  |  |
|  |  |  |
| мurarrargen, 6 |  |  |
| cugret. |  |  |
|  |  |  |
|  |  |  |
| ghargr. |  |  |
| mon¢0. |  |  |
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| ouraqu10. ELLM, |  |  |
| sıak6\%. |  |  |
|  |  |  |
| Labore. |  |  |
| Kapustha1.curas aur. |  |  |
| curds. |  |  |
| \%orumar. |  |  |
| resorepot\% $\mathrm{Enlo12}$, |  |  |
| karrtar. |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Delus. |  |  |
|  |  |  |
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|  |  |  |
|  |  |  |
| Fateua. |  |  |
| max. ASJSth |  |  |
| Jind, |  |  |
| Lohayb, |  |  |
| Empers. SH |  |  |
| slais nill statof |  |  |
| manal. |  | zitespur |
| BL10spore sukel. |  |  |

The local distribution will be considered in detail under each religion.
79. The inset table compares the strength of each religion per mille of the Variation
 religion will be discussed in the following paragraphs.

Section II- Musalmans.
80. The word "Islam" literally means (1) peace, (2) the way to achieve

Meaning of peace, and (3) submission. The word in its religious sense signifies complete Islam. submission to the will of God. "Islam" in its popular sense is the name by which the religion preached by the Foly Prophet Mohammed, who appeared in Arabia over thirteen hundred years ago, is known.
81. The basic principles of Islam are not contained in the Kalima only, Essentias as remarked in the Punjab Census Report 1911, but in the seven articles of faith of Islam. enumerated in the following quotation :-
"A manto billahe wa malaikatihi wa hutobihi wa rusolehi wal yaumil akhiri walqadri khairehi wa shasrehi minallahi taala wal baas baadal maut.
First of all every Muslim must believe in (1) Allah, (2) angels, (3) revealed books, (4) divine messengers, ( 5 ) the last day of judgment, (6) the measurement of good and evil by God and (7) the life after death. It must be noted however that these seven cardinals, the rejection of any of which would be fatal to one's belief in Islam, do not partake of the character of a dogma. They are, on the contrary, the aggregate of those verities which furnish the motive power of a Muslim life in which he translates these principles into action.*

The whole Muslim world after accepting these cardinal principles of Tslam; accepts the Holy Quran as the repository of the law recapitulating every law revealed to Mohammad and to the prophets who preceded him. To make one a practical Muslim requires the belief in and practice of the five "pillars" of Islam, namely, (1) declaration of faith in the oneness of God and divine messengerahip of Mohammad, (2) prayers, (3) alms-giving and poor-rate (zakat), (4) fasting, and (5) pilgrimage to the holy shrines of Mecca. These are briefly the main principles of Islam.
82. The map printed below indicates the relative distribution of the Musalman population by districts and States. Of $12,955,141$ Musalmans scattered

Local dis tribution.


[^21]throughout the provinces, more than three-fifths belong to the Sub-Himalayan Division and North-West Dry Area, as shown in the Subsidiary Table I. The Musalmans muster strong in the Attock district, where they form 91 per cent. of the population. They contribute 88 per cent. each to Jhelum and Dera Ghazi Khan. In the remaining districts of the Western Punjab their proportion ranges between 82 and 86 per cent. Generally speaking the Western Punjab is the stronghold of Musalmans and their proportion decreases as we cross the Punjab from the West in an East-South-Easterly direction. The supremacy of Islam in this tract is due to this part being exposed to the raids of foreigners. The Musalman invaders generally came from the North and West, and seem to have left their indelible mark on the religious constitution of this tract. In the Central districts the relative strength varies from 80 to 40 per cent. The number of Musalmans in the Himalayan Division is 77,425, which is barely. 5 per cent. of the population of that tract. The lowest percentage is reached in Kangra ( 5 per cent.) in British Territory, and in Suket (1 per cent.) in the Punjab States.
Varlation.

|  | Decade. | $\begin{aligned} & \text { Number of } \\ & \text { Musalmans } \\ & \text { in avery } \\ & 10,000 \text { of } \\ & \text { population. } \end{aligned}$ | liate op VariationpER CERT. wn |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Musalталs. | Total population. |
| 1881 | $\cdots$ | 4,758 |  |  |
| 1891 | . | 4.739 | $+8.7$ | $+10 \cdot 1$ |
| 1901 | . | 4,922 | +12.5 | $+6.3$ |
| 1911 | . | 5,075 | $+8$ | -2.2 |
| 1821 | . | 5,063 | $+5 \cdot 5$ | $+5.7$ | in the marginal statement with the rate of variation per cent. in the total population during the past four decades. It will be seen that the figures display a steady development in the number of Musalmans since 1881, notwithstanding disturbing causes such as plague and malaria, which inhibited the natural growth of population in the decade preceding 1911.

In the decade under review though there is no appreciable difference in the two sets of the rate of variation so far as provincial figures are concerned, yet the proportion of Musalmans to the total population presents a slight decrease when compared with the 1911 figures.* A closer examination of the variation during the past ten years in all natural divisions, worked out in the statement below, shows that Musalmans have not increased as rapidly as the total population in the North-West Dry Area where they are largely concentrated. It seems that they suffered more than their share from the vicissitudes of the decade in this area, and this accounts for the loss suffered by Musalmans in their proportion to the total population.

| Natural Divisions, • |  | MUBALMANS (ACTUAL MUNBER). |  | Increask per cent. in DECADE. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1911. | 1021. | Musalmana, | Total population. |
| Indo-Gangetic Plain Weat | * | 4,144,971 | 4,491,944 | $8 \cdot 4$ | $7 \cdot 2$ |
| Himalayan | - | 74,205 | 77,425 | $4 \cdot 3$ | 8 |
| Sub-Himalayan | * | 3,551,989 | 3,587,248 | $1 \cdot 0$ | $\cdot 7$ |
| North-West Dry Area | : | 4,504,312 | 4,798,526 | 6.5 | 9.4 |

This decline in the proportion of Musalmans is further explaineri if we compare the increase in the relative strength of the different religions in the Western Punjab where the population is essentially Musalman. An extract from Subsidiary Table IV is reproduced below for reference.

| District or State. |  | NUMBER PER 10,000 OF THE POPULATION WHO ARE |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Musalman. |  | Hindu. |  | Shri-tian. |  |
|  |  | 1911. | 1921. | 1911. | 1821. | 1911. | 1881. |
| Attook | ** | 9,088 | 9,091 | 380 | 511 | 14 | 11 |
| Rawalpindi | - | 8,362 | 8,257 | 884 | -1,005 | 152 | 163 |
| Jhelum | . | 8,840 | 8,860 | 670 | 730 | 8 | ${ }^{9}$ |
| Montgomery | . | 7,467 | 7,188 | 1,248 | 1,328 | 11 | 146 |
| - Bhahpur | $\cdots$ | 8,330 | 8,280 | 1,058 | 1,142 | 125 | 168 |
| Mianmali | - | 8,787 | 8,623 | 1,064 | 1,284 | 5 | 10 |
| Loyalipur | . | 6,113 | 6,074 | 1,803 | 1,853 | 374 | 429 |
| Jhang | - | 8,195 | 8,332 | 1,424 | 1,406 | $3{ }^{4}$ | 8 |
| Multan | . | 8,167 | 8,218 | 1,554 | 1, 505 | 30 | 67 |
| Bahawalpur | . | 8,381 | 8,285 | 1.403 | 1,407 | 3 | 4 |
| Muzaffargarh | - | 8,601 | 9,679 | 1,197 | 1,228 | 1 | 6 |
| Dorn Ghati Khan | $\bullet$ | 8,906 | 8,834 | 1,072 | 1,140 | 1 | 1 |

[^22] Agures.

The examination of the sbove extract makes it clear that Musalmans have not advanced as rapidly as the followers of other religions. The causes of this alow progress are different in the case of each district. In the Dera Ghazi Khan and Muzsfiargarh districts where the popalation is predominantly Musalman, the influenza epidemic exacted a heavy toll. The mortality from this disease was appalling in the rural areas of these districts which are entirely popu-

| Dintriot or 8:ate. | Number of Matalman Chubras and Masallis. |  |
| :---: | :---: | :---: |
|  | 1011. | 1821. |
| Remeipindi |  |  |
| Rawalpindi | 8,608 18,031 | 8,058 |
| 8hahpur .. | 68,785 | 86,419 |
| M anwill | 10,274 | 8,704 |
| Behamalpar | 23,539 | 16,293 | lated by Musalmans. In other districts, leaving out Montgomery and .Lyallpur, in which the foreign element as the result of migration (discussed in para. 40 of ChapterI) is largely responsible for the decrease in the proportion of Musalmans, it can be safely concluded from the figures noted in the margin that Chubras, who in 1911 were recorded as Musalmans, have now been absorbed into Christianity or Hinduism either by conversion or on account of the new classification adopted at the present census.

84. The birth of sectsin Islam dates back to the death of the holy Prophet, when the dispute on the question of his successorship gave rise to strong differences ${ }_{\mathrm{I}}$ of opinion among the followers of Islam. Abu Bakar was the first Caliph, then Umar, then Usman, and Ali was the fourth. But there was a section of Musalmans who opined that Ali was the only rightful successor to the Prophet. Thus two divisions sprang up among Musalmans holding divergent views on this point. Those who sided with Ali were styled Shias and the rest Sunnis.

There have been four great Jurists in Islam on the Sunni side-Abu Hanifah, Shafai, Malak, and Ahmad Hanbal. They have written beautiful books on the subject, basing their arguments on the Holy Quran and the Prophet's traditions. Every Muslim has a perfect right to follow any one of them or to make his own judgment on the things concerned, in the light of the traditions of the Prophet. Those who are guided by the traditions of the Prophet are called Traditionalists or Ahl-i-Hadis, and the schools of those which accept the teaching of particular jurists are named after them. But all these schools of thought never differ from each other in matters which constitute the basic principles of Islam.

Again, every century in Islam saw men of great piety. and learning. The magnetism of their devotion to Islam and their self-abnegation told powerfully upon their contemporaries, and they gathered round themselves groups of pupils and admirers. They represent the esoteric side of Islam. The admirers of these saintly personages followed their teachings, and every subsequent generation has regarded them with respect. These admirers were sometimes named after thess Muslim saints such as Qudris, Chishtis, Naqshbandis, Soharwardis, and Ahmsdis. Those great divines enriched Islamic literature with their learned expositions of Islam, but they never preached anything inconsistent with the fundamental tenets of Islam. They all respect each other; they may differ - in their explanation of certain events of a historic or of an academic nature mentioned in the Quran, but their mutual respect is all the same, the reason being that there can be no two opinions in the essential matters that constitute Islam. This brief description shows that the so-called sects of Islam are not sects in the received sense of the word; and the basic structure of the Faith, notwithstanding all minor divergences, remains unshaken.
85. The mothod adoptad at the present census for classification of the clasdices. entries of Musalman sscts in the census returns, was practically the same, as in ton of the 1911. The s3cts returned have bean grouped in Table VI (Appendix Part III) sects under three main heads, viz., (1) Shias, (2) Sunnis, and (3) Reformers. A small number of entries which did not appear to fall under either of these heads has been shown separately under the head "Sects analogous to other religions."
86. The provincial figures for the sects are detailed in the margin. Nearly strength of

| 8:06. | Punjab. | Dsibi. 1 | Soct | Pun:ab. | D.lui. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 8 Shiss | 258,029 | 9,729 | Reformers | 89,539 | 355 |
| Sannis | 12,486,791 | 138,681/ | Abl-i-Quran | 326 | 3 |
| Hang | 381 |  | Ahmadi | 28,816 | 35 |
| Minoollanoora | 6,000 | $\cdots$ | Ahl-i-Hadis | 60,327 | 317 |
| Bans | 871 | $\because$ | Mamahid ${ }^{\text {a }}$ | 68 | . ${ }^{\text {c }}$ |
| Uneproliod | 12,460,509 | 139,863] | Seote analogras to othor ruligions . . |  |  | ninety-seven per. cent. woess. of the Musalman population in both the Punjab and Delhi Provinces is Sunni, and of the rest more than two-thirds

returned themselves as Shias. Among the minor sects the number of Ahl-i-Hadis heads the list. The figures in the head "Miscellaneous" under Sunnis are very small and the reason appears to be in the effort on the part of the enumerators to return main sects only.

Varintion in seats.
87. The figurea for the main sects of the Punjab and Delhi combined are

| Sacts. | 1911. | 1821. | Inorvase or deorease por cent. |
| :---: | :---: | :---: | :---: |
| All Seots | 12,275,477 | 12,055,141 | + $8 \cdot 5$ |
| Bunnis | 11,968,758 | 12,005,472 | $+5 \cdot 3$ |
| Shias | 247,532 | 258,351 | +48 |
| Ahl-i-Hadis | 39,083 | 60,644 | +55.8 |
| Ahmadi | 18,695 | 28,851 | $+54.3$ |
| Bacts snalogous to other roligions | 20,104 | 823 | $-968$ | compared in the margin for the two censuses of 1911 and 1921. It will be noticed that the increase in Sunnia and Shias has been more or less proportional to the increase in the total population of Musalmans, but the number of Ahl-i-Hadis aud Ahmadis are more than half as much again than in 1911. The increase in the number of Ahl-i-Hadis, which is a sub-sect of Sunnis, shows that they are now no longer reluctant, as noticed in 1911, to express their views publicly, and the prejudices against the followers of this school of thought are gradually disappearing. The additions to the ranks of Ahmadis is due to the propaganda work earnestly pursued by the two sections of the community (stationed at Lahore and Qadian) into which it was divided on the death of Maulvi Hakim Nur-ud-Din, an able successor of the original founder of the movement. In 1908, when the founder died, the community had one high school at Qadian, a Theological School, two vernacular newspapers, and an English Monthly "The Review of Religions." The community has during the past decade extended the scope of its activities by starting missions in Europe and America. Production of religious literature by both the sections has done much in drawing men to their side. Two new schools have recently been opened by the Lahore section at Lahore and Baddo-Malli in the Sialkot district. The small number of entries returned under the "Sects analogous to other religions" shows a tendency on the part of the local converts to record themselves under one or the other of the established sects.

## Section III.-Hindus.

## M3an'n3 - of ting tis

 Hinju.88. The derivation of the term Hindu is fully discussed in para. 127 of the Punjab Census Report 1911. The term was originally invented by the early Musalman invaders to designate the people living east of the Indus, but its use has in the course of centuries been widely extended so as to cover all inhabitants of India who believe in the old faith:
nition of Hinduism and was made at the last census to evolve a complete defias to the application of certain tests prescribed by the Census Commissioner for the purpose of determining a criterion which might be taken to separate the pure Hindu from the low castes, which have adopted some or other form of Hinduism: but the result was an extraordinary divergence of opinion. The views expressed differed, according as Hinduism was considered to connote a religious, a racial, or a social organisation. It was found to include within its pale persons of various beliefs and shades of thought from the orthodox Brahman, down to the sweepers and members of other low castes, who are supposed to cause pollution by touch, and are not allowed access to Hindu temples. The term is indeed comprehensive enough, as remarked by the Census Commissioner in 1911, to include a complex congeries of creeds and doctrines. There are, however, two salient features of the Hindu religion which, generally speaking, distinguish Hindas from the followers of other religions, viz., (1) religious or economic objection to the slaughter of cows, (2) acknowledgment of the supremacy of Brahmans. There are certain sectarian groups who disown the supremacy of Brahmans,* but their number is very small compared with those who still hold the Brahmans to be spiritually and socially above ordinary human beings.
[^23]Taking the religious and social aspect of Hinduism into consideration, wo can say that in order that a person may be called a Hindu, he should be a native of Indis and not of foreign descent, acknowledge the supremacy of Brahmans, or, at least, refuse to kill or harm kine, and belong to a recognised Hindu caste.
90. The census returns comprise Hindus of various, beliefs and diverse $\qquad$ races who may or may not be considered Hindus according to many orthodox votai- consus pur ries of the ancient religion. The sole criterion adopted for the purposes of the censǜs poses. was to treat every person as a Hindu who did not profess to, belong to any recognised religion such as Islam, Christianity, etc. The definition is defective in the eense that it brings within the pale of Hinduism all members of the depressed classes who do not conform to the doctrines of any particular religion. In the matter of their customs and usages these classes are usually governed by the religions prevailing in the locality where they are found. It is a well-known fact that Chuhras and Chamars have no objection to eating beef in villages where the Muslim element reigns supreme, but not so in Hindu tracts. The formal adoption of the Hindu religion by these low castes does not improve their social status. They are looked down on by their Hindu neighbours. No Bramman ministers to them. They are not allowed to enter'Hindu places of worship, and they are supposed to cause contamination by touch. The definition of the term Hindu might be improved if we admit a third class of castes; comprising "unitouchables" who are in the transitional stage, and show them as professing no specified religion.
91. The inset map illustrates the local distribution of Hindus, who con- Loral ats stitute more than one-third of the population of the provinces.


The most distinctively Hindu districts belong to the Himalayan Division; Where Hindus amount to 94 per cent. of the population. Hindus represent a majority, 60 to 70 per cent. of the population, in the Delhi Province and in the districts and States of the Southern Punjab, the percentage rising in the Rohtak district to 82 per cent. In the central districts and States of the Punjab their number varies between 20 to 40 per cent. The proportion of Hindus steadily diminishes as we proceed westivard, and the minimum 5 per cent., is reached in the Attock district.

Variation
 shows the relative strength of Hindus in every ten thousand of the population of the provinces at the last five censuses, and gives the rate of variation per cent. during each decade. The number of Hindus has increased since 1911 by 4 per cent., but their proportion has declined from 3,628 to 3,586 per 10,000, which means that they have not advanced as rapidly as the followers of other religions. The explanation of this comparative stagnation during the past decade is found chiefly in the small

|  | Variation per cent. since 1911. |
| :---: | :---: |
|  | - |
| Indo-Gangetic Plain West | $+7.2$ |
| Eimalajan | 48 |
| Sab-Himalayan . .. | +7 |
| North-Weet Dry Ares | +9.4 | percentage of increase exhibited by the Himalayan and Sub-Himalayan Divisions which contain more than half of the Hindu population. The figures are given in the margin. The other causes which seem to have hampered the growth of Hindus are : (1) conversion of large number of Chuhras to Cbristianity, (2) the separation of Sikhs from the ranks of Hindus, (3) the effects of influenza on the districts of Gurgaon and Rohtak, both mainly Hindu, and, possibly, (4) the evil effects of child marriage and enforced widowhood.

The Chuhras have always been considered as the chief disturbing element
 in the return of religions in the Punjab on account of the flexibility of their religion. Special instructions were issued at the present census to return all Chubras who did not profess Christianity or Jslam as Hindus but in spite of these precautions, the figures in the margin show that Hindus have lost 81,229 Chuhras. Chuhras are found throughout the provinces and there is no reason to believe that they did not multiply, pari passu, with the rest of the population. Taking the increase ( $5 \cdot 7$ per cent.) shown by the population at large, into account, the net calculated loss suffered by Hindus in Chuhras amounts to 90,704 persons. The above loss seems to be due partly to real conversions to Christianity, which shows an abnormal increase in the number of its Indian followers, and partly to the registration of Chuhras as Mazhabi Sikhe. There is no sharp line of distinction between Sikhism and Hinduism, and it was due to this that in 1911, 44,000 persons described themselves as Sikh-Hindus. The change in the political atmosphere of the Punjab during the past decade has led Sikhs to separate themselves from the ranks of Hindus with the result that very few persons returned themselves as Sikh-Hindus at the present census. It seems probable that many Sikhs who were classed as Hindus at the former census have returned themselves as Sikbs at the present one. Again, the districta of Gurgaon and Rohtak suffered heavily from the ravages of the influenza epidemic in 1918. The death rate from influenza in these districts was estimated as 123 and 96 per mille, respectively. The percentage of Hindus to the total population in Rohtak and Gurgaon is 82 and 67 respectively. It is also sometimes argued that the prevalence of early marriage and enforced widowhood have made the Hindus less prolific than other communities, but the evidence for euch belief requires careful sifting. The growth of the Hindu population has been largest in the North-West Dry Area ( $9 \cdot 4$ per cent.) which contains a large proportion of Musalmans, while the Himalayan Division which is exclusively Hindu shotvs a 7 per cent., increase only, though both the areas were affected more or less equally by influenza and recruitment for the great war.

In this connection I am indebted to Mr. H.L. O. Garrett, I. E. S., who, during a part of the war was stationed as Recruiting Officer in Ludhians, a central Sikh district, for some interesting observations. Mr. Garrett writes :-
"My oxperience during 1917 and 1918 in Ludhiana and the adjacent territories was that thero were a large number of families of the Hindu Zamindsr class of which those. members who had enlisted in the Army had, as a matter of course, become Sikhs. Those who in the ordinary course of events would have stayed at home did not do so. When, as a result of the intensive recruiting at the later stages of the war, the latter were induced to join up, they too became Sikls. This déveloped into any ordinary Hindu of the zamindar class being taken by Sikh Recruiting Officers on condition of his becoming a Sikh. I have no figures by me but I know from memory that it was almost a daily occurrence for-say-Ram Chand to enter our office and leave it as Ram Singh-Sikh recruit. So much so that the local Hindu Recruiting Committee protested that their returns were being adversely affected. It would be worth while enquiring from other -x-Reoruiting Officers whether such was their experience, but my colleaguc, Mr. Crump, and myself often commented on the matter and both agreed that the Silh returns at the next consus would be affected by it. It would further be interesting to ascertain how far these converts have relapsed after their brief period of military service. Conversion on other than military grounds just before the war was not common. I have seen allusions, quoted in the Introduction to my new Edition of Cunningham's History of the Sikhs, to the apathy of the Khalsa on the subject."
93. It has been stated that Hinduism includes monotheists, polytheists and pantheists. The explanation to this variety of religious beliefs and social sects. practices is generally based on the theory that the ancestors of Hindus were immigrants from Central Asia, and that Hinduism, which was originally a pure and simple creed, has had to compromise with the Animism of the population, amongst whom it spread by accepting several of its godlings and superstitions. The explanation, however, loses some force on account of the probable absence of any organised missionary activity, among the Hindus, at the early stage of their history. Moreover, compromise implies selection and rejection and the existence of some agency entrusted with the duty of the selection. As a fact, however, we find that Hinduism has exercised very little selection, and that it practically covers all the beliefs and customs which prevail amongst the tribe who are included within its pale. Again, the very theory which forms the basis of this line of argument has been doubted by a learned Indian Scholar*, who has shown that there is no expression in the Vedas reminiscent of a foreign homeland, such as is likely to be met with in the literature of an immigrant race. According to this authority the higher forms of Hinduism are evolved from the lower ones, rather than other way about. This argument is now generally accepted by educated Hindus and affords an explanation of the origin of certain social customs. If this view is accepted Hinduism will have developed on rather unusual lines. In other religions the line of evolution seems to have been from polytheism to monotheism, but in Hinduism it was probably from polytheism to the higher pantheism.

It is very difficult to trace the growth of sects in Hinduism. As pointed out above it has no settled creeds which are obligatory on every Hindu. It does not prescribe any uniform standard for the innumerable sects and castes which bear its name. However, there are three ways of salvation recognised by the Hindu religious philosophers, namely, the way of knowledge, the way of faith and the way of service, and the two broad divisions into which Hindus can be divided seem to have sprung up from the difference in the relative importance to be attached to these three ways. The followers of the great Philosopher Sankaracharya maintain, that the Supreme Being is the only Reality and that the phenomenal universe is Mâyî, and that salvation comes only from the realisation of this fact. They give, in other words, a subordinate position to faith and service. The followers of Ramanuja, Madhva and Vallubhacharya refute the doctrine of the non-reality of the phenomenal universe, and lay more stress on faith and service than on knowledge. The Hindus may be divided as pointed out in para. 164 of the Punjab Census Report of 1911 into (1) the followers of Vaishnava, (2) the orthodox grihastis, (3) the uneducated masses, (4) the followers of reformers whose doctrines do not conform to the principles of either school of thought, and (5) saint worshippers. The sects which fall under these groups are fully described in the Punjab Reports of the previous censuses, and need no further remark.

[^24]The streng sectig.

| Seota. | Panjab, | Dolhi. |
| :---: | :---: | :---: |
| 1. Ond Seors : - |  |  |
| Bairagi | 4,407 | 863 |
| Udani | 2,861 |  |
| Fagir | 10,606 | -. |
| Sanysai | 1,381 |  |
| Jogr $\quad \because$ | 2,238 | 412 |
| Gorakh Panthi . | 1,216 | 61 |
| (b) Saint Wornhipper--. | 374 | 12 |
| Gugapir .. | 1,812 |  |
| Kabir Panthi | 87,111 | 9,894 |
| Kalu Panthi | 21,257 | -. |
| Namabanal | 6,471 | $\bullet$ |
| Pabaji .. | 6,347 | * |
| Panjpiria .. | 27,363 |  |
| Rai Dasis .. | 14,490 | 12,668 |
| Ram Raya | 201 | - |
| Sewak Darya | 4,073 | ** |
| (c) Orthodox FindusSanstan Dharm | 7,385,186 | 276,023 |
| 2. GEOTS WORSHIPPING |  |  |
| Mubatuar satnts In |  |  |
| ADDITION TO FEETB OWR Gods- |  |  |
| Sarwaris .. | 88,837 | * |
| Shamal | 394 | * |
| 3. Srects of Low Castes-m 77 |  |  |
| Balmiki . | 221,027 | 12.808 |
| Lal Begi .. | 437,205 | 12,686 |
| Rom Dasia | 230,809 | 130 |
| Belashuhif .. | 3,330 | .. |
| 4. Hzyotereso- 010.981 |  |  |
| Arys - | 210,872 | 12,881 |
| Brahmo .. | 2988 |  |
| Dev Dharm | 3,597 |  |
| Nanat Panthi | 9,716 | 402 |
| Radha Sawami | 2,710 | 402 |
| 8. Mrsominnrious- <br> (a) Miscellaneous Seoty .. <br> (b) Cantes roturnod as secta |  |  |
|  | $\begin{aligned} & 20,481 \\ & 20,429 \end{aligned}$ | 112 |
| 6. Disprolitisd | 11,398 | -• |
| 7. Geots Analocous $\$ 0$ OTHEB REHGIONE .. | 4,180 | - |

94. The figures of sects returned are given in the margin according to the $8 y s t e m$ of grouping adopted in 1911. Nearly 84 per cent. of the Hindu population in the provinces has been registered under the head "Sanatan Dharm." The word ordinarily means orthodox Hindu, but what particular form of doxy is to be considered orthodoxy is not clear. The phrase is chiefly used in opposition to the Arya Samaj, and in all probability denotes the number of persons who were averse to the use of the term "Arys." Thus the figures under the head Sanatan Dharm include a large proportion of persons who are Hindus by religion, but are unsble to define their sects exactly. Sects of low caste come next in importance. The figures indicate that most of the members of the depressed classes.still follow their own "Gurus " and it is only by the expansion of the term "Hindu" that they are brought within the pale of the ancient religion. The Aryas, or followers of the Vedic Dharm, rank third ( $2 \cdot 63$ per cent.) in numerical strength.

Other important entries are Sarwaris $(88,837)$ or Sultani, the worshippers of the great Saint Sultan Sakhisarwar, who settled down and practised austerities in the country round Multan; Kabir Panthi $(40,505)$, the followers of Kabir, a pupil of Ramanand, who was born in 1440 A. D. and whose mission was generally directed against idolatry ; Panjpiria ( 27,363 ), the worshippers of five saints which every worshipper is at liberty to select for himself: Kalu Panthis $(21,257)$, the followers of Kalu Bhagat, a waterman (kahar) by caste, who according to one version was the disciple of the Sikh Guru, Arjan, and who according to another, received supernatural powers from an ascetic who gave him his Gudri (cloak). The figures under the head "Miscellaneous" include Sansis, Bawarias and others who

Varration in Sects. really profess no religion.
 sects under the five main heads since 1911. The increase per cent. in the number of the adherents of the old faith is slightly more than the increase shown by the Hindu population of the provinces. The apparent increase ( 283.9 per cent.) in the number of Fakirs since 1911 is probably due to the inclusion of a number of Bairagis, Sanyasis, Jogis and others under the generic term "fakir" at the present census. There has been a ramarkable increase in the number of persons classed as Namabansis from 072 to 5,471 : but of this increase an explanation cannot be offered. The figares, however; suggest that most of the minor sects are gradually losing ground, probably on account

| Beota | 1911. | 1081. | $\left[\begin{array}{c} \text { varl } \\ \text { stion } \\ \text { por cont. } \end{array}\right.$ |
| :---: | :---: | :---: | :---: |
| 2. Bgote wonsimplice |  |  |  |
| 2. Monamat salme tix |  |  |  |
|  |  |  |  |
| Gods .. | 232,413 | 89,231 | $-618$ |
| Earweris . ${ }^{\text {a }}$ | 280,988 | 88,837 | $-618$ |
| Shamai .. | 1,425 | 394 | -78.4 |
| 8. Gxors or Low ohist | 981,311 | 014.424 | -6.8 |
| Balmiki .. .. | 316,674 | 221,104 | $-30 \cdot 0$ |
| Lalbogi .. | 466,172 | 449,091 | -3.5 |
| Ramdesis ., | 199,465 | 239,906 | +20.8 |
| Balamhanis .. | .. | 3,380 | +100 |
| 4. Reporimits, | 180,185 | 280,800 | +84.8 |
| Arya .. | 100,788 | 228,168 | +1214 |
| Brahmo .. | 700 | 305 | - 56.4 |
| Dov Dherm | 8.004 | 3,597 | +10\% |
| Nanak Panthi | 21,768 | 9,723 | $-55.3$ |
| Rechhasawami | 8,862 | 3,112 | -19.4 |
| 6. Mraguzanteotem |  |  |  |
| (a) Mucollanoous socta ... | 10,120 | 20,803 | $+103.4$ |
| (b) Cantos roturnod as soota | 17.718 | 20,448 | +184 |
| 6. Unarioitiod | 1,648 | 11,986 | $+591.5$ |
|  | 11,064 | 4,180 | -64.9 |

of the spread of education among the masses. The decrease in the number of Panjpirias and Rai Dasias is striking. It is difficult to suggest causes for the fall in the number of Panjpirias, but the loss of Rai Dasias seems to be due to the absorption of Chamars into Aryas. The number of persons registered under the head "sect worshipping . Musalman saints" has goié down by 61.6 per cent., as the result of the tendency on the part of the Hindus to withdraw themselves from the influence of the Musalman pirs. The decline in the strength of the sects of low caste illustrates the process of conversion which has been thinning their ranks during the decade. The discussion of the figures of Aryas, Brahmos, and Dev Samajists will be found in the following paragraphs. 90. The Arya or Vedic Dharm sect is the outcome of the religious movement founded by Swami Daya Nand Saraswati who inculcated monotheirm and .proclaimed the infallibility of the Vedas. The Aryas accept the Vedas as Divinely revealed and are opposed to idolatry. They also favour social reforms, such as the abolition of the custom of early marriage and the introduction of widow remarriage. In other words their aim is to purge Hinduism of what they consider later accretions. A full description of the tenets and rules of the sect is given in the Punjab Census Reports of 1891 and 1911, and needs no addition.

The strength of the members of the Samaj has been steadily increasing from 1877 when the Samaj was founded. In 1891, the adherents of the Samaj numbered 14,030 ( 8,103 males and 5,927 females). In 1911 the total number of Aryas was found to be 100,846 ( 57,956 males and 42,890 females). In 1901 separate statistics for Aryas were not prepared and hence the number cannot be ascertained. The number now recorded under one or the other of the following Argan returnod in Porsoma. Malos. Femalea. denominations:-Arya, Vedic and Vedic

| Argas returnod in Runjab and Dolhi as | Potsona. | Majot. | Femalen. |
| :---: | :---: | :---: | :---: |
| Boola of Hindus Boote of Bikha | $\begin{array}{r} 223,153 \\ 18 \end{array}$ | 124,852 <br> 8 | 08,801 7 |
| Totel | 293,168 | 124,860 | 98,308 | Dharm is shown in the margin. The increase in the number of Aryas seems to be largely due to the new process of proselytisation known as Shuddhi introduced by the members of the Arya Samaj. The majority of the converts are drawn from Bralimanic Hindus but special efforts are made to secure the re-conversion of converts from Hinduism to Christianity or Islam and the reclamation of the depressed classes. The theory of the submergence of caste in the Arya community appeals most to the lower classes, who look to the new system to raise their social status and to put them on the same footing as the higher classes. The conclusion is not inconsistent with the change in the numbers of persons who returned their oaste as Aryas in 1911 and 1921. In 1911 only 213 persons were recorded as Aryas by caste while in 1921 the number returned under this head is shown in Table XIII (caste or tribe) as 50,884 . The latter number probably includes a considerable number of low oastes, who were allowed to return their castes as Arya, as the result of the efforts of the Shuddhi Sabha, Hoshiarpur, and of the Arya Prati Nidhi Sabha, Punjab.

The followers of Vedic Dharm have been registered in all the districts and

| Dintriok |  | $\begin{gathered} \text { Nambor of } \\ \text { Aryan. } \end{gathered}$ |
| :---: | :---: | :---: |
| Rohtat |  | 97,089 |
| Kumal | -碞 | 18,813 |
| Lahoro | . | 12,254 |
| Qurdaspur | r | 36,048 |
| Sialkot |  | 34,946 |
| Delbs | -• | 19,281 | States of the provinces except the following:Dujana, Bashahr, Jubbal, Loharu, Bilaspur and Suket. The districts where the Samaj has made great headway are noted in the margin. Rohtak is the only district which for the first time figures in the census records as the centre of the Arya Movement. The caste which has supplied the largest number of Aryas in this district is that of the Jat $(23,995)$.

## Erahmo.

97. The number of Brahmos retarned in both the provinces is 305, or 395 less than in 1911, a fact which indicates that the movement is losing ground. The actual number, however, cannot be taken as showing the extent to which the doctrines have ceased to attract fresh recruits. As noticed in 1911 Brahmos are not considered as outcastes from Hindu society, and find no difficulty in stepping back to the folds of orthodoxy, and thus the progress made, from time

| Distriota. | UUrban Area. | Rural Area. |
| :---: | :---: | :---: |
| Lahore | - 167 | 4 |
| Bimla .. | - 24 | $\cdots$ |
| Montgomery .. | 15 | 7 |
| Hissar .. | - 16 | 2 |
| 8heikhnpura .. | 13 | .. |
| Rawalpindi .. | - 10 | $\cdots$ |
| Bialkot .. | - 8 | . |
| Rohtak .. | - 6 | 8 |
| Ambala . ${ }^{\text {a }}$ | - 4 | .. |
| Gujranwals .- | 4 | .. |
| Gujrat .. | $\cdot$ | .. | to time, in the numerical strength of the body is counteracted. Again, with the spread of English education and the inoulcation of social reforms which formed the chief aim of the Samaj, the modernist Hindu feels no necessity to separate himself from the ranks of his co-religionists and enrol himself as Brahmo. Those who still declare themselves as Brahmo come mostly from towns, as appears from the statement drawn up in the margin for districts of the Punjab. The castes from which the members of this sect are chiefly recruited are Brahman (82), Khatri (74), Arora (37), Ghirath (18), Ahir (12) and Jat (10).

There are three sections of Brahmos, viz., the Adi Samaj, the Nababidhan Samaj, and the Sadharan Samaj. The Adi Samaj condemns idol worship, but favours the maintenance of the caste system so far as it does not conflict with religious beliefs. It practically adheres to the doctrines preached originally by Raja Ram Mohan Roy, the founder of the Brahmo Samaj. Its members atyle themselves Theistic Hindus, the chief difference between them and other Hindus being that they are Monotheists. The Nababidhan Samaj which owes its origin to Keshab Chandra Sen is less conservative and more eclectic. They consider the scriptures of other religions as sacred as well as their own. The most enlightened and advanced section is Sadharan Samaj, which discards caste distinctions and advocates the raising of the status of women.

## Dgy Samaj.

98. As is well known, this Samaj was founded in 1887 by Shri Pandit
Sattyanand Agnihotri who is also called "Shri Dev Guru Bhawan" and Dev Atma." He declared that his life mission was to bring the reign of Truth and Goodness into this world by bringing changes into the minds and heart of mankind. When Shri Dev Guru Bhagwan proclaimed his life mission he had a sincere belief in the existence of "God," which he received from his ancestors, and this belief he held for about 12 years thereafter. But with the gradual evolution of his attachment to the ideals of Truth and Goodness, he found this belief to be entirely groundless, and renounced it in 1894, just as he had done in the case of various other beliefs which he had acquired from his early surroundings. A full account was given in the last census report to which the reader is referred for complete information regarding the teaching and development of the Samaj.

The Samaj has done very useful work during the decade in the spread of moral and literary education among the masses and the introduction of many social reforms. As many as 5,156 persons are reported to have pledged themselves to refrain from one or more such evils as dishonest dealing, bribe-taking, theft, repudiation of debts and deposits, gambling, and the use of intoxicants. Scores of persons are said to have made reparation of wrongs (Hani Parishodh) in various ways. In 1917 the Government made over to the Dev Samaj for reformation two settlements of criminal tribes in the Sialkot district. The efficient management of the Dev Samaj claims to have brought about remarkable changes in the lives of these notoriously criminal people. On the literary side the Samaj has opened 16 new schools, one High school for boys, 4 schools for the depressed classes, 4 schools for criminal tribes, 3 Primary and one Middle school for boys, and 4 Primary and Middle schools for girls, during the last 10 years. The special characteristic of these schools is that along with intellectual education, moral training is imparted in them. A new college named the Ramsukh Das College has recently been opened at Ferozepore by an esteemed member of the Dev Samaj, Shriman Gowardhan Das, B. A., Vakil, High Court, in memory of his father.

The total number of Dev Samajists in the provinces who returned their religion as such at the census was 3,597, as against $\mathbf{3 , 0 9 4}$ in 1911. The districts
and States registering the largest numbers are Ambala (778), Ferozepore (358), Sialkot (140), Lyallpur (406), Patiala (428) and Bahawalpur (1,493). There is, however, reason to believe that the number of followers of this Samaj is much greater than appears from the census returns. Thus in Lahore which is the centre of the movement the number has fallen from 133 to 71, which suggests a possible want of accuracy of the returns. Again in the Delhi Province none has been returned under this head-a very questionable result. The members of the Samaj belong to a number of different castes, the most strongly represented being Bania, Arora, Jat, Bawaria, Khatri, Saini and Brahman.

Section VI.-Sikhs.
99. It is very difficult to define Sikhism because it is not sharply divided meaning of from Hinduism as regards religious beliefs. The Sikhs, like the Hindus, believe sikh. in the transmigration of the soul, the law of Karma, and in the three modes of attaining union with the Supreme Being. The faith owes its origin to Guru Nanak, who flourished in the latter half of the 15 th century of the Christian Era. Guru Nanak preached that there is only one true God, he condemned idol worship, proclaimed the futility of pilgrimages, and declared that the path to salvation lies through good deeds combined with devotion to the Supreme Being. Thus Guru Nanak strove not to found a separate religion as a revolt from Hinduism, but to reconcile the ancient beliefs with the purer creed. Sikhism continued to exist as a pacific cult till about the end of the seventeenth century when the political tyranny of the Musalmans, and the social tyranny of the Hindus converted it into a militant creed. The momentous change was accomplished under the direction of Guru Govind Singh, the tenth and the last of Gurus. His teachings did not efiect any material change in the Sikh creed so far as religious principles were concerned, but he tried to organise the Sikhs into a separate nation; and with this object ordained on them the observance of certain rules of conduct, and insisted on a definite ceremony of initiation (Pahol). The Sikh believer was required, besides accepting the religious doctrines of the earlier Gurus, to wear long hair and refrain from smoking. These two distinguishing features were taken as a standard for judging between Hindus and Sikhs at the, Census of 1891. The rule was retained at the Census of 1901.

The difficulties experienced in the practical application of the definition led to its modification in 1911. In 1911 the statement of the persons enumerated regarding roligion was accepted without question. The same rule was repeated at the present consus because the term "Sikh" includes not only those who follow the ordinances of Guru Govind Singh, i.e., Kesdharis, but also Sahjdharis. Both sections accept the tenets held by the Gurus and embodied in the Granth, and being strict monotheists repudiate the authority of the Vedas.
100. The local distribution of Sikhs is illustrated by the map printed below: More than half the total population of Sikhs in the Punjab and Delli

Local dis iributlon.

provinces lives in the Indo-Gangetic Plain West where they represent $18 \cdot 8$ per cent. of the population. The four chief centres of the Gikh population are Ludhiang and Amritgar in the British Tarritory, and Faridkot and Patiala among Pupjab States. In the Ludbiana district their relative strength is 415 ger mille of the population, while Amritsar, which is the most important centre of Sikh religious activity, has 388 Sikhs to every 1,000 of population. The highest percentage of Sikha (44:\%) to the total population is met with in the Faridkot State, and Patiala follows next with $34: 8$ per cent. The other districts and Statos in which Sikhs are found in considerable numbers are Ferozepore, Jullundur, Nabha, Malerkotla and Kapurthala, The Sikh element is fairly strong in Lyallpur, Gurdaspur, Lahore, Sheikhupura, Ambala and Kalsia. Their proportion in these districts and States rainges between 164 to 139 per mille. The smallest proportion ( 5 per 10,000 ) is found in Mandi State in the Himalayan Division where Hindua predomingte. There are no Sikhs in Loharu, Dujana and

- Pataudi States,

Varlatlo $\mathrm{n}_{\mathrm{t}}$
101. The variation in the strength of Silkhs from one census to another

| , Qapana. | Actual number of Sikhg: | $\begin{gathered} \text { VABtation PEIT } \\ \text { GENK. In } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: |
|  |  | Şikhe: | $\begin{aligned} & \text { Total } \\ & \text { popue } \\ & \text { pation. } \end{aligned}$ |
| 1881 | 1,706,165 |  |  |
| 4891 | 1,849,371 | +8.4. | +10.1 |
| 1001 | 2.102,8913 | + $13 \cdot 7$ | $\pm 6.3$ |
| 1011 | 2,883,720 | +3711 | $-2.2$ |
| 1991. | 3,110,000 | +78 | +6.7 | is shown in the margin, It will be observed that Sikhism has made a very marked advance sine 1881. The Sikhs now number 226,331 souls mere than in $1911-$-an inerease of 78 per cent.-whereas Musalmans and Hindus have increased only 5.5 and 4 per cent, respectively. Sikhs have made the greatest advance ( $0 \cdot 8$ ) per cent. in the Indo-Gangetio Plain ter, has risen since 1911 from 1,808 to 1,834 per 10,000 of the population. The reason for this relatively more rapid growth of Sikhs during the last decennium undoubtedly lies in the realisation by the sikhs



| - District. | Hindu. |  | Muralman. |  | Sikh. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1911 | 1821 | 1911 | 1921 | 1911 | 1021 |
| Ferozopore | 91,033 | 93,269 | 13,263 | 4,221 | 3,546 | 13,629 |
| Amritas | 97,347 | 85,336 | 984 | 34 | 6,360 | 14,125 | of the fact that their religion is quite independent of Hinduism, and the conversion to Sikhism of many of the depressed classes whe formerly swelled the ranks of Hindus. The districts and States in which the largest increases in the number of Sikhs have occurred are shown in the margin. The closer examination of the figures reveals that Hindus have decreased in the districts and States which show a high percentage of increase among Sikhs. Statistics of conversion are not available but the figures of Sikh Chuhras and Mazbabis registered in the districts of Ferozepore and Amritsar suggest that untouchables are being fast absorbed into Sikhism as the.result of the efforts of the Sikh preachers. The other contributory causes are possibly the frequency of widow remarriage, less disparity in the ages of husband and wife and consequently a higher birth-rate. Separate vital statistics for Sikhs are not available so that these causes cannot be examined in detail.

Growth of
sikh socth. of Guru, Sikhism was never treated as a separate religion and its followers were regarded as belonging to an alien religion by Hindus. A new:form of baptism not !introduced by Guru Govind Singh, which laid the foundation of a new sect in the isikh religion. The Guru explained the doctrines of his new Khalsa religion to the Sikhs who were invited to attend the great Bisakhi fair at Anandpur in the year 1699. Thus "since the time of Baba Nanak, Charanpahol has been customary. Men drank the water in which the Gurus had washed their feet, a custom which led to great humility; but the Khalsa can now only be maintained as a nation by bravery and skill in arms. I now. institute the custom of baptism by water stirred with a dagger, and change my followers from Sikhs to Singhs or Lions.

They who accept the nectar of the Pahol shall be changed before your sery ejes from jackals into lions and shall obtain empire in this world and bliss hereafter. Let all embrace one creed and obliterate differences of religion. Let no one deem himself superior to another. Let none pay heed to the Ganges and other places of pilgrimages. Let men of the four castes receive my baptism, eat out of one dish, and feel no disgust or contempt for one another." The Guru ordained that his followers should wear the following articles, viz., Kes (long hair), Kanga ( a comb), Kirpan (a sword), Kachh (short drawers), and Kara (steel bracelet). Those who did not accept the Guru's baptism were termed Sahjdharis, thus splitting Sikhism into two broad divisions (1) Kbalsas, (2) Sahjdharis. The tenth Guru when hard pressed by the Emperor Aurangzeb settled himself in Nadiar (Hyderabad State) where he happened to baptise one Madho Das, a Bairagi ascetic. Madho Das, known also as Banda, was recognised by Sikhs as their leader on the death of the Guru. He proclaimed himself as the eleventh Guru and reintroduced the old custom of "Charanpahol," and baptised a large number of Sikhs in this form. A majority of the Sikhs, however, did not accept the change and the result was, that four sub-sects arose in the Khalsa religion, viz., (1) Sikhs, (2) Mazhabi Sikhs, (3) Tat Khalsas and (4) Bandia Khalsas.

The other important sub-sects of Kihalsa are Akslis and Kukas. The word "Akali" literally means a God worshipper. Opinions differ as to the foundation of this seot. Some say that Ajit Singh was its founder, while others traee its growth to Guru Govind Singh's days. The blue dress of the Akali is said to have been auggested by a piece of blue cloth preserved by Guru Govind Singh in memory of his troubles, as a remnant of the dress which he wore in imitation of the robe of a Musalman saint, when he tried to escape from the Anandpur Fort, where he was besieged by the Mohammadan Army. The sect of Akalis has long been known as a militant organisation. Their headquarters were the Akal Bunga at Amritsar, and they claimed the leadership of tha Khalsa.

The Kuka sect was founded by one Bulaka Singh, an Udasi, of Hazro in the Attock District. The doctrines were preached after the death of the founder by Ram Singh, a carpenter of Ludhiana district, who declared himself an incarnation of Guru Govind Singh. The Kukas differ from ordinary Sikhs in the manner of wearing the turban, and in carrying a necklace or woollen cord, divided into knots which serve as beads for prayer. They may be regarded as a puritanioal Sikh sect. In addition to these sects there are two principal ascetic orders, namely Udasi and Nirmala. The Udasi-sect was founded by Baba Siri Chand, the son of Guru Nanak, whe is alleged to have been a born Yogi. Siri Chand was not installed on the Gaddi after the death of his father, but he was recognised as a loader and prophet by the Udasis, who refused to acknowledge Angad, who was elected to succeed Nanak, as a Guru. Under the leadership of Siri Chand, Udasis gathered enormous strength and formed themselves into a purely ascetic order. The Udasis are not uniform in their outward appearances. Some wear long hair, some have matted locks, while others shave their head and beard. The Nirmalas sllege that their order was founded by Guru Nanak himself.
103. The statement given in the margin shows the numerical strength of strength of

| Soots. | Keadhari. | Sabjdhari. |
| :---: | :---: | :---: |
| A vind Singh | 42.878 |  |
|  |  | 1,013 |
| Mixhabl .. | 2,305 |  |
|  | \% $2,4,484$ | 14,178 |
| Panjpris | 4,592 |  |
| ${ }_{\text {Rex }}^{\text {Rom Dasia }}$.: | 20,668 | 299 |
| Ram Ral |  | 378 |
| Sirwaius | 14,259. | 2,883 |
| Uliasi | 831,209 |  |
| Uuspersited | 1,989,986 | 209,770 |
| Total | 2,876,380 | 298,598 | the different sects returned in the pro- sika roctso vinces under the two main divisions-. Kesdhari and Sahjdhari. It will appear that Kesdhari constitute the bulk of Sikh population, i.e., about 92 per cent. of the total population of the Sikhs. The Sahjdharis represent 9 per cent. of the Sikh population. The districts where their number is largest are Montgomery ( 36,845 ), Jullundur ( 29,282 ) and Hoshiarpur $(23,492)$. The remaining one per cent, is made un of the seets analogous to other religions and miscellaneous sects, Sadhu (575), Nirmala (112), Narankari (21), Gulab Dasi (74), Babá Falu (87), Bedi Sodhi (61), Garib Dasi (5), Baba Gurditta (2), Nam Dey (7), Kabir Panthi (22) and Amraoti (16). Among Kesdharis the Tat Khalsas, Hazuris,

and Nanak Panthis occupy prominent positions. The Patiala State being a Sikh State has the largest percentage of Tat Khalsas. The term though originally designed to denote the followers of Guru Govind Singh in opposition to the Bandia Khalsa, seems to have lost its historic significance, as the word Kesdhari is considered comprehensive enough to include the staunch disciples of Guru Govind Singh. It is for this reason that we find that in Amritsar, which is the principal centre of the Sikh religion, Sikhs have registered themselves under the general head "Kesdharis." Hazuris are both Sahjdharis and Kesdharis, the number being 246,384 Kesdharis, and 1,613 Sahjdharis. Hazuris follow the behests of Guru Govind Singh, and the appellation (as described in para. 219 of the Punjab Census Report 1911) is used for those who have been initiated at Hazur Sahib, in Hyderabad, Deccan, where the tenth Guru breathed his last. The Nanak Panthis number 22,486 Kesdharis, and 14,179 Sahjdharis. Etymologically the term covers all Sikhs, because the faith owes its origin to Guru Nanak, but in its popular sense it designates those persons who have not particularly attached themselves to the tenets of other Gurus. The only sect worth noticing under the head Sahjdhari is "Sarwaria." The distinguishing characteristic of the adherents of this sect is that they do not eat Jhatka meat.

Virlation In Sects. 104. The variation in the different sects since 1911 is worked out in the

to be mainly the result of accretion from the ranks of Sahjdharis and Hindus.

| District of City. | Sahidhari. |  | Kesphari. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 1911. | 1921. | 1911. | 1921. |
| Ambala | 12,052 | 6,009 | 82,333 | 91,429 |
| Hoshiarpur | 48,489 | 23.494 | 85,354 | 109,375 |
| Jullundur | 42,177 | 29,282 | 133,718 | 178,838 |
| I.udhiana | 17,020 | 6,597 | 188,52C | 239, 124 |
| Ferozepuro .. | 15,247 | 6,115 | 246,325 | 297,647 |
| Amritasar | 6,140 | 1,568 | 246,757 | 285,436 |
| Gurdaspur | 0,674 | 6,46: | 111,383 | 139,C02 |
| Sialkot | 16,090 | 6,946 | 65, 61 | 188,498 $\mathbf{1 5 2 , 8 2 7}$ |
| Lyallpur | 24,875 | 7,980 | 121,276 41759 | 152.827 56.926 |
| Kapurthala | 12,516 | 7,148 | 41,758 | 21,479 |
| Malorkothe | 3,729 | 348 7.632 | 17,287 405,119 | 514,774 |
| Patiala | 67.163 | 7,632 | 21,414 | 27,932 |
| Jind | 1,152 | 85 | 21,414 | 27,032 | The conclusion is borne out if we compare the figures of Kesdharis and Sahjdharis for districts and States which show the largest decreases in the strength of Sahjdharis. The figures are noted in the margin. It appears that the scparatist movement, which was held largely responsible in 1911 for the increase in the number of Sikhs and for a corresponding decrease in the followers of Hinduism, has done a good deal during the past decade in popularising the tenets of Guru Govind Singh. The activities of Khalsas in spreading their religious doctrines were first

observed at the end of the 19th century when a Singh Sabha was organised in Amritsar City. Its members were then reported to be busy, not only in the city, but also in rural areas, inculcating the principles of the Sikh faith and urging the necessity of a separate religious and political existence. A new movement was started by the Tat Khalsa between the years 1905 and 1912, which established a
central institution called the "Chief Khalsa Dewan." The objects of this Association are fully described an page 157 of the Punjab Census Report, and need not be recapitulated. It had its branches in nearly all districts and States of the Pumjab, and its acope was limited more or less to social and retigious organisation and reformation. It is due to the matiring zeal of the members of this religious body that the Tat Khalas show an increase of 54.4 per cent., whereas other minor sects have lost their separate existence. The third association which is of recent birth is known as "Sharomani Curdawara Parbandhak Committee." It is an unregistered body and its aims and objects are declared to be (1) to arrange for the management of the Sikh Shrines in accordance with the principles of Sikhism and Panthak Jathedari, (2) to introduce and maintain the Guru doctrines in all the Gurdawaras, (3) to provide, if necessary, and to make arrangements for the imparting of religions and moral education. The Committee chiefly represents the Akali mects, bat has received support from Sikhs generally in its campaign for the control of Sikh shrines, in which it has attained a considerable measure of success.

## Section V._Christians.

105. The map printed below shows the local distribution of Chris- Tre local tians. There are now 346,259 Christians in the proviaces, or 13 per melle of crirsians

of the total population. Of these 7.6 per cent. belong to European and allied races, $1 \cdot 4$ per cent. are Anglo-Indians, and 91 per cent. Indian Cbristians. Nearly half the total number of Christians are found in the districts and States of the Indo-Gangetic Plain West, chiefly in Gujranwala, Lahore and Sheikhupura, where their proportion per ten thousand of the population ranges between 448 and 411. Next in importance comes the Sub-Himalayan tract which contributes more than one-third of the total Christian population of the provinces. The districts of this tract in which they are chiefly settled are Sialkot and Gurdaspur, Where they constitute 7 and 4 per cent., respectively, of the population. The districts in the North-West Dry Area which contain a fair proportion of Christians are Lyallpur, Shahpur and Montgomery: Proportionately the greatest number of Christians is found in the Simla district ( 84 per cent.), and the smallest in the. Dera Ghazi Khan district (1 per 10,000) in British Territory: No Christian was returned in Dujana, Pataudi, Jubbal and Lohara States.

Variation

| Reno or Nationality. | 1911. | 1821, | Variation per cent. |
| :---: | :---: | :---: | :---: |
| All racos | 109,751 | 346,250 | $73 \cdot 3$ |
| Europeans and allied | 32,278 | 26,313 | -18.5 |
| Anglo-Indians. | 3,478 | 4,915 | 41.3 |
| Indian Christians | 163,994 | 315,031 | 82.1 |
| District. | 1911. | 1921. | $\begin{aligned} & \text { Wecruase } \\ & \text { in } \end{aligned}$ |
| Ambala | 6,914 | 1,403 | 4,811 |
| Jullundur | 1,285 | 764 | 521 |
| Ferozepore .. | 2,098 | 1,224 | 874 |
| Jahore .. | 4,796 | 3,847 | 949 |
| S:alkot | 2,287 | 1,800 | 487 |
| Rawalpindi .. | 7,054 | 6,226 | 828 |

almost doubled itself during the last decade. While in 1911 there were 199,751 Christians in both the provinces, the number now registered is 346,259 , or $73 \cdot 3$ per cent. more than in 1911. The inset table gives the variation exhibited by the different racial sections of the Christian population since 1911. There has occurred an actual decrease in European Christians which is probably due to the reduction of the British Army in India, and to diminished commercial activity. As would appear from the figures noted in the margin, the decrease is mostly confined to the districts containing Military Cantonments. It may also be possibly due to some extent to the partial replacement of Europeans by Indians in both the higher and subordinate services.

The increase in the number of Anglo-Indians, as compared with 1911, is, in all probability, partly due to some Anglo-Indians who recorded themselvos as Europeans at the last census, having returned themselves under their proper designation, and partly to a growing tendency among Indian Christians to pass themselves off as Anglo-Indians. The above mentioned facts are proved by the increase registered in Anglo-Indians in the age group 30 and over, which is 502, or more than one-third of the total increase shown by this cammunity within the last ten years.

The great rise in the number of Indian Christians between 1911 and 1921 affords a striking indication of the increase in missionary activity during the decade. In 1881 the total number wias 3,796. In 1891 Indian Christians numbered 19,547 , and a decade later the number rose to 37,980 . The increase since 1901 has been more than maintained, and the present census shows 315,031 , or an increase of 311,235 , since 1881 .

The districts and States in which Christianity has made the greatest development during the decade are named in the

| District or State. | 1911. | 1921. | Absolute increase. |
| :---: | :---: | :---: | :---: |
| Hissar | 273 | 1,024 | 51 |
| Rohtak .. | 334 | 10,03: | 0,689 |
| Karaal .. | 982 | 3,321 | 2,338 |
| Kapurthala.. | 107 | 1,106 | 993 |
| Amritaar .. | 4,763 | 12,776 | 8,010 |
| Gujrat .. | 570 | 2,37: | 1,803 |
| Montyomery | 581 | 104,008 | 9,827 | margin. The increase in Hissar, Rohtak and Karnal districts is due mainly to the zeal and activity of the Methodist Episcopal Mission. In Kapurthala the increase appears to be the work of the Punjab Mission of the American Presbyterian Church. In Gujrat and Amritsar the Church of Scotland Mission, and the Church Missionary Society have done useful work. In Montgomery several missions are reported to have brought about the result, the chief among them being the Associated Reformed Presbyterian Mission.


107. Detailed figures for the Christian sects are given in Imperial Table

| Ssot. | Pupjab. | Delhi. |
| :---: | :---: | :---: |
| Abybsinian | 1 |  |
| Anglican Communion | 63,437 | 5,037 |
| Armenian .. | 107 |  |
| Buptist ... | 1,378 | 1,178 |
| Congregationalist .. | 31 | - |
| Greek | 3 |  |
| Lutheras: | 36 | 3 |
| Methodist $\quad \because$ | 33,058 | 2,985 |
| Minor Protegtant Donomina- | 6,631 | 148 |
| $\xrightarrow{\text { tion }}$ Presbytorian | 133,056 | 107 |
| Protestant (Unspecifiod) | 16,484 | 500 |
| Quaker |  |  |
| Roman Catholio .. | 38,21! | 2,010 |
| Salvationist .. | 38,11: | 5 |
| Syrian .. | $?$ |  |
| Sunt not retumed . . | 1,451 | 390 | XV, and the totals for the provinces are noted in the margin. The Presbyterians coustitute the bulk of the Christian population of the Punjab, representing 40 per cent. thereof. Out of 134,063 followers of this sect found in both the provinces, 1,349 or 1 per cent. are

${ }_{3}$ Europeans, 110, or less than 1 per cent. are Anglo-Indians, and 132,604 , or 98 per cent. are Indian Christians. They
${ }_{107}^{148}$ have been returned from all the districts
560 of the Punjab, notable exceptions
${ }_{2}, 010$ being the Hissar, Rohtak, Gurgaon, Multan, Muzaffargarh and Dera Ghazi 390 Khan districts. The districts where they are found in over-whelming majority
are Lahore, Sialkot, Gujranwala, Sheikhupura and Montgomery. Anglicans come next in point of numerical strength to Presbyterians, numbering 69,374, of whom 26 per cent. are Europeans, 4 per cent. Anglo-Indians, and about 70 per cent. Indian Christians. The districts where they are most numerous being Lahore ( 11,376 ), Gujranwala ( 10,287 ) and Lyallpur ( 10,045 ). Roman Catholics rank third, their number being 40,225 . Of these 12 per cent. are Europeans, 4 - per cent. Anglo-Indians, and about 84 per cent. Indian Christians. The important centres of the mission are the Sialkot and Lyallpur districts. The number of Salvationists is almost equal to that of Roman Catholics, there being 38,123 persons of whom 38,091 are Indians, the balance representing the number of European Officers in charge of the mission work in the Punjab. The largest number of Salvationists is found in Gurdaspur ( 16,334 ), Lyallpur ( 8,755 ) and Amritsar ( 6,112 ). Methodists number $\mathbf{3 6 , 0 4 4}$ of whom 35,667 are Indians, 331 Europeans and 46 Anglo-Indians. They are confined mosfly to the districts of the Ambala and Lahore Divisions of the Punjab. Other important sects are Abyssinian (1), Armenians (107), Congregationalists (31), Greek (3), Lutheran (39), Quaker (1), and Syrian (28).

The sects included under the heading "Minor Protestant Denominations" are the American Church of God Mission (3,944), Brethren in Christ Mission (17), Church of Christ Mission (1,456), Church of India (11), Mennonite Mission (123), and Seventh Day Adventists ( 1,165 ):

The entries which did not indicate any particular set of beliefs or where the word " Protestant" was only put down in the column for sects, were included in "Unsectarian or Unspecified Protestants." The detail is given on the title page to Table XV.
108. The figures of Christian sects for 1921 are compared with those Vartation to

| Soot. | 1911. | 1821. | Rercentage of variation 1911 to 1921 . |
| :---: | :---: | :---: | :---: |
| All Dinominstiona | 109,68: | 346,259 | 73.4 |
| Abyasinian .. |  |  | $100 \%$ |
| Arglioan Communion | 63,427 | 60,374 | 29.8 |
| Arcionian .. | 12 | 107 | 791.7 |
| Baptist .. | 1,340 | 2,550 | 90.7 |
| Singrogationaliat | 2 A | 31 | 24.0 |
| Grak .. | 18 | 3 | -83.3 |
| Litheran .. .. | 115 | 38 | -68.I |
| Mithodiat .. | 12,850 | 36,044 | $180 \cdot 5$ |
| Minor Protestant Donominations .. | 1,479 | 6,776 | $358 \cdot 1$ |
| Preabytarian .. ... | 95, 63 E | 1,34,063 | $41 \cdot 1$ |
| Proknstant (Ungrota rian) or (seot not spaciffud) | 930 | 17,044 | $1732 \cdot 7$ |
| Quaker .. .. | 8 |  | -66.7 |
| Roman Catholio | 15,847 | 40,225 | 153.8 |
| Rolvalionist . | 18,973 | 38,123 | $110 \cdot 9$ |
| Srinn (Janobitr) | -1 | ${ }^{26}$ | 2,500\% |
| 8 sot not returaod | 538 | 1,846 | 2431 | (983). Armenians now aggregate 107 as against 12 in 1911. Baptists pindi incrensod by 1,210 during the past decade. The number of Europeans, however, has fallen from 186 to 127, but the number of Anglo-Indians and Indian members of this sect has increased from 1,154 to 2,429. Increases have occurred mainly in Delhi and in the Ambala district and Patiala State. Congregationalists show an increase of 8 , and Greeks a decrease of 15 . The number of Methodists has risen from 12,850 to 36,044 , an increase of 180.5 per'cent. An increase has occurred among Indian Christians, chiefly in Rohtak $(9,267)$, Lahore ( 5,613 ) and Gurdaspur (2,159). The high percentage of increase under " Minor Protestant Denominations" is due to the inclusion in this sect of 3,944 persons, who returnedthemselves as members of American Church of God Mission. The strength of Presbyterians has increased by 39,024 or $41 \cdot 1$ per cent. Notable increases have taken place in Jullundur ( 1,875 ), Lahore ( 9,626 ), Gujranwala $(9,100)$ and Montgomery ( 3,471 ). Their number has fallen in the districts of. Lyallpur and Shahpur by 2,141 and 4,541, respectively, owing to the emigration of Indian Christians from these districts to the newly colonised districts of Montgomery and Sheikhupura. Roman Catholics have increased during the last ten

years, by 24,378 , or 153.8 per cent. Towards this increase Anglo-Indians have contributed 507, and Indian Christians 25,360 . The number of European members has gone down from 6,310 to 4,821 or $23 \cdot 6$, per cent. The districts in which the largest number of converts have been secured are Sialkot (7,003), Montgomery (3,424) and Lyallpur (7,885). Salvationista have added 20,050 persons to their number since 1911. The increase is chiefly represented by Indian Christians. The number shown under "Socts not returned" and "Unspecified Protestants" is larger than in 1911 in spite of every effort to obtain as correct a return of the Christian Sects as possible. Missionary societies were asked to give slips to their converts showing the name of the Church to which they belonged so that uneducated Indian Christians might know what entry they should make, but the result was not satisfactory.

## Section VI.-Minor Religions.

| Ambals |  |  |  |
| :---: | :---: | :---: | :---: |
| Simla | ${ }^{20}$ |  | ${ }^{1}$ |
| rop | 178 |  | 1 |
| itasa | 5 |  |  | pur ( 1,079 ).

Pars! and 2,052 to Bashahr State. The rest are distributed in the districts noted in the margin. Their number has declined from 7,690 to 5,918 since 1911, and the decrease is shared chiefly by the Kangra district (873), and Bashahr State (636). The decrease in the Kangra district may be due to migration, but in the.Bashahr State the loss seems to be part of the general decrease of 3 per cent. in the population.
 1911 seems to be due to migration.
109. Jainism was originally a sect of Hinduism, and even now the boundary line between the two religions is indeterminate. Jains are still regarded as a recognised section of Hindu Society, and consequently many Jains returned themselves as Jain Hindus in spite of clear instructions to the contrary. There are now 46,019 Jains in these Provinces, or 756 less than in 1911. The decrease seems chiefly to be due to some Jains having recorded themselves as Hindus. It is also possible that they are not so prolific as other constituents of the population owing to their living in towns, being engaged in sedentary occupation, and abstaining from nourishing food, such as meat and egge. Nearly half the total number of Jains in the Punjab are settled in the districts of the Ambala Division, chiefly in Hissar, Rohtak and Karnal. There are 4,698 Jains in the Delhi Province principally belonging to the Bania class. Other districts and States of the Punjab which possess a fair number of Jains are Patiala (3,249), Sialkot (2,147), Ludhiana ( 1,796 ), Jind ( 1,548 ), Amritsar ( 1,375 ), Ferozepore ( 1,211 ), and Hoshiar-

There are two main sects of Jains, known as Digambars and Swetambars. The important sub-sects are Dhundia and Sathanakwasi. About 44 per cent. of $J$ Jins are Digambaris, and 53 per cent. Swetambaris of all kind. 3 per cent. did not return any sect and were grouped under the head " miscellaneous."
from 54 to 36. They heve been chienom are dod where Government Offices and Military Cantonments are located.

- 113. The term includes all those persons who did not profess to belong to any religion, but returned themselves as Atheists, Agnostics, etc. At the previous census they were included among Christians, but now they have been excluded from the Christians in Table VI, and shown separately under the instructions of the Census Commissioner. Their number is 15 of whom 12 are Europeans, 1 Anglo-Indian, and 2 Indians.

OHAPTER IV.


cinapter iv.


Nort.-* Steikhupura figares for 1911, 1901, 1891 and 1881 ara + Attook figures for 1901, 1891 and 1881 are inoluded in Jhelum $\ddagger$ Mianwali and Lyallpur figures for 1891 and 1881 art not

TABLE $I I$.
of the main religions.

POFULAKIOT NETO AEB


Inoluded in distriota of Isullpar, Gajraumala, Lahore and Sialkot,
and Rowalpindi Diatricta.
araleble.


Noxs-*Shoikhupura figures for 1881, 1891, 1001 and 1911 are included in those of Gnjranwala, Lyallpar and Sialkot.
$\dagger$ Figures of 1881, 1891 and 1901 aro includod in Jholum and Rawalpindi Districts.
tFigures of 1881 and 1891 are not available.
§Figurea for Delhi province as now constituted are not available for previous comuses.

|  |  |  |  | T TA <br> and Ru | LIV | Iation. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Natural Division. | Numbir fre 10,000 of Urbak Population WHO 48I |  |  |  |  | Number per $\mathbf{1 0 , 0 0 0}$ ot Rural Population WHO ARE |  |  |  |  |
|  | Hindu. | Munalman. | Christian. | Jain. | Sikh. | Hindo. | Musaman. | Christian. | Jain. | Sikh. |
| 1 | 2 | 8 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11. |
| punjab .. -. | 4,021 | 5,060 | 205 | 88 | 628 | 8,446 | 6,110 | 124 | 8 | 1,808 |
| L-Indo-Gangetio Plain Wert | 4,160 | 4;888 | 145 | 99 | 709 | 4,134 | 3,629 | 119 | 18 | 2,100 |
| It,-Himaleyan $\quad .$. | 7,178 | 1,846 | 672 | 27 | 262 | 9,526 | 398 | 4 | 1 | 36 |
| ILI-Sub-Himalayan .. | 3,482 | 6,381 | 399 | 103 | 633 | 2,584 | 6,221 | 180 | 3 | 1,012 |
| 1V.-North-West Dry Area .. | 8,783 | 5,689 | 123 | ${ }^{9}$ | 385 | 1,236 | 8,069 | 117 | .. | 578 |
| DELHI .. . | 8,788 | 8,768 | 289 | 127 | 87 | 8,280 | 1,472 | 246 | 46 | 5. |
| L.-Inda-Gangotio Plaln Weat | 5,720 | 3,768 | 289 | 127 | 87 | 8,230 | 1,472 | 246 | 46 | 5 |

# CHAPTER•V. 

Age.
SECTION I.-THE AGE RETURNS.
114. Instruotions to enamerators. 115. The actual ages returaed at the Census, and comparison with 1911. 110. Comparison of Punjab (unselected), Englinh (selected) and American (unselected)longevity. 117. The "Stationary" Population. 118, Persons over 40 years of age in varions casten.

## SECTION II.-VITAL STATISTIOS.

110. Births and Deaths. 120. Ratio of fomale to malo birthe. 121. Doaths in tho Punjab, 1807-1021. 122. Deaths in Punjab Jails.

## Section I.-The Age Returns,

Instructions
Instructions 114. The Instructions to enumerators which were printed on the cover of tors. the enumeration book state "Column 7 (age)-Enter the number of years each person has completed. For infants less than one year, enter the word "infant." " The actual procedure adopted appears to have introduced at least 4 classes of cases. These were-
(1) Cases in which the person questioned gave his age at a figure which appeared reasonable to the enumerator.
(2) Cases in which the given age seemed improbable, and the enumerator then either put down the age estimated by himself or questioned some of the bystanders.
(3) Cases in which the person questioned gave two alternative ages, almost always differing by an even number; and the enumerator was left to make his own choice between them.
(4) Cases in which the enumerator questioned a third party, usually the head of the house, as to the ages of his family and, where, often the enumerator had no means of applying even the roughest check to the replies given.
Though the manner of obtaining the record of ages for entry in the census schedules, was thus, in itself, responsible for heterogeneity, it is doubtful whether any systematic procedure, with the material at present available, would produce any betterment of the returns. To record only the ages given by the persons questioned might make the returns even more inaccurate than they are. To record only the ages as estimated by the enumerators would certainly lead to large errors due to " personal equation." Possibly a definite instruction to the effect that where two ages are given (e.g., 20 or 22 years, 60 or 70 years) the mean age, or the whole number next below the mean age, where the mean is a fraction, might help to limit the individual initiative of enumerators : but even this would be unlikely to lead to any appreciable improvement. The difficulties in the way of obtaining anything approaching the actual age-distribution of the population are thus almost insuperable, and no surprise need be felt at the abandonment by the actuary (Mr. Acland), at the 1911 Census, of the task of graduating the female returns, which are more entangled than even those of the males.*

The actual
115. If we look at a histogram showing the frequency of the age-groups returned in the Punjab for each year of age, it must be admitted that it resembles the forest of factory chimneys of some big industrial town, rather than the falling outline of some smooth hill, whose curves swing easily down to the plain.

The outstanding chimneys are placed where those whose ages (at the last birthday), are recorded as a multiple of ten. The secondary chimneys are those for ages which are multiples of five, though that for age 25 actually overtops that for age 20 , both for males and females. Smaller, but still prominent smokestacks arise at ages 12, 22, 32, 42, 52, 62 and 72, and so on down to the ages which terminate with a seven or unity, represented by the spallest of elevations. $\dagger$

[^25]Truly over all these statistics of age hangs a dense curtain of fog and murkiness produced by those tall smoke-belching chimneys.

Diagram 35.


The great irregularity of the data is illustrated by the above diagram, which shows the recorded ages for each year, for males. The data for females are very similar, possibly due in part to the fact that the women's ages are very largely, if not wholly, the ages which the men select for them, and they naturally tend to choose the same ages for their womenfolk as they do for themselves.*

As so much uncertainty attaches to the age-distribution figures, it is of little use discussing them in detail until they have been graduated by the Government Actuary, and as his Report on the Punjab figures will not be available till after this Report has gone to press, the remarks made must not be interpreted as expressing any conviction on my part.

For form's sake I have had the age figures doubly smoothed by Bloxam's. method, smoothed again by curve-drawing, as was done in 1911, and then given a final smoothing by adjusting the second differences. The results, which are exhibited in the diagrams on the opposite page, have a spurious appearance of validity, which is, in reality, quite illusive. One obvious defect from which the curves suffer is that they do not possess any points of inflexion, so that they differ, in this respect, from some properly constructed tables. For example, the Punjab Life Table, P Males, for 1911, has a point of inflexion at 38 years, the Agra and Oudh Tables for 1911 for Males and for Females, have points of inflexion at 29 and 28 years, respectively, while the American Experience Table has two points of inflexion. $\dagger$

[^26]

The observed numbers in the age-gronps, and the smoothed values per 100,000 males, are reproduced in the statement below :-

Statement showing the age-distribution of 100,000 males by annual periods and their smoothing by Blocam's method from Subsidiary Table I, Chapter V.



The smoothed values for females, and for males and females together, have been calculated, but are not printed here, as the process adopted, has neither scientific validity*, nor, apparently, the sanction of actuarial usage.

We may pass on, then, to consider how the recorded ages by years differ from those given in 1911. Reference may be made to Subsidiary Table XI, which contains for each year of age the ratio of the number of males, females and persons per 100,000 as recorded in 1911 to the corresponding figures for 1921. A few salient points may be noticed. In the first place the ratios differ from unity, sometimes by a good deal, and there is a tendency for the ratios to be above or below unity for a number of consecutive ages. Thus for ages 4 to 11 (inclusive) fewer persons per 100,000 were recorded in 1911 than in 1921. From 12 to 51 there are more persons in 1911 than in 1921, while from 52 years and upwards till the age of 85 is recorded, there were again fewer persons in 1911 than in 1921. The possibility that there is a falling off in 1921 in the preference for the ages which are multiples of ten is suggested, but on the whole it is difficult to say whether the differences in the recorded ages are the result of the differential birth-rates $n$ and $n+10$ years ago, respectively, or of any change in the aptitude for misstatement which is a feature of all age-relations. The question could only be answered if the number of survivors for each year of age at each of the last 2 censuses, were calculated directly from the birth returns, and from the deaths each year at each year of age. A comparison of the ratio of the number of survivors so determined with the ratios of the recorded number of persons as given in Subsidiary Table XI, would show to what extent the variation of the ratios from unity is a physiological or a psychological characteristic.

[^27]$\qquad$
116. There are many ways of summarising the results of a Life Table, of punjab so as to compare the chances of life of one population with that of another. The (unseloctad) readiest way of doing 80 is to compare the expectations of life in the two communities. Two expectations may be made use of, (1) the actuarial expectation, which American is the ratio of the number of persons of age $\mathbf{x}$ and over, to the number who reach (iongovited. age $x$, or what is the same thing, the average number of years lived by persons who reach age x ; (2) the median expectation, which is the number of years after which a person is just as likely to be alive or dead, or, in other words, is that number of years for which it is an even contingency that a person will survive or die.

The following expectations for English and Punjab lives are given with

| Age. | Median Expectation, |  |
| :---: | :---: | :---: |
|  | Punjab Lifo Tabla Malea. Consua 1911. | British Offices O. M.(6) Table |
|  | 8.97 | 3 |
| 10 | 29.68 | 54.30 |
| 20 | 22.03 | 45.91 |
| 30 | 19:30 | $37 \cdot 37$ |
| 40 | 15.63 | 28.98 |
| 50 | 12.77* | $20 \cdot 90 *$ |

Probably a comparison of the Mortality Table for the North-Eastern States

| atotarial Eipeotation ot iffe in thic Ponjaband fi Anerioa. |  |  |
| :---: | :---: | :---: |
|  | - Expectation |  |
| Age. | Punjab Lifo Trable Minos. Cenaus 1911. | $\left\{\begin{array}{c} \text { North Eant } \\ \text { om Statos, } \\ \text { Mortality } \\ \text { Tablo (1808- } \\ \text { 1912). } \end{array}\right.$ |
| 0 | 21.23 | 50.41 |
| 10 | 31.38 | $51 \cdot 97$ |
| 20 | 20.72 | 43:36 |
| 30 | 21.60 | 35.49 |
| 40 | - 17.55 | 27.96 |
| 60 | 14.16 | $20 \cdot 76$ | insured lives are based on the experience of panied Lives in 60 British life-insurance companies from 1863-1893, and are, therefore, selected Table Punjab, Males in the Actuarial Relife on Chapter V, Age, of the Census of Indi Report Volume I, page 187) are based on unselected lives, and that the latter are, therefore, subject to much greater rates of mortality. The figures are given in the margin. of America, constructed by Robert Henderson on the census returns of 1900 and 1910 of the New England States, the 3 Middle. Atlantic States, New York, New Jersey and Pennsylvania, $\dagger$ which appears to deal with unselected $\ddagger$ lives, may be more appropriately used for comparative purposes. The figures for the life table expectation are noted in the margin. Striking as the difference is between the expectations for the Punjab and for American lives, one must be cautious in assuming that the differences of the mean durations of life are real, in view, particularly, of the inaccuracy of the Punjab returns; though the whole of the differences could hardly be explained on this basis. Ene most emphatic warning, that, whereas the

117. In actuarial language a "stationary" population is one in which the numbers of persons entering and leaving each age-group at each moment, "\$atitonars" is constant. It corresponds, in fact, to a state of steady flow in hydrodynamics. In particular, in a "stationary" population the number of births from moment to moment must be invariable, or, at least, invariable within the limits of the discrete intervals chosen for the age-groups. This is of course a state of affairs never realised in population statistics, and until actuarial calculations have formed this stationary population our discussion of the comparative numbers of persons in the age-groups at different censuses will be of but slender value. We want, indeed, to trace the history of the persons born each year, and find out how many of them are alive in each subsequent year. For this purpose we should keep our eyes on the "natural" population, and follow it through all its vicissitudes of nigration up to the time of death.

In the table that follows no attempt has been made to allow for the effects of migration, and the figures quoted are simply the smoothed age-groups, altered

[^28]in each census in the proportion requisite to make the total number of persons equal to the adjusted total population as given in Imperial Table II, for the Punjab, as at present constituted, and Delhi. The process, though a rough one, makes a comparison possible between the numbers in the age-groups, in one census and another.

Smoothed figures by quinquennial age-groups of the total population of the Punjab and Delhi at the respective censuses. The population figures are taken from Table II.

| Ago-period. | 1881. | 1891. | 1901. | 1811. | 1021. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Population, Punjab and Delhi | 21,151,092 | 23,288,248 | 24,772,034 | 24,204,814 | 25,580,248 |
| 0-4 | 3,110,480 | 3,980,358 | 3,753,335 | 3,667,382 | 3,950,803 |
| 5-9 | 2,654,276 | 3,267,458 | 3,277,912 | 3,227,305 | 3,323,874 |
| 10-14 | 2,384,701 | 2,702,191 | 2,852,535 | 2,811,068 | 2,901,795 |
| 15-10 | 2,125,494 | 2,435,743 | 2,502,425 | 2,493,828 | 2,506,006 |
| 20-24 | 1,887,024 | 2,114,936 | 2,201,958 | 2,200,435 | 2,215,916 |
| 25-29 | 1,658,822 | 1,841,658 | 1,026,712 | 1,907,044 | 1,952,116 |
| $30-34$ | 1,451,557 | 1,588,370 | 1,676,489 | 1,638,102 | 1,688,317 |
| 35-39 | 1,264,829 | 1,306,983 | 1,426,267 | 1,369,160 | 1,450,888 |
| 40-44 | 1,078,300 | 1,093,113 | 1,188,566 | 1,124,607 | 1,239,868 |
| 45-40 | 912,407 | 903,006 | 988,378 | 920,073 | 1,055,188 |
| $50-54$ | 777,620 | 736,663 | 800,711 | 733,478 | 870,538 |
| 55-59 | 653,200 | 594,083 | 650,578. | 686,783 | 712,209 |
| 00 and over | 1,202,716 | 739,039 | - 1,503,836 | 1,430,283 | 1,710,973 |

Norn- Figures againat 60 and over have not been amoothed.
From this table we may construct a rough " stationary" population and compare it with the Table P, for Males, prepared by the Actuary for the Census of 1911.


The want of agreement between column 2 and column 3 shows how unwise it is to proceed to comparisons without having fully adjusted life-tables at our command. The difference seems large even admitting that the comparison is not in pari materia, as Mr. Acland's table was, of course, constructed without the help of the statistics of the 1921 Census, and of the birth and death records of the last decade.

The last point to be noted in this connection is that the "stationary" population for which the age-group frequencies are given in column 2 above, is that obtained by following the life-history of the persons between 0 and 4 at the Census of 1881, and observing how many of them are alive at each subsequent census. This, of course, gives us a death-rate applicable to persons aged 0 in 1881, aged 1 year in 1882, 2 years in 1883, and so on, which may be very different from the mortality found for ages $0,1,2$, and so on, in 1921, or in the decade 1911 to 1921. It would be wrong, therefore, to apply these results, quite apart from their palpable defects, in determining the actual rates of mortality prevailing at the present moment. This of course, is theinformation, Tife Insurance Companies want, and for this they must await the publication of the Actuary's report.
118. The marginal table shows the number of males and females over 40, persons over

Table showing the onder of number of pernons per mille over 40 geara of age In priacipal caster of tho Panjab, 8ubaidiary Table 4, Cbapter V.

H. $=$ Hinda, M. $=$ Musalman, B. $=$ Sikh

Avorago for the Punjab in 1021 of porsons over 40 years per mille .. 226.
Aremge for the Punjab in 1911 of pensons over 40 years per mille . . 220.
in various Punjab ${ }_{\text {age }}^{40}$ years or Castes, and also a ous castes.
comparison between the number of persons over 40 in the various castes at the 1911 Census with that of 1921. On the face of it, it seems as if the criminal and menial ( $k a-$ min ) classes had an early mortality which left them with comparatively few people over 40, but this presumption would have to be tested by excluding the possibility of a recent more rapid increase in the births of the criminals and menials, and also by examining the likelihood of these classes understating their age more frequently than the higher
and well-to-do classes.

## Section II.—Vital Statistics.

119. The numbers of births and deaths for males and females, the excess of births over deaths, and the ratio of female to male births and deaths, are given Doaths for each year since 1881 to 1920 inclusive, in Subsidiary Table XII to this Chapter. The question of the accuracy of the returns of births and deaths has been dealt with by Mr. Middleton in paragraph 25 of Chapter I, and by myself in paragraph 51 of Chapter II, and in Appendix I. My own belief is that there is a serious amount of omission in both birth and death returns, though in some districts, and, as it happens, in the whole of the Punjab taken together, the balance of reported births and deaths corresponds pretty closely with the change in population between the census of 1911 and that of 1921, after allowance for emigration and immigration. The reported figures of the vital statistics of the decade are

Vital Statiatice for the Punjab.

given in the margin for the whole of the Punjab, which, of course, excludes the Delhi Province. The figures are quoted for the 2 quinquennia 1911-1915 and 1916 -1920. From these figures, adopting as the approximate excess of immigrants over emigrants during the decade, 30,000 ( 15,000 males and 15,000 females), we make the following calculation of
the 1921 popalation from that of 1911 :-


The differences between the calculated populations male and female, and those given by the census figures, are indicative (so far as we accept the accuracy of the census figures, and of the calculation of emigration and immigration) that while male births are less frequently unreported than male deaths, for females the reverse is the case. The tendency to omit the births of females, is even greater than the tendency to omit reporting their deaths, though, as has been observed, there is reason to suppose that in both cases the number of omissions is considerable. even to that approximation the figures are probably not to be relied on. At any rate, those who wish to make the deduction that there has been a genuine inc rease in the ratio of female to male births since 1881, do so at their own risk. The apparent rise since 1891 may be explained by the slight increase in the efficiency of registration, which continued until the burden of the war on District Officers, and the turning of their attention to the more immediately pressing problems of recruitment and of anti-revolutionary measures, caused a slight relaxation in supervision of the chowkidar's (village watchman's) returns of births and deaths.*

The ratio of females to male deaths exhibits considerable irregularity, the highest reported ratio being 1.05 in 1904, and the lowest 0.85 in 1920. The comparatively high ratio of 0.97 in 1918, has been attributed to the effects of the influenza epidemic, to which a higher proportion of females than males succumbed. The other variations must be referred to their causes by medical experts.

## Deaths in

121. According to the scheme elaborated with Colonel Forster, I. M. S., Director of Public Health, Punjab, the deaths from the following categories of
diseases have been examined from 1867 onwards, for the elucidation of the sea sonal variation. The categories were :-
(1) deaths from all causes.
(2) " $"$ cholera.
(3) " " small-pox.
(4) " " bowel complaints.
(5) " " plague.
(6) " " fevers.
(7) " ", all causes not specified under groups (2)-(6) inclusive.

The 55 years have been separated into two periods, viz., from 1867-1896 ( 30 years) and from 1897-1921 ( 25 years), the latter period corresponding to the intensive colony-development policy of the Punjab Government, which has been the big factor in Punjab economic history in the past fifty years. A further advantage of this separation is that it will enable successive groups of 30 years' statistics to be compared, as the figures up to and including' 1926, 1956, 1986 and so on, become available. The method adopted for preparing the statistics is known as Newsholme's. In this method the daily death-rate is determined by dividing the total number of deaths from the particular disease by the number of days in

[^29]the year, while the number of deaths in each month is divided by the number of days in the month. The ratio of the second quotient to the former, expressed as a percentage, gives a number indicative of the relative intensity of the disease in the month in question. By averaging these percentages for a good many years, we determine to what extent there is a seasonal recurrence of intensity.

By grouping the years according as the mortality from the disease considered was low, normal, or high, any differences in the seasonal recurrences for mild, moderate or severe epidemics can be isolated. All relevant data are collected in Appendix 4 to this volume. I leave to more competent persons the task of interpreting the results, in terms of fluctuations in the climate, food-supply, dates of fairs*, natural immunity, and medical treatment.

The reader is referred to Appendix 4 for farther notes on the subject.
122. It has been observed, from time to time by, various writers on the subject that a fair comparison of the death-rate in jails, and in the free popalation, is possible only if allowance is made for the fact that persons undergoing imprisonment consist mainly of persons in the healthy middle ages of life, and of very few young children and aged persons.

Thus, in Punjab jails the death-resistant group of males, aged 16-40, comprises no less than 80 per cent. of the jail population, whereas in the population at large this age group includes only about 40 per cent. of persons alive. In this way jails escape the major portion of the high infantile mortality and of the deaths among the aged. To institute a comparison of the healthiness of jails and of the free-living persons outside, it is necessary, therefore, to correct the crude jail death-rates for the effects of the differential size of the age-groups.

There are two standard ways of doing this, named respectively, the " direct" and "indirect" mathods of correction. In the "direct" method the deathrates for each age-group in jails are applied to the numbers of persons in the corresponding age-groups of the free-population, and a total death-rate calculated. In the "indirect" method the death-rates for each age-group in the free population are applied to the number of persons in the corresponding age-group of the jail population, and an "expected" total death-rate calculated; the ratio of the actual total death-rate in jails, to the "expected!" death-rate forms a factor, which multiplied by the actual jail death-rate, gives the "indirectly" corrected jail death-rate. Colonel Ward, I. M. S., Inspector-General of Prisons, having very kindly supplied me with the figures of -
(1) the ages of admission of convicts into Punjab jails,
(2) the mortality rates based on the average daily population,
for the eleven years 1911-1921 inclusive, the corrected jail death-rate has' been found by the "indirect" method referred to above. $\dagger$

The resulte for males onty are given in the table below :-'

| Mertality per mille in Punjab Jaile. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Your. |  | Actual deathrate in jails, as given in I. G. of Prisons Report | Ratio of column 3 to column 2. | General deathrato per mille from Sunitary Roporto | Corrected jail death-rate : column 4 into colamn 5. |
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| 1911 | $\cdots$ | 18.38 | 29.20 | 1.51 | 34.05 | 61.42 |
| 1912 | $\because$ | 11.44 | 20.06 | 176 | 28063 | 46.60 |
| 1014 | $\because$ | ${ }_{12} 18.91$ | 1772 26.90 | 1.46 8.09 | $30 \cdot 19$ 31.98 | 44.08 68.80 |
| 1015 | $\cdots$ | 20.97 | 2681 | $1 \cdot 28$ | ${ }_{38} 33$ | 46.50 |
| 1910 | $\cdots$ | $12 \cdot 12$ | 21.71 | 175 | 3070 | 6373 |
| 1917 | $\because$ | 18.08 04.33 | 28.02 $89 \cdot 51$ | 178 | -37.91 | 70 |
| 1919 | $\because$ | 1434 | ${ }_{23} 23$ | 0.91 188 | $80 \cdot 98$ 2834 | 73.67 45.91 |
| 1930 | $\cdots$ | 14.64 | 1005 | 114 | ${ }_{28} 255$ | 45.51 32.51 |
| 1981 | $\cdots$ | 13'45 | 17:35 | 130 | $30 \cdot 13$ | 3917 |

-Colonol Burstor, I.M:S., to whase help, buth montal and material, I am greatly indobted, pointa out that
 sholera.
†Fad tims promittod I would havo caloulatod the oorrooted jail death-rato by the " direct " method as well. Bor this parpzeo, howovar, tho laburious abstrastion of tho deathy by ago-groupa is a necessary preliminary, and thet tho tikik, important though it is, could not be undortation at presont

As it stands the table shows that, with the single exception of 1918, when the jails escaped much of the mortality from the severe influenza epidemic, the healthiness (as shown by the death returns) in Punjab jails from 1911 to 1921 was below that of the free population. Now, there are a great many points to be noticed before jumping to conclusions unfavourable to prison administration.

Firstly, the ages adopted in the calculation above are those of convicts

Average duration of mentence in Punjab Jails, 1014.

| Period of nentenco. | Adopted moans in. yoars. | Convicta in thousands. | Product. |
| :---: | :---: | :---: | :---: |
| 1 month and under <br> 6 months to over 1 month <br> 1 year to over 8 montha <br> 6 yearn to over 1 year <br> 10 years to over 5 years <br> Over 10 years <br> Transportation for life and term. | $\begin{gathered} 0.06 \\ 0.30 \\ 0.80 \\ 2.0 \\ 7.0 \\ 12.0 \\ 20.0 \end{gathered}$ | 316840 | 18820.4 |
|  |  |  |  |
|  |  |  | 36.8 |
|  |  | 48 37 | 74.0 |
|  |  | 5 | 35.0 |
|  |  | 0.4 1 | 4.8 |
|  |  | 18 | 36.0 |
|  |  | $189 \cdot 2$ | $208 \cdot 86$ |

Averago daration, excluding transportation, 0 ' 92 years. Avorage duration, including transportation, ill yeans.
on admission. Actually we want the ages of convicts during the term of sentence. A calculation for 1914 given in the margin shows that we may adopt 1 year as an approximate figure for the duration of sentences in Punjab jails, and that therefore we should add, roughly, half a year to the ages of prisoners on admission to get the ages of those undergoing imprisonment. This will very slightly alter the corrected death-rates in favour of the jails.

Secondly, there is in jails a certain number of deaths of persons, who have been concerned in riots and affrays, and may have received such severe injuries, that they have died shortly after admission.

Thirdly, a large number of convicts are persons who earn a precarious livelihood outside prison, and belong to the relatively poorly-clad and ill-fed portion of the population. In other words the jail population is not a pure random sample from the general population.

Lastly, there is the psychological effect of captivity* which, even in the healthiest surroundings from the standpoint of sanitation and medical attention, has a depressing effect on the prisoner's physical "tone" and lessens his resistance to disease.

[^30]I. Age distribution of 100,060 of asch sex by annual periods. II. Based on Imperial Table VII Age distribution of 10,000 of each sex in the Province and each Natural Division. III. Age distribution of 10,000 of each sex in each main religion. IV. Besed on Imperial Tablo XIV. Age distribution of 1,000 of each sex in certain castef. V. Proportion of children under 10
 under 10 and of persons over 00 to those aged 16 - 10 in certain religious, and airo ol mand Natural Divisions for British Territory VI. Variation in popolation at eertain age-perioda. Vil. Reported Birti-rsterytory only). IX. Reported desth-rate by sex and onjy). VIII. Reported doam-rato by sex alle living at same ago according to the Consu of 1911 (for Punjab and Delhi, British ago in decado an X. Reported deaths from certain disesses per mille of each sex. XI. The ratio of the number of males, females and permons por 100,000 st the Census of 1011 to that of the Census of 1921 foresch year of age, as recordedin the Census Sohedules. XII. Statement howing tho Birtha and Deaths since 1881, Panjab (British Territory) including Delhi.

## SUBSIDIARY TABLE I.

Age distribution of 100,000 of each sex by annual periods.

| A02, |  | Males, |  |  |  | Freales. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Hindu. | gikh. | Mraalman. | Total. | Hindo. | Sikh. | Musalman. | Total |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| TOTAL |  | 100,000 | 100,000 | 100,000 | 300,000 | 100,000. | 100,000 | 100,000 | 300,000 |
| Under 1 | J | 3,800 | 2,982 | 3,986 | 10,748 | 4,148 | 4,098 | 4,104 | 12,350 |
| $1$ | J | 1,448 | 2,005 | 1,658 | 5,011 | 1,626 | 1,759 | 1,908 | 5,291 |
| 2 | $\because$ | 2,261 | 2,024 | 2,344 | 6,629 | 2,627 | 2,343 | 2,755 | 7,725 |
| 8 | $\because$ | 2,651 | 2,187 | 2,803 | 7,661 | 3,030 | 2,020 | 2,895 | 8,645 |
| 4 | . | 2,673 | 2,345 | 3,230 | 8,257 | 2,999 | - 2,711 | 3,194 | 8,904 |
| 6 | - | 3,269 | 3,190 | 3,221 | 9,080 | 8,297 | 3,307 | 3,449 | 10,003 |
| 6 | . | 2,898 | 2,378 | 3,488 | 8,762 | 3,134 | 2,788 | 3,838 | 8878 |
| 7 | . | 2,735 | 2,035 | 2,804 | 8,474 | 2,937 | 2,831 | .3,117 | 88880 |
| 8 | . | 3,113 | 2,880 | 4,040. | 10,033 | 3,348 | 2,696 | 3,786 | 9,830 |
| 0 | . | 2,293 | 2,411 | 2,223 | 6,027 | 2,337 | 2,421 | 2,191 | 6,949 |
| 10 | . | 3,174 | 2,922 | 3,712 | 9,808 | 3,187 | 3,140 | ,3,376 | 9,703 |
| 11 | - | 1,664 | 2,417 | 1,641 | 5,622 | 1,635 | 1,857, | 1,447 | 4,039 |
| 12 | $\cdots$ | 3,050 | 3,386 | 4,102 | 11,138 | 3,052 | 2,871 | 2,739 | 8,662 |
| 18 | . | 1,041 | 2,047 | 1.365 | 5,043 | 1,469 | 1,695 | .1,332 | 4,496 |
| 14 | .. | 2,009 | 1,065 | 2,204 | 6,178 | 1,840 | 1,842 | 1,869 | 5,551 |
| 16 | . | 2,241 | 2,604 | 2,018 | 6,863 | 1,884 | 2,114 | 1,950 | 5,958 |
| 10 | - | 2,025 | 2,138 | 1,008 | 6,071 | 1,946 | 1,622 | 1,913 | 6,481 |
| 17 | . | 1.013 | 1,311 | 1,010 | 3,334 | 892 | 949 | 779 | 2,620 |
| 18 | . | 2,448 | 2,726 | 2,256 | 7,430 | 2,374 | 2.120 | 2,518 | 7,012 |
| 19 | . | 794 | 086 | 875 | 2,665 | 613 | 721 | 728 | 2,062 |
| 20 | . | 3.186 | 3,470 | 2,854 | 9,610 | 3,910 | 3;289 | .4,344 | 11,543 |
| 21 | : | 895 | 744 | 508 | 1,847 | 392 | . 683 | 413 | 1,488 |
| 22 | .. | 1,082 | 2,440 | 1,850 | 6,222 | 1,978 | 1,828 | 2,016 | 5,822 |
| 23 | . | 684 | 912 | 033 | 2,229 | 526 | 531 | 454 | 1,511 |
| 24 | - | 013 | 1,090 | 1,257 | 3,260 | 932 | 810 | 1,071 | 2,813 |
| 25 | $\cdots$ | 4,200 | 3.974 | 3,919 | 12,153 | 4,590 | 3,719 | 4,842 | 13,151 |
| 26 | . | 1,042 | 1,148 | 888 | 3,176 | 1,004 | 1,111 | 1,121. | 3,236 |
| 27 | $\cdots$ | 731 | 906 | 778 | 2,415 | 600 | 764 | 522 | 1,886 |
| 28 | - | 1,295 | 1,195 | 1,229 | 3,719 | 1,467 | 1,590 | 1,356 | 4,413 |
| 20 | - | 333 | 363 | 605 | 1,261 | - 338 | 316 | 351 | 1,005 |
| 80 | - | 4,496 | 4.295 | 4,177 | 12,908 | 5,102 | 4,938 | 5,328 | 15,458 |
| 81 | * | 212 | 190 | 314 | 716 | 143 | 158 | 225 | 526 |
| 32 | $\bullet$ | 1,761 | 1,768 | 1,604 | 5,173 | 1,528 | 1,395 | 1,606 | 4,529 |
| 33 | . | 349 | 420 | 377 | 1,152 | 280 | 356 | 177 | 813 |
| 34 | .. | 364 | 359 | 556 | 1,279 | 400 | 470 | 585 | 1,464 |
| 35 | $\cdots$ | 3,804 | 3,990 | 3,481 | 11,365 | 3,696 | 3,973 | 3,780 | 11,449 |
| 30 | $\cdots$ | 703 | 541 | 583 | 1,827 | 613 | 450 | 562 | 1,625 |
| 37 | * | 231 | 245 | 227 | 703 | 184 | 202 | 195 | 581 |
| 88 | - | 471 | 833 | 395 | . 1,389 | 583 | 533 | 396 | 1,512 |
| 30 | - | 927 | 180 | 640 | 1,057 | - 189 | 231 | 104 | 574 |
| 40 | - | 4,782 | 4,461 | 4,102 | 13,345 | 5,173 | 5,418 | 4,937 | 15,528 |
| 41 | - | 188 | 114 | 161 | 407 | 118 | 110 | 124 | 352 |
| 42 | $\cdots$ | 658 | 657 | 420 | 1,635 | 556 | 570 | 339 | 1,465 |
| 43 | $\cdots$ | 172 | 149 | 80 | 401 | 84 | 154 | 55 | 293 |
| 44 | $\because$ | 141 | 148 | 436 | 725 | 132 | 208 | 97 | 437 |
| 45 | $\cdots$ | 3,088 | 2,883 | 2,588 | 8,659 | 2,954 | 3,350 | 2,893 | 8,997 |
| 40 | - | 258 | 190 | 171 | 013 | 179 | 165 | 132 | 476 |
| 47 | $\cdots$ | 184 | 184 | 137 | 495 | 102 | 148 | 51 | 301 |
| 48 | $\because$ | 185 | 350 135 | 323 | 1,084 | 460 | 429 | 370 | 1,259 |
| 80 | -* | 3,091 | 3,530 | 3,695 | 11,216 | 3,606 | 184 4,359 | 91 3,940 | 116 $\mathbf{1 1 , 9 0 5}$ |
| 51 | $\cdots$ | 123 | 95 | 123 | 341 | 82 | 99 | 89 |  |
| 58 | - | 431 | 437 | . 285 | 1,153 | 323 | 388 | 211 | 923 |
| 63 84 | $\because$ | 83 190 | 145 | 688 | 296 | 43 | 81 | 34 | 158 |
| 55 | $\because$ | 190 1,748 | 1294 | 298 1.785 | 5338 | 103 | 311 | 60 | 474 |
|  |  | 1,78 | 1,436 | 1,786 | 6,013 | 1,308 | 1,636 | 1,333 | 4,367 |



Noren-This Table was prepared by sorting actual samples, the numbers actually sorted wero-
Malea,-Hindu 51,403 from the Weatern and 60,008 from the Eastern Punjab.
Bikh 01,120 from the Contral Punjab
Musalman 54,303 from the Westom and 00,666 from the Fastern Punjab.
Females.-Hindu 50,605 from the Western and 65,856 from the Eastern Punjab,
Bith 101,654 from the Contral Punjab.
Musalman 52,92 from th ' Weatern and 56,302 from the Enstern Punjab.
Tho figures have not boen adjusted in any fray beyond proportional reduction to a total of 100,000 of anoh wex


Norm. -1. Figures of age-poriode $60-64,65-69$ and 70 and over are not available for 1881, 1801 and 1901, and have
boon collootively worked out for 60 end ovor.
2. Figaree of 1001 do not inolude tho population of Biloch Trans-Frontier.

| Age distribution of 10,000 of each sex in each msin Religion． |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Age． |  |  |  |  | Pukjab and Dilmi． |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 1821. |  | 1911. |  | 1801. |  | 1891. |  | 1881. |  |
|  |  |  |  |  | 等 |  | 量 | 最 | 安安定 | 安 | 突 | 安 | $\frac{8}{5}$ | 富 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | $13^{\circ}$ | 14 | 16 |
| ALL RELIGIONS <br> $0-4$（inclusive） | 1，272 | 1.478 | 1，047 | 1，420 | 1，268 | 1，477 | 1，277 | 1，472 | 1，245 | 1，350 | 1，003 | 1，74C | 1，210 | 1，366 |
| 5－9（inclusive） | 1，457 | 1，538 | 1，117 | 1，377 | 1，451 | 1，530 | 1，333 | 1，388 | 1，365 | 1，365 | 1，364 | 1，35t | 1，354 | 1，350 |
| 10－14（inclusive） | 1，217 | 1，104 | 1，013 | 956 | 1，213 | 1，102 | 1，188 | 1，029 | 1，231 | 1，087 | 1，054 | 914 | 1，216 | 1，008 |
| 15－19（inclusive） | 851 | 785 | 976 | 927 | 853 | 788 | 915 | 817 | 913 | 842 | 1.045 | 1，078 | 802 | 801 |
| 20－30（inclusive） | 2，895 | 2，894 | 3，720 | 3，338 | 2，910 | 2，902 | 3，050 | 3，116 | 3，001 | 3，128 | 3，176 | 3，25t | 3，055 | 3，151 |
| $40-59$（halusive） | 1，610 | 1，580 | 1，688 | 1，538 | 1，618 | 1，578 | 1，635 | 1，611 | 1，649 | 1，632 | 1，433 | 1，356 | 1，673 | 1，835 |
| 60 and over | 692 | 621 | 430 | 443 | 687 | 617 | 601 | 588 | 608 | 500 | 325 | 29. | 584 | 675 |
| Meas 408 | $25 \cdot 4$ | $24 \cdot 5$ | 25.8 | 24.1 | 254 | 24.6 | $25 \cdot 2$ | 2A－7 | $25 \cdot$ | 24.8 | 23.0 | $22^{\circ} \mathrm{C}$ | $25 \cdot 4$ | $24 \cdot 7$ |
| HINDU |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0－4（inclusive） | 1，211 | 1，436 | 1，053 | 1，408 | 1，205 | 1，435 | J，188 | 1，386 | 1，150 | 1，267 | 1，546 | 1，706 | 1，122 | 1，260 |
| 0－9（inclusive） | 1，384 | 1，489 | 1，112 | 1，346 | 1，374 | 1，480 | 1，235 | 1，302 | 1，304 | 1，349 | 1，294 | 1，30！ | 1.201 | 1，312 |
| 10－14（inclusive） | 1，187 | 1，096 | 1，015 | ${ }^{836}$ | 1，180 | 1，090 | 1，166 | 1，028 | 1，234 | 1，102 | 1，082 | ${ }^{932}$ | 1，217 | 1，064 |
| 15－19（inclusive） | 888 | 817 | 998 | 900 | 800 | 822 | 909 | 886 | ${ }^{9} 948$ | 882 | 1，076 | 1，082 | 947 3191 | 887 3.247 |
| 20－39（inclusive） | 3.005 | 2，052 | 3，724 | 3，356 | 3，032 | 2，905 | 3，158 | 3，188 | 3，078 | 3，158 | 3，274 | 3，327 | 3,191 1,697 | 3，247 |
| 40－59（inclusive） | 1，676 | 1，605 | 1，687 | 1，541 | 1，67¢ | 1，602 | 1，69b | 1，065 | 1，717 | 1，681 | 1，435 | 1，365 | 1，697 | 1,687 563 |
| 60 and over | 652 | 605 | 431 | 452 | 644 | 605） | 558 | 554 |  |  | 203 |  | 635 |  |
| Meas agi | $25 \cdot 7$ | 247 | 25.7 | 24.2 | $25 \cdot 6$ | 24.6 | $25 \cdot 5$ | 250 | $25 \cdot 8$ | 25.1 | 28.1 | 22.7 | 25.2 |  |
| MUSALMEAN－ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0－4（inclusive） | 1，328 | 1，518 | 1，054 | 1，453 | 1，324 | 1，517 | 1，347 | 1，541 | 1，342 | 1，451 | 1；673 | 1，806 | 1，313 | 1，453 |
| 5－9（inclasive） | 1，533 | 1，586 | 1，164 | 1，454 | 1，528 | 1，585 | 1，422 | 1，467 | 1，421 | 1，407 | 1，443 | 1，418 | 1，440 | 1，417 |
| 10－14（inclusive） | 1，237 | I，106 | 1，044 | 1，013 | 1，235 | 1，105 | 1，200 | 1，040 | 1，233 | 1，083 | 1，026 | 894 | 1，229 | 1，089 |
| 15－19（inclusive） | 816 | 769 | 943 | 841 | 817 | 770 | 848 | 776 | 869 | 8211 | 1，024 | 1，075 | ${ }_{2}^{864}$ | 840 3,051 |
| 20－39（inclusive） | 2，823 | 2，878 | 3，542 | 3，247 | 2，832 | 2，882 | 2，970 | 3，059 | 2，940 | 3，093 | 3，093 | 3，178 | ${ }_{1}^{2,818}$ | 3，061 |
| 40－69（inclusiva） | 1，563 | 1，635 | 1，774 | 1，556 | 1，568， | 1.536 | 1，588 | 1，053 | 1，572 | 1，553 | 1,397 | 1，321 | 1，827 | 1，582 |
| 60 and over－ | 700 | 608 |  |  | 693 | 605 | 622 | 564 |  |  |  |  |  |  |
| brean age | 25.0 | $24 \cdot 1$ | 26.0 | 239 | 250 | ：24\％ | 24.8 | 24－2 | $24 \cdot 6$ | 24＊4 | 22.7 | 22.2 | 247 | 248 |
| CHRISTIAN－ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0－4（inclusive） | 1，394 | 1，091 | 937 | 1，353 | 1，375 | 1，678 | 1，348 | 1，777 | 949 | 1，557 | 891 | 1，788 | 678 | 1，679 |
| 5－9（inclusive） | 1，520 | 1，671 | 894 | 1，357 | 1，495 | 1，660 | 1，293 | 1，572 | 956 | 1，472 | 788 | 1，506 | 548 | 1，477 |
| 10－14（inclusive） | 1，230 | 1，100 | 720 | 935 | 1，208 | 1，152 | 1，001 | 1，081 | ${ }_{608}^{810}$ | 1110 | 530 775 | 977 1.052 | 414 | 1，120 |
| 15－19（inclusive） | 883 | 811 | 851 | 1，027 | $8{ }^{81} 2$ | 818 | \％ 744 | 702 | ${ }_{5}^{608}$ | 878 3.367 | 0，137 | 3，503 | 7 7，695 | －8，671 |
| 20－39（inclusive） | 3，015 | 2，783 | 5，095 | 3，728 | 3，100 | 2，817 | $\mathbf{3 , 9 5 5}$ $\mathbf{1}, 225$ | 3，045 | 5，378 | 1，238 | ${ }^{0} 1767$ | ${ }^{3} 984$ | 771 | ${ }_{9} 908$ |
| 40－59（inclusive） | 1，348 | 1，369 | 1，252 | 1，313 | 1，345 | 1，367 | 1，225 | 1，332 | 1，011 | ${ }^{1237}$ | 114 | 190 | 85 | 180 |
| 60 and over |  | 615 |  | 287 | 516 |  | 43 F |  |  |  |  |  | 25.4 | 20.8 |
| Mzan age | $28 \cdot 8$ | 227 | 24.8 | 28.2 | $28 \%$ | 22．7 | 23 | 22.8 | 24 | 225 |  | 20 | 26 |  |
| SIKH－ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1，208 | 1，412 | 631 | 1，517 | 1，208 | 1，412 | 1，247 | 1，417 | 1，157 | 1，151 | 1，545 | 1，542 | 1，184 | 1，291 |
| 0－9（inclusive） | 1，358 | 1，458 | 651 | 1，354 | 1，358 | 1，458 | 1，261 | 1，300 | 1，249 | 1，190 | 1，317 1,082 | I， 2642 | 1,225 1,163 | 1，197 |
| 10－14（inclusive） | 1，210 | 1，115 | 672 | 877 | 1，218 | 1，115 | 1，189 | 975 | 1，2198 | 1,040 | 1，006 | 1，017 | ${ }_{030}$ | 1，024 |
| 15－19（inclusive） | 8891 | 760 2,806 | 946 5,039 | 990 3.922 | 8.81 2,853 | 160 2,808 | 2，092 | 781 3,136 | 2，870 | 3，189 | 3，021 | 1，368 | 3，016 | 3，223 |
| 20－30（inelusive） | 2,850 1,691 | 2,806 1,718 | 5,038 <br> 1,317 | 3,922 1,078 | 2,853 1,690 | 2，806 1,718 | 2，692 1,679 | 1，746 | 1，767 | 1，863 | 1，633 | 1，520 | 1，809 | 1，788 |
| 40－5i）（inclusive） |  | 1，7181 | 1，244 | 1,263 | 1，681 | $\bigcirc 731$ | ${ }^{1655}$ | ${ }_{64}$ | 731 | ： 703 |  |  | 604 | 027 |
| Meas aub | 26.2 | $25 \cdot 6$ | 26.6 | 22.0 | $26 \cdot 2$ | ：25\％ | 257 | 257 | 20 | 267 |  |  |  | 258 |

subsimiary Tabless,
CBAETIA 7.


OBAFTER 7.
BUBSIDLARY TAELEO.

s'Ubsidiary tables.
CEAPTER $V$.

| SUBSIDIARY TABLE IV. <br> based on imperial table xiv. <br> Age disifibution of $\mathbf{1 , 0 0 0}$ of each sex in cortain castes. DELHIL |  |  |  |  |  |  |  |  |  |  | SUBSIDIARY TABLE IVA. <br> Proportion of ehlldren uncer 12 and of persons over 40 to those aged 15-40 in certain castes, also of married females aged 15-40 por 100 females. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ouersm. | malis.-Nomarr per mille aosd |  |  |  |  | Femalks.-Nombir per mille acid |  |  |  |  |  | $\begin{aligned} & \text { BTION } \\ & \text { LDREN } \\ & \text { SBYERS } \\ & 100 . \end{aligned}$ | $\begin{array}{\|c\|c\|} \hline \text { PROPO } \\ \text { OF PRE } \\ \text { OVER } \\ 1004 \\ 15 \end{array}$ |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 2. | 8 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1. Aggarwal (\#indu) .. | 102 | 134 | 60 | 450 | 254 | 122 | 150 | 47 | 437 | 244 | ${ }_{58}^{56}$ | 155 | 56 | ${ }_{50}^{56}$ | 38 |
| 2. ${ }^{\text {8. }}$ ahir (Hindu) ${ }^{\text {(Jain) }}$ ( ${ }^{\text {a }}$ | 158 | 114 | ${ }_{65}^{93}$ | 447 | 218 | 145 | 172 | 60 | 497 | 226 | ${ }_{88}^{38}$ | 192 | 48 | 57 | 36 |
| 4. Arain (Musalman) ${ }^{\circ}$ | 130 | 183 | 66 | 446 | 176 | 177 | 161 | 62 | 389 | 211 | 77 | 193 | 39 | 54 | 36 |
| 8. Brahman (Hindu) .. | 91 | 123 | 63 | 512 | 211 | 127 | 160 | 4. | 420 | 244 | 51 | 173 | 41 | 58 | 36 |
| 0. Chamar (Hindu) .. | 108 | 148 | ${ }^{68}$ | 468 | 206 | 146 | 180 | 58 | 453 | 163 | 62 | 160 | 44 | 38 | 42 |
| 7. Clurah (Hindu) - | 118 | 184 | ${ }_{88}^{88}$ | 427 | 183 | 164 | 193 | 59 | 4 | 171 | 77 | 192 | 438 | 38 | ${ }_{41}^{39}$ |
| 8. Dhanak( l (indu) ${ }^{\text {8. }}$ | 113 | 173 | 56 | 480 | 178 | 143 | 181 | 4 | 442 | 193 | 64 | 173 | 35 | 44 | 40 |
| 10. ") (Mumalman) | 138 | 161 | 73 | 418 | 208 | 178 | 202 | 53 | 425 | 144 | 79 | 223 | 50 | 34 | 33 |
| 11. Dngi or Koli (Kindu) | 83 | 108 | 94 | 571 | 174 | 128 | 177 | 50 | 488 | 155 | 44 | 134 | 31 | 32 | 45 |
| 12. Fagir (Musalman) .. | 141 | 190 | 80 | 415 | 174 | 178 | 200 | 66 | 379 | 176 | 89 | 212 | 42 | ${ }_{5}^{46}$ | 35 |
| 14. Jat (Hindu) | 114 | 168 | 70 | 448 | 109 | 159 | 176 | 59 | 394 | 213 | 72 | 185 | 44 | 54 | 37 |
| 15. Jhwar (Hindu) | 88 | 176 | 51 | 658 | 127 | 135 | 172 | 40 | $44^{4}$ | 206 | 54 | 181 | 23 | 46 | 41 |
| 10. Julnka (Hindu) .. | 102 | 147 | 53. | 482 | 216 | 133 | 162 | 76 | 448 | -181 | 58 | 147 | 45 | 40 | 42 |
| 17. Khatri (Hindu) .. | 74. | 120 | 61 | 528 | 216 | 124 | 171 | 48 | 448 | 208 | 48 | 139 | 41 | 47 | 40 |
| 18. Kumbar (Hindu) .. | 108 | 152 | 69 | 512 | 168 | 150 | 201 | 50 | 429 | 170 | 63 | 174 | 33 | 40 | 39 |
| 10. Lohar (Hindu) ${ }^{\circ}{ }^{\circ}$ | ${ }_{83} 11$ | ${ }_{98}^{164}$ | 72 | 469 | 188 | 148 | 202 | 50 | 390 | 212 | 69 | 205 | 40 | 54 | 36 |
| 20. Jinohh ( | 83 | ${ }^{6}$ | 204 | 431 | 186 | 118 | 194 | 32 | 503 | 153 | 49 | 155 | 43 | 30 | 45 |
| 21. Mnll (Hindu) | 131 | 1325 | 57 72 | 488 | 248 | 125 | 154 | 54 | 449 | 218 | 54 | 144 | 53 | 48 | 40 |
| 23. Mughal Musalman) ${ }^{\circ}$ | 115 | 157 | 70 |  | 248 | 19 | 1748 | 75 | 424 | 185 | 73 84 | 183 273 | ${ }_{81} 7$ | 44 86 | 38 <br> 26 <br> 8 |
| 24. Naid (Hindu) | 118 | 171 | 60 | 453 | 198 | 131 | 186 | 48 | 426 | 208 | 88 | 173 | 44 | 49 | 38 |
| 26. Pathan (Musalman). | 88 | 127 | 72 | 451 | 262 | 118 | 140 | 67 | 468 | 215 | 51 | 38 | 68 | 46 | 43 |
| 96. Qumshi (Muaalman) | 122 | 133 | 74 | 450 | 221 | 127 | 219 | 90 | 388 | 176 | 70 | 227 | 49 | 45 | 28 |
| ${ }^{28 .}$ 20. ( ${ }^{\text {ausalman) }}$ | 80 | 132 | 67 | 807 | 264 | 15 | 182 | 39 | 428 | 192 | 51 67 | 167 176 | 54 | 42 | 40 |
| 20. Sainl (Hindu) .. | 128 | 188 | 72 | 385 | 217 | 171 | 207 | 56 | 374 | 192 | 93 | 218 | 57 | 51 | 34 |
| 30. Sanal (Hindu) | 117 | 143 | 10 | 488 | 253 | 73 | 173 | 100 | 482 | 172 | 54 | 156 | 54 | 36 | 39 |
| 31. Sayad (Musalman) | 113 | 150 | 66 | 436 | 228 | 129 | 194 | 64 | 68 | 246 | 72 | 661 | 52 |  | 27 |
| 33. 8hoikh (Musaiman) | 102 84 | 127 | 95 64 | ${ }_{460}^{454}$ | 222 260 | 138 | 177 | 87 | 410 | 189 | ${ }^{61}$ | 163 | 49 | 46 | 38 |
| 34. Tarkban (Hindu) $\because$ | 73 | 118 | ${ }_{84} 8$ | 626 | 128 | 129 | 153 155 | 534 | 423 | 242 | ${ }_{48}^{56}$ | 156 | 57 <br> 39 | 57 | 42 |
| 35. Toll (Musalman) | 118 | 167 | 73 | 425 | 216 | 178 | 207 | 85 | 364 | 166 | 8 | ${ }_{215}$ | 51 | 43 46 | 34 34 |

OHAPTER 7.
GUBadDLABY TABLbg.

craptir 7.

SUBSIDIARY TABLE V-A.
Proportion of children under 10 and of parsons over 60 to those aged 15-40 in certain religions, and also of married females aged 15-40 per 100 females.



## SUBSIDIARI TABLE VI.

Variation in Population at cortain apo-pariods-continued.



CHAPTMB 7 .
888smikby Taples.


Traps-Frontior Traot. of tho romainiug (b) Fume of deathe of 1011 and 1012 for Delhi not being availablo, the adjusted figures for 1911 and the averagie (a) Tutal mortality attributable to Inflocnea in 1018 wase of each of these years.
whioh is oquivalont to nearly 5 per cent of the popalation of 1911 for both the provinces. 23,178 in the Punjab and Delhi reepeetively

## SUBSIDIARI TABLE EX,

Roported death-rate by sex and age in decade and in selected years per mille living at same age according to the Consus of 1911 (for Punjab and Delhi, British Territory only).


Norm-Figuret of popolation are thoee given in Imperial Table VII of 1911.


## SUBSIDIARY TABLE XI.

The ratio of the number of males, femaies and persons par 100,000 at the census of 1911 to those of the census of 1921, for each ytar of age, as recorded in the census schedules.

orafine v.

## SUBSIDIARY TABLE XII.

Siatoment showing the Births and Deathr wince 1881, Punjab (British Territory) including Dolhi.


## CHAPTER VI.

Sex.


#### Abstract

123. Nature of the data. 124. The proportion of the soxes, 125. Comparison with other provisces, places and censusen. 126. Proportion of females to males in difincentsastes. 127. Proportion of famalos to malen in the different ago-groups.


Nature of the Data. 5 of the enumeration schedule is that, eunuchs and hermaphrodites should be entered in the column as males. Thus, though in certain parts of the Punjab (Delhi for example) there exists a fair number of eunuchs, no separate record of these has been obtained. No separate reference need be made to any of the Imperial or Provincial tables contained in Parts II and III, as practically all the census statistics have been classified according to sexes, and only the following references to the subsidiary tables printed at the end of this chapter will be necessary.

Subsidiary Table I gives the general proportion of the sexes by natural divisions, districts and States, both for the actual and " natural" population, the "natural" population excluding those who were born outside the Punjab and enumerated within it, and including those enumerated outside the Province, so far as they are known, and born within the Punjab. The corresponding figures for all the censuses since 1881, inclusive, are also given in this table.

Subsidiary Table II gives the number of females per 1,000 males for different age-periods by religions at each of the last 3 censuses, for the Punjab and Delhi together, and also for the Punjab and Delhi separately, for the Census of 1921.

Subsidiary Table III gives the proportion of females for different religions by age-groups for the Indo-Gangetic Plain West, Himalayan, Sub-Himalayan, and the North-West Dry Area, separately.

Subsidiary Table IV gives the number of females per 1,000 males for certain selected castes, the caste names under each religion being entered in alphabetical order.

Subsidiary Table V gives the actual number of births and deaths reported for each sex for each year since 1891 for British Territory only, and gives also the number of female to male births, as well as the proportion of female to male deaths for the same periods.

Subsidiary Table VI gives the number of deaths for each sex at different ages, for the six years 1913-1918 inclusive, the figures for the Punjab and Delh; being exhibited separately.

Subsidiary Table VII gives the proportion of females per 1,000 males for each Tahsil and State for the Census of 1921, these figures being necessary in order to construct the isopleths of distribution of similar sex proportions over the Province.
The proportlon of the sexes.
124. In the whole of the Punjab $25,101,060$ persons were enumerated, of whom 13,732,048 were males and $11,369,012$ were females, being a proportion of 828 females per 1,000 males, while in the Delhi Province out of a population of 488,188 persons there were enumerated 281,633 males and 206,555 females, being a proportion of 733 females per 1,000 males. For the "natural" population the Punjab had 819 females per 1,000 males, and Delhi 788 females per 1,000 males, showing that the efflux of males from the Punjab, and the influx of males into the Delhi Province were greater than the corresponding efflux and influx of females. In dealing in paragraph 51 of Chapter II with the subject of the accuracy of the census figures, the conclusion was tentatively arrived at that an error of 1 per cent. might be adopted as a working hypothesis of the difference between the actual and the enumerated population. It is now necessary to observe that it seems likely that the greater part of the assumed error will be due to the omission of females, and a relatively smaller part of the inaccuracy will be due to the omission of males. It might be possible, for example, that the error in the enumeration of males amounts to only, say, $\frac{1}{2}$ per cent. whereas the error of omissions in the case of females might amount to over $1 \frac{1}{2}$ per cent. Adopting these figures for the error, hypothetically, we find that the percentage error in the proportion of males to females in the 1921 Census will be just over 1 per cent. If this is so, all the figures showing the number of females per 1,000 males will have a standard error of about eight or nine. These possibilities must
be borne in mind when comparing the proportions of the sexes at different censuses and in different localities. For example, the number of females per 1,000 males in 1911 was 817 , as against 826 in 1921, the difference in these figures being less than the standard error of their difference on the above assumptions, it would be somewhat unsafe to deduce that there has been a real increase in the number of females per 1,000 males during the last decade. The same reasoning would apply in comparing, say, the proportion of females per 1,000 males in Jullundur (807) with that of the adjoining State of Kapurthala (816), it being possible that the observed differences are due solely to errors in enumeration, and not to any fundamental change in racial or economic causes. On the other hand, a difference of 25 in the number of femáles per 1,000 males in one locality and in another, or in one and the same locality at different epochs; would be double the standard error of the.difference and should, therefore, be regarded as of probable significance. Thus, for example, Kangra (946), the Simla Hill States (917), Mandi State (944), and Dujana (908) have almost certainly a greater proportion of females than the Kalsia State (761), Ambala (766), Lahore (751), and Malerkotla (711). Again, in -comparing the proportion of females at the 1901 Census with that of 1921 it is probable that the drop in the number of females per 1,000 males from 854 to 826 is a real one.

In comparing the proportion of females per 1,000 males of one religion with another, or of one caste with another caste belonging to the same religion, we might, in certain cases, be rash to accept even a difference of 25 per mille as proof of a genuine difference between the proportions of the sexes. On the other hand, in comparing the proportions of the sexes in different age-groups we are probably on fairly safe-ground for ages below 10 and above 30, but between those ages, which are the average marriageable limits for females, it is possible that the sex proportions differ considerably than those given by the returns. Discrepancies may arise from the largely prevailing custom of early marriage, and from the tendency, noted by Rai Bahadur Pandit Hari Kishen Kaul, for the reputed age of a girl to jump straight up to 20 years as soon as she is married. This would account for the great defect in females of ages 10 to 20 which is a feature of the returns for all religions during the last 3 censuses: - The point will be further commented on in a subsequent paragraph.
125. The proportion of females to 1,000 males for each of the lasst 5

| Province. | Proportion of femalea to 1,000 males. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1821. | 1911. | 1901. | 1891. | 1881. |
| Blhar and Orisa | 1,029 | 1,043 | 1047 |  |  |
| Madraa ${ }^{\text {andeal }}$ | 1,023 | 1,028 | 1,047 978 | 1,040 | 1,024 |
| Cuntral Provincos and Bihar | 1,002 | 1,008 | 1,078 1,019 | 1,024 | -1,014 |
| Bangal | 955 | 059 | 063 | 958 | 877 |
| Bombay | 932 | 946 | 980 | 073 | 894 |
| Unitod Provincen of Agra and Oudh | 818 | 933 | 946 | 938 | 038 |
| Rnjputana Ageoay | 8898 | 915 | 987 | 030 | 925 |
| Kinhmir 8tate .. | 8898 | 8808 | 905 | 801 | 848 |
| North-Weat Frontior Province | 848 | 8885 | 884 | 880 |  |
| Punjab $\quad \because \quad .$. | 848 828 | 88.5 | 833 | 843 | 818 |
| Coorg $\quad$ - | 831 | 817 | 854 | 850 | 844 |
| Baluohiatan $\quad$. | 735 | 798 | 801 | 804 | 775 |
| Andaman and Nioobar | 30 | 788 | 820 |  | - ${ }^{\text {d }}$ |
| Ajmor Morwasm .. | 837 | 352 | 319 | 167 | 157 |
| Arsam | ${ }_{986}$ | 884 | 800 | 881 | 851 |
| Dolhi | 739 | 0 | 949 | 942 | 953 |
| Barodn Stato | 73 | 944 | 862 | 881 | 898 |
| Contral India Agray | 9.2 | 928 | 836 | 928 | 917 |
| Qwalior State ... | 0.4 <br> 880 | 974 <br> 903 <br> 08 | 973 | 913 | 886 |
| Hydormbad Stato.. | 018 | 008 | 908 |  |  |
| Myoro SLato | 0108 | 968 | 964 | 004 | 968 |
| Sikkim Slato | 981 | 0 OL | 81 | 991 | 1,006 |
|  |  |  | 916 | 834 | .. | censuses for various Pro(1) vinces and. States in places and India is given in the censuses. marginal table, and it will be seen that excluding the Andamans and the Delhi Province, which contain an abnormal number of males due to the great number of male convicts in the one case, and to immigration from cooly gangs in the other, the Punjab has the smallest recorded number of females per $1 ; 000$ males of any Indian Province or State, with the exception of Baluchistan (735). Without detailed analysis of the figures of other Provinces and States it will be unwise to believe that the whole of the differences between the proportions of the sexes in the Punjab and other Provinces of India is to be attributed to a real defect in the number of females in the former province. On the other hand, knowing the disregard for female life, except during the marriageable ages, which prevails in the Punjab, it should cause no surprise that females do not outnumber the males. In studying changes in

the number of females per mille: in the Punjab during the last 40 years, an apparent increase in the number of females is observable from 1881 to 1001 : between 1901 and 1911 there was a marked drop from 854 to 817 females per 1,000 males; and between 1911 and 1921 there has been again a rise to 828 per mille: That the drop in 1911 and the subsequent rise in 1921 are, at any rate, partially real is indicated by the great female mortality ( 1,000 females or over per 1,000 males) which obtained during the years 1002 to 1905 inclusive. Since 1891, only in thoee 4 years and in 1918, the year of the Influenza epidemic; were there more female than male deaths. An exact study of the proportion of female to male births and deaths, and their bearing on the census figures of the proportion of females to males, cannot be undertaken here. The proportion of females to males for each of the last 5 censuses by

| Natural Divinions. | 1821. | 1911. | 1001. | 1891. | 1881. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Indo-Gangetio Plaso Weat | 808 | 795 | 842 | 830 | 836 |
| Bimalsyan .. | 807 | 901 | 892 | 880 | 878 |
| Sub-Himalayan .. | 882 | 827 | 880 | 863 | 856 |
| North-West Dry Ares | 827 | 825 | \$88 | 847 | 835 |
| Delhi | 783 |  | - | -* | .. | natural divisions is given in the marginal table. The only observable systematic variation in the figures is that shown by the number of females in the Himalayan Area, which has steadily increased from 878 per

mille in 1881 to 907 in 1921 . This twact appears to tend to draw away gradually from the rest of the province.

At this stage we may at once compare the proportion of females per 1,000 males for the whole of the province by reference to the diagram below:-


This diagram shows very clearly the feature referred to above namely the high proportion of females in the Himalayan tract. The lowest number of recorded females per 1,000 males occurs in two large areas (which in reality may be only one) stretching across the centre of the Punjab. The general features of the isopleths are explicable as a crater-like area with a central depression, containing a low proportion of women, in the colony areas, and in that part of the Punjab in which Sikhs predominate, and where, at any rate, till recently, female infanticide prevailed*. No finer gradation of the number of females per 1,000 males than by giving the isopleths for 800 and 900 females per 1,000 males, respectively, is attempted, as the previously noted possibilities of error are confirmed by the irregularities of the detailed isopleths.

The effect of immigration and emigration on the proportion of the sexes has already been noted, and the details are given in the table below. Of the total

| - |  | 1921. .- |  |  |  | 1911. |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Malen. | Femsles. | Total. |  | Malee. | Femalea. | TotaL |  |
| Aotasl Ropulation. | Total Punjab and Dolbi. Punjab Dolh | $\left.\begin{array}{r} 14,013,681 \\ 13,732,048 \\ 281,633 \end{array} \right\rvert\,$ | $11,575,567$ $11,369,012$ 206,555 | $25,589,248$ $\mathbf{2 5 , 1 0 1 , 0 6 0}$ $\mathbf{4 8 8 , 1 8 8}$ | 825 828 733 | 13,314,975 | 10,872,775 | 24,187,750 | 817 |
| Doduct Imoigrante. | $\begin{array}{cc} \text { Total Punjab } \\ \text { and Delhi } \\ \text { Punjab } & \text {. } \\ \text { Dolhi } \end{array}$ | $\begin{aligned} & 423,341 \\ & 319,309 \\ & 103,042 \end{aligned}$ | 389,668 307,738 81,828 | 812,907 687,137 185,770 | 920 983 788 | 352,039 | 308,180 | 660,219 | 875 |
| Add Emigranto. | Total Punjab and Dolhi . Punjab Dolhi | $\begin{gathered} 372,494 \\ 342,396 \\ 30,098 \end{gathered}$ | $\begin{array}{r} 246,090 \\ 206,990 \\ 39,100 \end{array}$ | 618,584 649,386 69,198 | 661 605 1,298 | $314,789$ | 201,823 | 616,612 | 641 |
| Natural Population. | Total Punjab and Dolhi .. Punjab Delhi | $\begin{array}{r} 13,962,834 \\ 18,765,045 \\ 207,780 \end{array}$ | $\begin{array}{r} 11,432,091 \\ 11,268,264 \\ 163,827 \end{array}$ | $\begin{array}{r} 25,394,925 \\ 25,023,308 \\ 371,616 \end{array}$ | 812 812 788 | 13,277,725 |  | 24,044,143 | 81E |

of 812,907 persons enumerated in the Punjab and Delhi in 1921, but born outside these Provinces, 423,341 were males and 389,566 were females, being a proportion of 920 femsles per 1,000 males. Of persons born in the Punjab and Delhi and enumerated outside the proportion of females is only 661 per 1,000 , the actual numbers being 372,494 males and 246,090 females. The Punjab, therefore, draws to itself more females than it parts with: the effect is not surprising in view of the probable shortage of females in this part of India. The proportion of
 females according to religious groups is given in the marginal table, which shows that the proportion of females. to 1,000 males descends from the Jain (853), Musalman (843), Hindu (825), Christian (782) and Sikh (764). The only steady variation exhibited by any other of the figures by religion is that exhibited by Christians which has risen from 465 females per mille of males in 1891, to 782 in 1921. This increase must be attributed to conversions from the ranks of low caste Indians, the initially low proportion being due solely to the fewness of female Europeans, who were, not so long ago, the only representatives of the Christian
community in the Punjab.

[^31]Proportion of females to maios lo dilmant age-groups up to 40 years of age, are given in Subsidiary Table IV to this chapter. Among Hindus the castes with a high proportion of females are the Ghirath (955), Dagi or Koii (948), both these castes being of low social position, and, therefore, not predisposed to conceal the existence of females, and Kanets (936): while the Hindu castes with a low proportion of females are the Rajput (796), Ahir (794), Jat (789), Chhimba (780), Gajjar (778) and Sansi (720). Among the castes of the latter group, that is, those containing proportionally few females, the Rajput is notorious for his practice of female infanticide; while, of the others the Sansi is a criminal tribe, anid: the Gujara, though it numbers a large proportion of agriculturists, is also a caste with a somewhat unsavoury local reputation.*

Among the Sikhs, Khatris alone (917) have a large proportion of females per 1,000 males, while Tarkhans (795), Nais (789) and Jats (726) have the lowest proportion of females. Female infanticide probably accounts for the low proportion of females among Jat Sikhs, but there is no particular evidence of the existence of this custom among Sikh barbers and carpenters. Among Musalmans, the highest proportion of females is found among the Khojas (975), and they are followed by the Maliar (923), Awan (907) and Qassab (904). The two lowest castes are Sheikh (780) and Harni (725): : all the other Musalman castes except those mentioned have between 800 and 900 females per 1,000 males. The Harni, like his Hindu confrere the Sansi, belongs to a criminal tribe, and the fewness of the number of females among them may be attributed to this cause; but it seems probable that the lowness of the number of females among Sheikhs results from the concealment of the existence of their womenfolk.

The marginal table contrasts the position of certain leading castes in

| Caste. |  | 1921. | 1911. |
| :---: | :---: | :---: | :---: |
|  |  |  |  |
| Pathan | - | 827 | 757 |
| 8heilch | $\cdots$ | 780 | 807 |
| Brahman | - | 821 | 809 |
| Khatri | - | 825 | 814 |
| Rajput | . | 845 | 819 |
| Biloch | - | 835 | 838 |
| Mughal | -. | 889 | 841 |
| Aggarwal | - | 834 | 851 |
| Beyad | . | 875 | 876 |
| Qurasi | - | 884 | 886 | relation to the proportion of females for 1911 and 1921. In 1911 the Pathan had the ferrest number of females per 1,000 males, and was followed by the Sheikh, Brahman, Khatri and Rajput in the order named. In 1921 the Sheikh, as already noted, had the fewest number of females, and was followed in order by the Brahman, Khatri, Pathan and Aggarwal. This change in the relative order of the proportion of females in different castes indicates that physiological causes are probably more potent than social custon, and that it would be rash to associate too closely variations in sex proportions with variation in tribal characteristics. This latter point is very clearly brought out if we correlate the number of females per 1,000 males for each caste as given for 1911, with the corresponding figures for 1921. 57 castes have been so correlated and the co-efficient of correlation is found to be 0.67 . Though this is a high correlation, it is very far indeed from being perfect, and shows that during the 10 years elapsing between 1911 and 1921 there has been a very marked change in many castes in the proportion of females to males. Only if we were to correlate the proportion of females per 1,000 males at a considerable interval, asy, 100 years, would it be possible to assert that the sex ratio was a tribal characteristic. It is worth recording that the co-efficients of variation of the numbers of females per 1,000 males from caste to caste were almost identical in 1911 and 1921, being $5 \cdot 68$ per cent. for the latter census and $5 \cdot 72$ for the former.

Proportion
sfoomancsio liable are the We have already seen in paragraph 115 of Chapter $V$ how unremale tia the liable are the figures for the age-returns, and in comparing, therefore, the propor croupa. expect females to males for the different age-groups we might not unnaturally cannot even fall back to be confusing and inconsistent inter se. In the Punjab we for the purposes of comparison, as Mrr. Acland, whe dealt of males and females figures for 1911 and constructed a life-table for males, found the figures for teale ages too unreliable to graduate. It has been necessary therefore to compare the crude figures of the number of males and females in each age-group, and it

[^32] thone two castes on the lovel of cat and dog.
is surprising to find that the results for different religions and for different censuses are so accordant. The results are exhibited graphically in the diagrams which follow, and it will be observed that the curve showing the relative numbers of females to males follows similar courses for different religions, and for the same religion at different censuses. The observed correspondence may be due to a reality underlying the phenomena, or it may be spurious. In the latter case the agreement between the sex-age-distributions at different censuses would be explicable by reference to the constancy of the habit of misstatement, which must obtain in any large and conservative population. The correspondence between the curves for Hindus, Musalmans and Sikhs may likewise be a specious correspondence, and arise from the essential homogeneity of the Punjabi population in respect of such traits as the inaccurate statement of ages. For example, in many branches of conduct and in his attitude towards social and economic problems, the Jat Sikh of the Central P年jab resembles the Arain who lives in his own village much more nearly than the latter does a Musalman Arain living in the United Provinces. Nevertheless, it seems improbable that the whole of the correspondence between the different curves showing the proportion of females to males for different ages can be put down to a mere tendency to minimise or exaggerate ages, or to conceal the existence of femsles of marriageable ages, which is common to all religions in the Punjab. There is a possibility, therefore, of a smaller proportion of females to males between the ages of 10 and 20
than there is at any other ages. Diagrams 38, 39 and 40 may now be referred to.

Dlagram 38. PROPORTION OF FEMALES PER LOOOMALES
ACCORDIMG TO ACE GROUPS BY RELIGIONS TOR PUNUABE DELHI

(20)

EOR ALL RELIGIONS


FOR HINDUS


TOR MOHAMMADANS


THE CURLY BRACKETS MDICATE THE ACE GROUPS AT THE CERTRE OF WHCH THE TREQUEMCY IS CONCENTRATEO



These give the number of females per 1,000 males for all religions, and for Hindus, Musalmans, Sikhs and Christians separately for the 3 censuses, 1901, 1911 and 1921, and display that remarkable similarity of feature which has been already referred to. In comparing the figures for the different censuses for Hindus, Musalmans and Sikhs, the great deficiency in the number of females in the marriageable ages from 10 to 20 is most striking. The deficiency was greatest in 1911 when the curve dropped far below its 1901 position. In 1921 the curves had moved part of the way towards their position in 1901, but are atill somewhat below it. For Christians the greatest defect is in the number of females between the ages of $20-30$, a fact which must be attributed to the later age of marriage among Christians as compared with the people of other religions. For Christians, however, the fewest number of females of marriageable age was found in 1901, and the number has risen steadily since then up to the present time. If the proselytisation of low caste Hindus, Musalmans and Sikhs continues it seems certain that the distribution curve for Christians will approximate more and more closely to the features of the curves of those religions. More particularly, this result is likely to be accelerated by the increasing tendency to defer the age of marriage among Punjabis of all non-Christian religious groups. This feature is well marked in the diagrams, there being a perceptible tendency for the minimum number of females per 1,000 males to leave the group 10 - 15 years for the group 15-20 years. In the case of Hindus, the minimum has actually shifted to the $15-20$ group in 1921, probably for the first time in recent history, while for Sikhs the shift took place between 1901 and 1911. For Christians the reverse process is at work and the minimum has shifted backward from the age-group $35-30$ years in 1901, to the age-group of $20-25$ years in 1911: and there it still remains. It may be interesting to suppose, just for a moment, that the figures of the relative numbers of males and females for each age-group really correspond with the facts, and to attempt to explain the variations of the relative frequency of females to males for each age-group. More males are born than females, roughly in the proportion of 10 males to 9 females. Among Musal-: mans and Hindus a greater mortality appears to occur among boy children than among girl children during the first five years of life, and up to the age of $4^{-}$the proportion of females is well maintained if not actually increased. From the age of 5 to 15 years the drop in the proportion of females is very marked, and this may be due to the neglect of female children during the years preceding puberty. From the age of $15-25$ years the female is in demand, and will have more attention paid to her, so that during those years the proportion of females rapidly increases. There is a drop in the curves for Musalmans and Hindus towards the ages of $25-30$, and this may be attributed to the mortality arising from early child-bearing. After the age of 30 the proportion of females rises to another maximum between the ages of 40 and 50 which corresponds to the close of the usual span of female fertility. Thereafter the curve drops away towards the high ages, women of over the age of 50 , especially among the poorer classes, suffering considerably from neglect, if not from:actual privation.:

It is instructive to compare the figures with the corresponding figures for the proportion of females to males in Engalnd and Wales according to the Census of 1911. The results are exhibited in diagram 41 below:-


The explanations offered for the variations in the curves for Musalmans, Hindus and Sikhs in the Punjab may apply to the peak in the English curve which ocours between the ages of 20 and 30 , and to the slight subsequent drop between the ages of 30 and 40. That is to say, that at the marriageable ages of 20 to 30 females have much greater care and attention bestowed upon them than males of the corresponding ages, but that the mortality of child-bearing produces a




OHAPTER VI.
BUBSLDIABX TABLRg,

SUBSIDIARY TABLE III.
Number of females par 1,000 males at different age-periods by roligions and natural divisions (Census of 1921).
DELHII.

| A0.3. |  | Indo-Garaitio Plum Wrat, |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Religions. | Hindu, | Musalman. | Christian, | Jaina ${ }^{\text {a }}$ | Bikh. |
| 1 |  | 2 | 3 | 4 | $\sigma$ | © - | 7 |
| Under 1 | - | 973 | 983 | 947 | 1,089 | 765 | 972 |
| 1 | - | 1,019 | 970 | 1,194 | 794 | 852 | 786 |
| 2 .. | - | 1,032 | 890 | 1,146 | 910 | 1,064 | . 848 |
| 3 | . | 1,032 | 1,069 | 962 | 980 | 1,088 | 2,187. |
| 4 . .. | - | 944 | 916 | 944 | 1,045 | 1,339 | 562 |
| Total 0-a incluaivo .. | - | 994 | 986 | 1,014 | 985 | 1,011. | 878 |
| 8-9 \% .. | - | 904 | 893 | 919 | 1,035 | 1,000 | . 844 |
| 10-14 $\quad$, .. |  | - 692 | 680 | - 714 | ; 886 | 531 | 630 |
| $18-10$ " .. |  | . 608 | 709 | $656{ }^{\circ}$ | 823 | 868 | - 425 |
| 20-24 - ., .. |  | . 701 | 736 | 700 | 351 | - 851 | - 311 |
| 25-29 " . | - | 641 | 643. | 651 |  | 784 | - 290 |
| Total 0-29 \% .. |  | $\cdots 773$ | 776 | 782 | -678 | 838 | 465 |
| 30-39 $\quad \therefore \quad . \quad$ |  | .. 639 | 628. | . 672 | 657 | 756 | 264 |
| 40-49 \% * |  | .. 649 | 854 | $843^{-}$ | B78 | 704 | 330. |
| 50-69 \#, .. |  | .. 701 | 725 | 649 | 791 | 680 | 338 |
| 80 and over .. |  | .. 740 | 774 | 670 | 779 | 759 | 437 |
| Total 30 and ovar .. |  |  | 669 | 659 | . 690 | 727 | 301 |
| Torac Actaal Popolation |  | 733 | 737 | 736 | 682 | 794 | 408 |
|  | - | 788 | ... |  |  |  | .. |

BUBSDIATH PMBERS.
oraptee vi.



GHAFIER 7I.
BUBSDIARY TABLES.

## SUBSIDIARY TABLE V.

Actual number of Births and Deatha reported for each sex during decades 1891-1900, 1901-1910, and 1911-1920. (For British Territory only).



## gTEsIDIABI TABLRE.

OEAPTER VL.

SUBSIDIARY TABLE VII.
Proportion of fomales per 1,000 males (by Tahsils) Census 1921.


# CHAPTER VII. 

## Civil Condition.

SECTION 1.-GENRRAL.
128. Inatruction to enumeratora, 129. Prootical univarsality of marriage. 180. Widown. 131. Widow

SECIION II.-FRRTILTIX DATA AND ALLIED TOPIOE.
132. The Family Census. 133. Sox of the firtborn. 134. Age of the woman at marriage. 135. Effect of age of woman at marriage on fertility. 136. Sizo of families. 137. Varistion of fartility with duration of zarriage 138. The most favourable time to be born

SEOTION III.-COUSIN MARRIAGE.
139. Contrast between Eindu and Musalman communities. 140. Enquiry into porcentage of cousip marriage. 141. Tendenoy to marry cousins most marked for firat marriage.

## Section 1.-General.

128. The instruction to enumerators for filling up the schedule in respect of column 6-"married," " unmarried " or " widowed," was as follows :-
"Enter each person whether infant, child or grown-up as married, unmarried or widowed ; divorced persons should be entered as widowed."
Instruction
Further the supplementary instruction to supervisors printed as Appendix to Enumera-I to the Code of Census Procedure, 1921, stated-
"Column 6.-A woman who has never been married must be shown in column 6 as unmarried, even though she may be a prostitate or concubine. Persons who are recognised by custom as married are to be entered as such, even though they had not gone through the full ceremony, e.g., the widows who have taken a second hasband by the rite known as karewa or chaddar. andazi."
The karewa or choddar andazi marriage is, as is well known, a most shadowy affair, and in the Central Punjab forms one of the most frequent causes of criminal litigation, the death of a husband being commonly the signal for the widow to attempt to escape from her late husband's home, an attempt which is countered by the deceased husband's brothers bringing a complaint under section 498 of the Indian Penal Code. In such cases the brother who happens to be the complainant, will assert that a marriage by karewa or chaddar andazi has taken place, the performance of the ceremony being strenuously denied by the widow. The introduction of a voluntary system of marriage registration, which has been introduced into the several districts of the Punjab, has helped to give greater certainty as to whether such a marriage has taken place or not.

The figures regarding civil condition distribution according to age and sex are given in Imperial Table VII. This table is divided into three parts : Part A shows the distribution for the Punjab as a whole and for the Punjab States for both groups, and for Delhi, for each main religion by age, sex and civil condition. Part B gives the distribution for districts and States, and Part C gives similar details for cities and selected towns, in which the figures for Buddhists, Parsis and Jews are also included. Further information is contained in the subsidiary tables to this chapter.

Subsidiary Table I gives the distribution by civil condition of 1,000 of each sex, religion and main age-period for each of the last five censuses.

Subsidiary Table II gives the distribution by civil condition of 1,000 of each sex for various age-periods by religions and natural divisions.

Subsidiary Table III gives the distribution by age and civil condition of 10,000 persons of each sex and religion.

Subsidiary Table IV gives the proportions of the sexes-for different religions by natural divisions, and for various age-periods.

Subsidiary Table $\bar{V}$ gives the distribution by civil condition for 1,000 of each sex for galected castes at various ages.

The remaining subsidiary tables embody the main statistics obtained from the Family Census.

Subsidiary Tables VI, VI-1, VI-2, VI-3, VI-4, VI-5 and VI-6 give the number of children born and alive for various durations of marriage; and for male and female children separately. The sex of the firstborn child is also given, and the age of the woman at marriage, together with the number of children born to women of various ages at marriage. Subsidiary Table VI gives the figures for all the caste-groups among whom the enquiry was made, while the other Tables VI-1, VI-2, VI-3, VI-4, VI-5 and VI-6 give the figures for each caste-group separately; Table VI-1 dealing with the clerics, VI-2 with agriculturists, VI-3 with traders, VI-4 with artisans, VI- 5 with menials and VI- 6 with criminals.

Subsidiary Table VII-A shows the gross fertility for males and females for each year of marriage up to 10, and thereafter by quinquennial periods up to 30, for each caste-group separately.

Subsidiary Table VII-B gives the same information for the nett fertility, that is, for the number of children actually alive at the time of the Family Census.

Subsidiary Tables VIII-A and VIII-B give the comparison of the observed fertilities (gross and nett) together with the graduated values determined by calculation.

Subsidiary Tables IX-A, IX-B, IX-C and IX-D give the results of a special enquiry into the frequency of cousin marriage among Musalmans in the Attock, Muzaffargarh and Gurdaspur districts, and the Delhi- province, respectively.
129. The proportion of males who live anything like the allotted span of years and remain unmarried is very small, and the proportion of females even smaller. In the whole of the Punjab only 5.6 per cent. of the males over 60, and 0.7 per cent. of the females, have never been married. The percentage of unmarried men over 60 (which excludes widowers) is 2.9 per cent. for Christians, 3.8 per cent. for Musalmans, $7 \cdot 1$ per cent. for Hindus, $9 \cdot 0$ per cent. for Sikhs and $\theta \cdot 1$ per cent. for Jains. Spinsters over 60 years of age form 0.3 per cent. of the age-groups for Sikhs, 0.4 per cent. for Hindus, 0.7 per cent. for Jains, 1.0 per cent. for Musalmans and 1.8 per cent. for Christians. The relative fewness of females among Sikhs is responsible for the relatively high proportion of unmarried men, and for the relatively low proportion of unmarried females among this religious group as compared with the corresponding proportions for other religious groups. During the last 40 years there has been a tendency for fewer males to remain unmarried among those of 60 and over . Details are given in the marginal table.

Percontage of unmarried mos over 00 (excluding vidowers) for each of the lath five cenauses.

centage of unmarried males has increased as follows:to be a tendency during the last 40 years to postpone the age of marriage, as in the younger age-groups from 5 to 19 the proportion of unmarried males has increased somewhat since 1881. Taking, for example, the agegroup of $15-19$ years, the per-

$$
\text { From } \quad \dot{T}
$$



Only among Christians has the reverse tendency been observable, and the number of unmarried between 15 and 19 has fallen from $92 \cdot 1$ per cent. in 1881 to 70.3 per cent. in 1921 . The reason for this drop among Christians is undoubtedly the fact that in 1881 the Christians enumerated were mainly Europeans, among whom there would of course be a large proportion of unmarried males between 15 and 19. The conversion of a number of Indians to Christianity during the last 40 years would, therefore, bring about a reduction in the proportion of unmarried males of the younger ages. The question of the age of the woman at marriage is discussed in detail in paragraph 134 of Section II of this Chapter.

At any given time，irrespective of age，rather more than half the males

| Civil condition． | 1921. |  | Civil oondition． | 1921. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Males． | Femalen． |  | Malos． | Females． |
| BRITISE TEREITOKY（PUNJAS AND |  |  | BRITISH TERRITORY（DELAT）． |  |  |
|  |  |  | Unmarried．． | 438 | 346 |
| Unmarried ．． | 638 | 408 | Married | 484 | 521 |
| Married | 375 | 460 | Widuwed | 98 | 133 |
| Widowed | 87 | 132 | TOTAL PROVINCE | PUNJAB | AND |
| PUNJAB STATES．DELHI |  |  |  |  |  |
| Unmarried．． | 518 | 372 | Onmarried ．． | 535 | 402 |
| Married | 388 | 482 | Married | 373 | 464 |
| Widowrd | 94 | 148 | Widowed $\because$ | 88 | 134 |
| BRITISH TERRITORY（PUNJAB）．PUNJAB PROVINCE． |  |  |  |  |  |
| Unmarried．． | 641 | 1400 | Unmarried ．． | ｜ 637 | 403 |
| Married | 373 | 459 | Married ． | 375 | 463 |
| Wldowed | 86 | 132 | Widowed | 88 | 134 | and about two－ fifths of the females alive are unmarried． The figures for the British Territory，Pun－ jab States and the Punjab and Delhi are given in the marginal table．

The earliness of marriage among Punjabis is well illustrated by the marginal

| Ago－periods． | Mabrizd rersons per mille， 1921. |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Male |  |  |  | Females． |  |  |  |
|  | $\begin{gathered} \text { 亳 } \\ \text { 品 } \end{gathered}$ | $\begin{aligned} & \text { 总 } \\ & \text { 㬝 } \\ & \text { 思 } \end{aligned}$ | $\underset{\text { 号 }}{\text { 号 }}$ |  | 穻 | 最 | 蔕 | 霛 |
| Under 5 |  | 1 | 2 |  | 3 | 1 |  | 1 |
| 5－8（inclusive） | 22 | 8 | 6 | 6 | 68 | 25 | 18 | 24 |
| 10－14＂ | 113 | 50 | 80 | 63 | 362 | 185 | 184 | 221 |
| 15－19 ．．． | 330 | 213 | 388 | 258 | 848 | 680 | 816 | 780 | table which shows the number of married males and females for each of the first four quinquen－ nial age－groups．It will be observed that 33 per cent．of male Hindus and 85 per cent．of female Hindus are married before the age of 20 ；while among Musalmans the corresponding figures are 21 per cent．for males and 68 per cent．for females．These figures may be compared with those of 1881 when 38 per cent．of Hindu males and 88 per cent．of Hindu females were married before the age of 20 ，while 28 per cent．of Musalman males and 76 per cent．of Musalman females were married before the age of 20 ．

Widows．
women are left widowed before they the very early age of marriage is that many at the Census of 1921 there were no reach the age of puberty．Thus in the Punjab were 2,835 under the age of $10,8,963$ under the age of 15 ，and 26,400 widere inder the age of 20．Taking the widows between the ages of 15 and 19 as typical，the Jains show the highest percentage of widows（ 3.2 per cent．），

| Religions； | Pborortion of widows per 1,000 in the agrs or 0－39（nNoLusive）． |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Punjab and Delhi． |  |  |  |  | Punjab： | Delhi． |
|  | 1921. | 1911. | 1901. | 1891. | 1881. | 1921. | 1921． |
| Findua | 49 | 58 | 47 | 68 | 54 |  | 43 27 |
| Musalmana | 29 | 32 | 68 | 98 | 68 | 77 | 92 |
| Jains | 79 | 101 |  |  |  |  |  | Hindus come next with 3.0 per cent．，Musalmans next with 2.9 per cent．， Sikhs 1.7 per cent．and Christians 0.3 per cent． The proportion of widows below the age of 40 is shown for the last five censuses in the marginal table．

WIdow re－ marraga．

131．The evils which arise from early widowhood have been vigorously combated by various reformers．In the Punjab the most prominent body which Lahore，under the Presidentship of Sir Ganga Ram，Rai Bahadur，c．I．e．，m．v．o．， which was inaugurated in 1914．The objects of this society，as given by the Honorary Secretary，are－
（1）to encourage and arrange widow－marriages；
（2）to place proper literature in the hands of the public．
The society has brought about the following number of widow re－marri－

| ages：－ |  |  |  |  | $\cdots$ |  | ．． 12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1914－15 | $\cdots$ | $\because$ | $\cdots$ | $\cdots$ | $\ldots$ | ． | ． 13 |
| 1916 | $\cdots$ | ！ | $\cdots$ | ．． | $\cdots$ | ． | 40 |
| 1917 | $\cdots$ | $\cdots$ | ． | ． | $\cdots$ | ． |  |
| 1918 | $\cdots$ | $\cdots$ | $\cdots$ | $\ldots$ | ．． | $\cdots$ | － 220 |
| 1919 | － | － | $\cdots$ | ． | ．． | $\cdots$ | $\cdots$ |
| 1920 | － | $\cdots$ | $\cdots$ | ． | ． | $\cdots$ | $\ldots 453$ |
| 1921 | $\cdots$ | $\cdots$ |  |  | ． | ． |  |
| 1922 | ．． | － |  |  |  |  |  |

Thus the Sabha is steadily expanding, and is effectively bringing about a steady increase in the number of widow remarriages. From the list of marriages published for 1921 some very interesting information is available, namely, that out of 317 widow-marriages arranged by the society, no Tess than 47 , viz., 15 per cent. took place between parties of different castes; a fact which is in itself evidence of a tendency to loosen the bonds of marriage within the caste. One notable feature of these inter-caste widow-marriages is that the widow has, in nearly every instance, to marry below her own caste; thus a Brahman widow will marry an Arora or Aggarwal, a Rajput widow will marry a Khatri or a Sud, a Khatri widuw will marry an Arora, but, of the 47 marriages between parties of different castes, I can only find one instance, that of an Arora widow who married a Khatri gentleman, where the widow gained in social status by remarriage. However this may be, it is clear that the aims of the Vidhva Vivah Sahaik Sabha are philanthropic, and that it is doing a valuable work for the community in saving young widows from degradation.

## Section II.-Fertility Data and Allied Topics.

132. A special census, commencing in August 1920 and completed in July 1921, was carried out at the suggestion of the Census Commissioner for India, in order to obtain data for discussion of the problems of the effect of the duration of marriage on fertility, of the size of the family, of the age of the woman at marriage, of the effect of primogeniture on longevity, and the like. The enquiry was a voluntary one, and no pressure' was brought to bear to obtain replies. It follows that the data do not necessarily form a random sample of all marriages of the type to which the enquiry was confined, namely, to families in which both parents were alive at the time of the census, and in which there was, or (presumably) had been only one wife. The data recorded were as follows :-
(1) Name of the district or State.
(2) Name of the informant.
(3) Informant's caste.
(4) Informant's age.
(5) His wife's age.
(6) Duration of marriage.
(7) Number of children born alive--(a) male, (b) female, (c) total.
(8) Number of children still alive- (a) male, (b) female, (c) total.
(9) Sex of the first-born.

The figures obtained were sorted to show the numbers of children, male and female, born alive, or still living, number of childless marriages, the age of the woman at marriage, and the largeness of the family alive at the time of the census, classified according to the age of the woman at marriage, for marriages of five years' duration and over.

The data were further classified in six large groups each of which comprised a miscellany of castes, though there is a general homogeneity of occupation
(1) group 1 is comprised mainly of genealogists, priests, writers and merchants;
(2) group 2 is almost wholly comprised of the agricultural castes;
(3) group 3 is formed from the trading classes;
(4) group 4 comprises artisans, carpenters, masons, goldsmiths and . what not;
(5) group 5 is formed from other manual workers and menials, such as oilmen, sweepers, washermen, butchers, potters, barbers and so forth;
(6) group 6 is comprised of no less than 108 castes, some of whom have families of very high standing, such as the Ahluwalia, Qazilbash, Sheikh and Chishti, but of whom the majority belong to the tribes which lead a wandering, criminal and generally preearious existence, for example, the Bazigar, the Bawaria, the Pakhiwara, the Chirimar, the Sansi, the Kanjax, the Mullah, the Nat and the Harni, to mention only a few of the more noted castes.

The actual caste names which are included in each group are given in the following list:-

List showing the castes grouped together for the purposes of the Family Census enguiry.
Group 1.-Bhat (Bhatra), Bhat or Kai Brahman, Padha, Ulema, Kayasth, Khatri.
Group 2.-Arain, Awan, Ahir, Bahti, Bishnoi, Biloch, Bodla, Pathan, Thakkar, Jat, Janjua, Chang, Dogar, Dhund, Rathi, Rajput, Rawat, Sansar, Sati, Sayed, Eaini, Qurcshi, Karal, Kambob, Kanet, Khokhar, Gaddi, Gakkhar, Gujjar, Ghirath, Lilla, Lodha, Mali, Moghal, Maliar, Mahton, Meo.

Group 3.-Arora, Bania, Bohra, Bhabra, Bhatia, Khoja, Dhusar, Sud, Khakha, Mahajan. Group 4.-Tarkhan, Tank or Toba, Raj, Ram Garhia, Sunar, Lohar, Mair.
Group 5.-Od, Batwal, Barar, Barwala, Balodi, Beldar, Rhil, Pasi. Teli, Jalahs, Jhiwar, Chamar, Chanal, Chubra, Chbimba, Dagi and Koli, Dooli, Dosali, Dhanak, Dhuli, Dhngri Dumna, Rihar, Sarera, Ghulam, Qassab, Kumbar, Kanera, Kori, Gandhila, Lilari, Musealli, Mochi, Mahtam, Mehra, Mirasi, Nai, Hadi.

Group 6.-Abdal, Arab, Arya, Agiry, Ahluwalia, Aheri, Bazigar, Bagri, Bawaria, Baddun, Bukhara Bangali, Bhatra, Bhand, Bharai, Bhatiara, Bharbhunja, Babrupia, Bhanjra, Bhojki, Bairagi, Patwa, Pachahdha, Paracha, Pakhiwara, Phiphra, Perna, Penja, Tajik, Tugab, Turk, Tamboli, Tanaoli, Thori, Thathiar, Jangida, Jogi, Jogi-Rawal, Jhoja, Jhabel, Chirimar, Chiehti, Changar, Churigar, Khalsa, Khanzada, Khumra, Khushabi, Darugar, Daudpotra, Darzi, Dabgar, Rabbari, Rababi, Ror, Sansi, Sapela or Sapadha, Sirkiband, Shoragar, Sheikh, Sikligar, Faqir, Qazilbash, Qalandar, Kapri, Katbia, Kachhi, Kangar, Kurmi, Kashmiri, Kakkezai, Kalal, Kalwar, Kamangar, Kanjar, Kanchan, Kunjra, Kehal, Khatik, Gadi, Gara, Garri, Gagra, Gadaria, Gorkha, Gosain, Ghai, Ghosi, Kedari, Labana, Machhi, Mazhabi, Mujawir, Mallah, Maniar, Miana, Megh, Mina, Natak, Nat, Lungar, Niaria, Harni, Hali, Hijra, Hesi.

The number of families for which data were obtained was 166,419 , the division according to caste-groups being as follows. For convenience I have given a general name to each group corresponding to its principal component occupation:-


As all the information is further classified separately for each Punjab district and State, as well as by the natural geographical divisions of Indo-Gangetic Plain West, Himalayan, Sub-Himalayan and North-West Dry Area, it is clear that, if the data are reliable, as they probably are to within the same limits of accuracy as the Census proper, they form a mass of extremely valuable material, to the examination of which one might appropriately devote months of labour, were it feasible to do so.

It is out of question even to print anything but the bare totals for the Punjab of the figures for each caste-group and for all caste-groups together. These are given in Subsidiary Tables VI, VI (1), VI (2), VI (3), VI (4), VI (5) and VI (6), the numbers in brackets referring to the caste-group number assigned in the list on this page. Only a few of the many interesting paths of enquiry, which invite seemingly to distant bournes can be pursued, and even these must be trodden warily, else we shall soon be lost in a forest of perplexity.

Ser of the nest-born.
133. The following are the data showing the observed numbers, and the ratio of the numbers of female to male first-born children; according to duration of marriage for all caste-groups :-

| Duration of marriage in years. | 0-4. | 8-9. | 10-14. | 16-10. | 20-24 | 20-29. | 30 and over. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & 8,051 \\ & 3,926 \\ & 0.778 \end{aligned}$ | $\begin{aligned} & 10,368 \\ & 12,218 \end{aligned}$ | $\begin{aligned} & 12,321 \\ & 16,817 \end{aligned}$ | $\begin{aligned} & 10,082 \\ & 14,200 \end{aligned}$ | $\begin{gathered} 0,765 \\ 13.034 \end{gathered}$ | 6,242 | 18,803 |
| Number of female first-born |  |  |  |  |  |  | 20,265 |
| Number of male first-born ... |  |  |  |  |  |  |  |
| Batio of numbers of fomale firut-born to male first-born |  | 0.848 | $0 \cdot 756$ | 0770 | 0.740 | 0.735 | 0.681 |

On the whole, therefore, there is a tendency for there to be more female first-born in the case of marriages of duration between 5 and 10 years than for marriages which have lasted less than 5 or more than 10 years. The observed ratio for the first 10 years of duration of marriage is as follows for each year sepa-rately:-

| Daration of marriage in yens.* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Ratio of numbers of fomalo to malo firstbors | 0 | $0 \cdot 785$ | 0.755 | 0.757 | 0.807 | 0-848 | $0 \cdot 825$ | 0.868 | 0-852 | 0.846 |

Thus, while the first-born child is, according to these figures, always less likely to be a girl than a boy, it is more likely to be a girl for marriages which had lasted (in $1920-21$ ) from 5 to 10 years than any other time, and the maximum likelihood of a female first-borm is for those marriages which took place 7 years before the Family Census, that is in 1913-14. $\dagger$

Now, in the first place, it is obvious that the duration of the marriage after the birth of the first child can have no possible effect on the sex of the first-born, and as the first-born children of parents who had been married, say, 15 years in 1920-21, may have been born in the 1st, 2nd, 3rd years of marriage, the ratio of the sexes of the first-born of parents, whose duration of marriage was 15 years, includes births which took place from the 1st to the 15th year of marriage.

What we really want to know is whether the sex-ratio of first-born children varies with the variation in the years elapsed from marriage to the date of birth of the first child, and on this problem the light obtained is only indirect. Thus, we know that marriages of long duration will include cases in which the first-born ohild was born after several years of marriage, while marriages of short duration cannot include such cases ; but numerical precision cannot be reached as to the exact way in which the first-born sex-ratio varies with the interval between marriage and the birth of the first child. All that it is possible to say is that there is an indication that the first child when it is born in the early and late years of marriage is more likely to be a boy than in the middle ( $5^{-1-10}$ ) years of married life. Even this conclusion must be regarded as subject to error from the concealment of female births, to which the Punjab is prone. If this tendency (as there are reasons to think possible) is more marked for children born in the early and late years, when disappointment at bearing a girl-child may be most intense, then -our figures may be of no use at all from a phýsiological stand-point.

Lastly, in this connection it will be necessary to examine the general ratioof female to male births, any variation in which, for example an increase in this ratio during the last 30 years, would produce a smaller female to male ratio of first-born children for marriages of long duration (in 1921) than for marriages of short duration; and this would vitiate, pro tanto, the tentative result suggested above.

For this purpose we will compare the ratio of female to male first-born for each year of duration of marriage with the general ratio of female to malebirths. The question arises "which year should be adopted for a comparison?" Take for example marriages which have lasted 8 years ; some of them will have had their first-born child in the first year of marriage, some in the second, and so-

Showing percentape of childless marriagese for uhe firet 10 patarn of durction of married tife.

| $\begin{aligned} & \text { Duration } \\ & \text { marrikgo. } \end{aligned}$ | $\begin{aligned} & \text { Porcontago } \\ & \text { or ohildog } \\ & \text { marriapcos. } \end{aligned}$ | Phrentago If fant-born children |
| :---: | :---: | :---: |
|  | ${ }^{90}$ |  |
| $\frac{1}{2}$ | ${ }_{61}^{84}$ | $\begin{aligned} & 1 \overline{15} \\ & 33 \end{aligned}$ |
| 3 | 96 | 14 |
| 5 | 19 | 7 |
| 7 | ${ }_{8}^{13}$ | ${ }^{8}$ |
| ${ }_{8}^{8}$ | 8 | 1 |

forth. Now the percentage of childless marriages for marriages of various durations is as shown in the margin. These figures show the percentage of childless marriages. on the total number of marriages which have lasted from " $n$ " to " $n+1$ " years, where " $n$ " is the tabled value of the duration of marriage. Thus of $100 \mathrm{mar}-$ riages which have completed 4 years,' 37 per cent. are childless at the end of the 4th year. From this result, assuming that we are dealing with marriages in which there is no mortality in the first 10 years, we find the percentage of first-born children occurring as in column 3 of the marginal table, so that the majority of

[^33]first-born occur in marriages of 2 years' duration, that is in the 3rd year of marriage.*

We may assume, therefore, that the first child is most usually born in the 3rd year of marriage, and that consequently for a marriage in the 9th year, say, that is of 8 years' duration the first child was born 6 years previously. For marriages in the 1st and 2nd years it will be appropriate to assume that the firstborn child has occurred 0 years previously. So, for marriages which had, say, 8 years' duration at the time of the Family Census ( $1920-21$ ) it will be proper to compare the sex-ratio of the first-born with the sex-ratio of all children born in 1915. For marriages of 7 years' duration the comparison must be made with the general sex-ratio of births in 1916 and so on. The following result is reached :-

| Duration of marriage in years. | Year fur which the general sex-ratic at birth is selected. | Sox-rativ of firat-born female/male. | General sex ratio at birth. |
| :---: | :---: | :---: | :---: |
| 0 | 1821 | 0.00 |  |
| 1 | 1920 | 0.78 | $0 \cdot 9$ |
| 2 | 1820 | 0.75 | 0.90 |
| 3 | 1920 | 0.76 | 0.90 |
| 4 | 1919 | $0 \cdot 81$ | $0 \cdot 89$ |
| 5 | 1918 | 0.85 | $0 \cdot 89$ |
| 6 | 1917 | 0.82 | 0.91 |
| 7 | 1816 | 0.87 | 0.91 |
| 8 | 1015 | 0.85 | 0.91 |
| 9 | 1914 | 0.85 | 0.91 |

On the face of it, therefore, the conclusion to be drawn is that although some part of the variation of the sex-ratio for marriages of longer duration is to be attributed to a secular change in the general sex-ratio, yet the proposition is probably true that while the proportion of female to male births is about 9 to 10 , the proportion of female to males among first-born children is only about 8 to 10 . If the data are reliable the result is of great physiological and sociological significance; but, however attractive fearless assertion may be, it is wiser to remind the reader of the pride that the Punjabi takes in his male children, and of the effect that pride may have in causing him to misstate the sex of his first-born. $\dagger$
Ase of the woman at mirriage.
134. When we observe that there were 64 persons ( 37 males and 27 females) who were widowed before the age of 5 , enumerated in the 1921 Census, the youthfulness of some bridegrooms and brides has been sufficiently emphasized. As is well-known, consummation of the marriage does not take place (perhaps many years later) till the muklawa ceremony has been performed, the bride in the meantime living with her parents. Even so the marriage proper will take place as soon as possible after the girl has reached the age of puberty. Unlike the schedules of the main census, the Family Census schedules record the duration of marriage dating from the time at which the woman came to live in her husband's house, and therefore the "duration of marriage" does not correspond with the period elapsing since the time of the civil marriage, nor with the time elapsed. since the commencement of cohabitation. In fact, the recorded "duration of marriage" will ordinarily date from the time of the mukla:oa (home-bringing) ceremony, which usually takes place several years after the initial nikah or shadi

\footnotetext{
*This would not be exactly true if the Family Consus was not a strictly randum selection from all marriagep. It is probable that it is not so, and that District Officern naturally tended to get information about marriages wheh had larger rather than smaller families.
ger rather than smaller families.
$\dagger$ The percentage of ohildlessness for each of the first ten years of marriage for each casto-group reparately is as follows:-

| Duration of marriage. | 0 | 1 | 2 | 3 | 4 | 6 | 6 | 7 | 8 | 0 years. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Caste-group 1 | 100 | 80 | 49 | 37 | 24 | 16 | 15 | 10 | 5 | 4 |
| \% 02 | 99 | 84 | 51 | 37 | 26 | 10 | 12 | 9 | 9 | 4 |
| \% $\quad 3 \quad 3$ | 100 | 86 | 50 | 40 | 28 | 17 | 10 | 9 | 7 | 6 |
| \% 4 | 100 | 80 | 39 | 34 | 23 | 18 | 13 | 9 | 9 | 4 |
| - 6 | 89 | 88 | 57 | 41 | 20 | 22 | 17 | 11 | 7 | 7 |
| 6 | 100 | 83 | 49 | 32 | 27 | 18 | 12 | 10 | 8 | 6 |

(civil marriage), and, not infrequently, a good time before the actual consummation of the marriage with the husband.

In studying the data of the Family Census, therefore, it must be remembered that when we find that 15 per cent. of the women were below the age of 10 at marriage, that this denotes that these girls had been married civilly at a very young age indeed, and had actually come to reside in their husband's home (though not necessarily to cohabit with him) before the age of 10.

The results obtained from the Family Census are exhibited in two tables, the first showing the actually observed numbers of women of each age at marriage, and the latter the relevant percentages. The data are given separately for each caste-group.

Table ahowing the actual number of women whose "age at marriage" is given. -

*
Table showing the percentage numbers of toomen whose "age at marriage" is given.

|  | Below 10 | 10-14. | 15-19. | 20-24. | 25-29. | 30-34. | 35-39. | 7 40 and over | Total. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Avi Castes .. | $16 \cdot 2$ | $36 \cdot 3$ | 31.7 | $10 \cdot 9$ | $3 \cdot 5$ |  |  |  |  |
| Canto group 1. . | 22.8 | 41.5 | $25 \cdot 7$ | $6 \cdot 2$ | 1.8 |  | 0.8 | $0 \cdot 6$ | 100 |
| " 2.: | 18.4 | $35 \cdot 1$ | 33.7 | 12.0 | $3 \cdot 5$ |  | 0.5 | 0.3 | 100 |
| " 3.. | 14.7 | 424 | 31.0 | 87 | 2-2 | 0.6 | 0.3 | $0 \cdot 1$ | 100 |
| * 4.. | 18.4 | $37 \cdot 1$ | 327 | 11.2 | 3-4 | $1 \cdot 3$ | 0.6 | 0.3 | 100 |
| \% 8. | 17.7 | $35 \cdot 5$ | 30.1 | $11 \cdot 1$ | $3 \cdot 3$ | $1 \cdot 3$ | 0.5 | 0.4 | 00.9 |
| O 0.. | 13.4 | $33 \cdot 9$ | 3177 | 21.8 | $5 \cdot 9$ | 2.0 | 0.9 | $0 \cdot 6$ | 99.8 |

From this it will appear that a greater percentage of clerics ( $22 \cdot 5$ ) marry girls below the age of 10 than any other caste-group. Next in order of preference for very young wives come menials ( 17.7 per cent.), then traders ( 14.7 ), and lastly agriculturists, artisans and criminals, all of whom marry when 13.4 per cent. of their wives are below the age of ten. Caste-group 3, comprising a majority of traders, has the most marked aversion of all to marry women above the age of $40 . \dagger$

[^34]Effeot of age of vomag on fortillty.
135. In order to determine what effect, if any, early or late marriages have on fertility, it would be necessary to compare the number of children born for all "completed" marriages, that is to say of 30 year"' duration and over, the only variable factor being the age of the women at marriage. Even this would not enable a just estimate of the effect of early or late marriages to ba made, as, should early or late marriages tend to increase mortality, this consequence would be obscured, owing to the exclusion from the data of marriages in which one parent had died.

At first sight the requisite information might appear to be available on examining the figures of the number of children for all marriages, of whatever duration, classified according to the age of woman at marriage. The data are exhi- . bited in the statement below :-

Statoment of the percentage age-groups of age of woman at marriage with $0,1,2,3$ to 5 and 0 to 10 lieing children for all caste-groups from the Family Censud recordo.

| Age of woman at marriage in years. | $\left\|\begin{array}{c} \text { Below } \\ 10 \end{array}\right\|$ | 10-14 | 16-10:2 | $20-24$ | $25-2013$ | 30-343 | 35-30 | 40 <br> and over. | Totel. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Percentage on enumorated childless m | $19 \cdot 1$ | $39 \cdot 1$ | $20 \cdot 8$ | $8 \cdot 6$ | $3 \cdot 3$ | $1 \cdot 8$ | 0.8 | 0.81 | 100 |
| Percentage on enumerated marriages with 1 ohild living | 16.8 | $37 \cdot 6$ |  | $8 \cdot 4$ | $3 \cdot 0$ | $1 \cdot 3$ | $0 \cdot 6$ | 0.7 | 100. |
| Percentage on onumeratod marriages with 2 ohildron living | $15 \cdot 2$ | 37-1 | $30 \cdot 9$ | $10 \cdot 6$ | $3 \cdot 6$ | 1.5 | 0.7 | 0.4 | 100. |
| Percentage on enumerated marriages with 3 to 5 ohildren living | 14.3 | 34•8 | $33 \cdot 2$ | $\cdot 8$ | $3 \cdot 7$ | 13 | $0 \cdot 6$ | $0 \cdot 2$ | 100 |
| Percentage on enumerated marriages with 6 to 10 ohildren living | $13 \cdot 8$ | 36-4 | $32 \cdot 2$ | $1 \cdot 7$ | $6$ | 3 | 0.7 | 0.3 | 10 |
| Percentage on enumorated total number of marriages with $0,1,2,3$ to 5 and 6 to 10 children living | $16 \cdot 2$ | $38 \cdot 3$ | 31-7 | 10.8 | $3 \cdot 5$ | $1-4$ | $0 \cdot 6$ | $0 \cdot 4$ | 10 |

The conclusions which this table suggests are exactly those which fit in with our preconceived notions of the evil effects of early or late marriages. For this very reason we must be careful to see what fallacies may underlie the seeming simplicity of the data.

Thus, if we look down the columns for the age of the woman at marriage, we observe that as the number of children increases-
(1) the proportion of marriages for the age of woman at marriage below 10, diminishes,
(2) the proportion of marriages in which the woman is between 10 and 14, diminishes,
(3) the proportion of marriages in which the woman is between 15 and 29 at marriage, increases,
(4) the proportion of marriages in which the woman is over 30 , diminishes.
Three explanations seem possible, namely-
I.-That in the years immediately preceding the Family Census of 1920-21, there had been an increase in the number of very early or very late marriages. As a recent marriage must necessarily tend to be a childless marriage at the time of the Family Census, this would account for the relatively high proportion of childless marriages and marriages producing a small number of children, for women marrying below 15 and over 30.
II.-That when the age of the woman at marriage is below 15 and over 30 , that the mortality rate of either parent, or both parents, becomes higher than in the general population. This would tend to make such marriages of short duration, and, therefore relatively infertile.
III.-That when women marry below 15 or above 30 , the resulting marriage is less fertile than marriages which take place when the woman is between those ages.

Explanation II is, in a sense, virtually the same as explanation III, as if either parent dies, as a consequence of the immaturity or excessive maturity of the woman, at the time of marriage, this is a legitimate argument against such marriages. The first explanation is not, I think, consonant with what is geverally believed as regards the increase in the age of woman at marriage during recent years, and therefore explanations II and III may be accepted as correct alternative interpretations of the data, and admit the conclusion that marriages in which the woman is below 15 or above 30 years of age at marriage are relatively infertile.
136. In order to compare the relative fertility of one section of the population with another, it is desirable, in the first instance, for simplicity's sake, to examine only the figures for "completed" marriages, which will be the term applied here to marriages of 30 years' duration and over. For this purpose the table compiled below is apposite-
Htalement of the percentage of families with $0,1,2,4,8$ and 12 living children for "completed" "urariages of 30 yeare" duralion and over.

|  | Chett-arour aturikrs. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| , - | 1 | 2 | 3 | 4 | 5 | 6 | 1-6 |
| Porcentage of familiou with 0 ohildren living .. | 6.04 | $5 \cdot 68$ | 4.68 | $5 \cdot 69$ | $7 \cdot 68$ | $6 \cdot 56$ | 6.12 |
| Porcontage of families with 1 ohild living .. | 28.66 | 18.77 | $20-20$ | $18 \cdot 82$ | 20•77 | 20.98 | $20 \cdot 62$ |
| Porcontage of familiot with 2 children living | 32-82 | 32-59 | 27.09 | 30.80 | 31-32 | 31.68 | 31-85 |
| Porcontege of familioe with 3 to 5 children living | 26.38 | 35-53 | 38.81 | - 3678 | 33-66 | 32.67 | 34.04 |
| Percontage of tamilies with 6 to 10 ohildren living | 8.08 | 7•36 | 9.07 | 7.91 | $6 \cdot 49$ | 8.03 | 7.27 |
| Porcontage of families with 12 or mare ohildren living | 0.03 | 0.09 | 0.15 | $0 \cdot 13$ | 0.08 | 0.08 | $0 \cdot 11$ |

This indicates that for "completed" marriages sterility is very low forming only about 6 per cent. of all such marriages; the highest degree of sterility (7.68 per cent.) being found among menials (comprised in caste-group 5) and the lowest ( 4.68 per cent.) among traders (caste-group 3).

The most usual size of family for "completed" marriages is from 3 to 5 children, except among clerics (caste-group 1) for which a family of 2 is more common than any other. The mean size of family for "completed" marriages has been calculated by assuming that where the number of recorded children is between 3 and 5 it was actually 4, where it is recorded as between 6 and 10 it

Mean sise of families, is e, of living children for ${ }^{\text {completod }}$ "marriages.

| Onate-group. | $\begin{aligned} & \text { Numbor of } \\ & \text { living } \\ & \text { ahildran. } \end{aligned}$ | $\begin{aligned} & \text { Nomboro } \\ & \text { abildron } \\ & \text { born. } \end{aligned}$ |
| :---: | :---: | :---: |
| 1. Clorice .. | 370 | $6 \cdot 15$ |
| 2. Agriculturiste | C03 | 5.70 |
| 3. Traders | 4.87 | 605 |
| 4. Artieant | $6 \cdot 10$ | $6 \cdot 24$ |
| 6. Manials | \$388 | 5.83 |
| 6. Ciminuls | 406 | 546 |
| All Contere. | 3.99 | 568 |

was actually 8. The results are recorded in the margin. The results in the first column of figures give the living children, and for marriages of such long duration as 30 years, which are the only ones included in these data, the number of children lost by death is considerable. The results given in the second column of figures show the total fertility, that is the total number of children borm, whether alive or not at the time of the Family Census. Thus, while artisans have the greater gross fertility, they come only second to traders in nett fertility, whilst the lowest fertility, both gross and nett, is possessed by the

Size of famillea

Varistion of fortillty with duratlonprece 137. The terms gross and nett" fertility have been used in the of marriage. marriage at any given moment, and to the marriage throughout.

To obtain the "gross" and " nett" fertilities for any given duration of marriage the number of children born and alive, as shown for each caste-group in the sorters' tickets, was divided by the number of marriages for various durations of marriage.*

The results are given in Subsidiary Tables IX-À and IX-B for the " gross" and "nett" fertilities for males and females separately. Naturally the gross fertility rises more or less steadily right up to marriages of 30 years' duration and over, both for males and females. The nett fertility, however, for females shows signs of diminishing as the duration of marriage approaches 30 years.

Diggram 42.

-As very fow persons ase likely to read a consus report, or even s chapter, right through, it is necessary tus ropeat that tho duration of marriago is measured from the time the wife comes to live in her hushand's house, and does not dato from the time of the civil marriage.

As the figures for the gross and nett fertilities show certain irregularities, which can hardly be due to anything but chance or minor inaccuracies in the statistics, it seems desirable to graduate them by means of some appropriate formula. This was done for all caste-groups separately, and for the totality of caste-groups. The graduation used was that of an equation of the second degree fitted by the method of least squares, the condition imposed being that the fertility (both nett and gross) was zero for a marriage of a duration of 0.7 years. This period, which is equivalent to about $8 \frac{1}{2}$ months, corresponds to the minimum time from the time of marriage within which a child is likely to be born.


The resultant equations connecting the number of children born. $(y)$ with the duration of the marriage in years ( $x$ ) are as follows for each caste-group:-

## Grose fertility curves

| All castegroups | - | -. |  |
| :---: | :---: | :---: | :---: |
| Castogroup $1 .$. | .. | .. | .9 . $. y=-2608+.3769 x-0063 x ~$ |
| 8 .. | $\cdots$ | .. | . $\mathrm{y}=-2332+\cdot 33565-0047 x^{2}$ |
| " 3 .. | $\cdots$ | .. | $\cdots y=-2303+\cdot 3819 x-0042 x^{2}$ |
| 5. | $\cdots$ | - | . $\mathrm{y}=-2296+33080-0041 x^{2}$ |
| 6. | - | - | $\cdot . y=-2177+3136 x-0038 x^{2}$ |
|  | - |  | 240x |

The similarity of all these equations is remarkable, and they show that during the first few years of married life we may say that, roughly, one child is born in every 3 years. The rate of child-bearing shows a steady falling off with duration of marriage, and practically vanishes, for ordinary Punjab conditions, after 36 years of married life.

Diagrams 42, 43, 44 and 45 exhibit the actually observed values of the "gross" and "nett" fertilities; together with the curves of graduation, for caste-groups 1, 2 and 3 (clerics, agriculturists and traders) and all castes together.

Diagram 44.


Special attention may be drawn to Diagram 42 which gives the fertility curves for the clerical, religious and generally literate classes. In this case the graduation cannot be described as at all successful, as the observed fertilities rise sharply till 3 children have been born, after about 7 years of married life, and thereafter rise very slowly indeed. Contrasted with all the other curves* the failure of the graduation is conspicuous, and the conclusion seems probable that the high class Hindu knows something of the effective use of contraceptives.

Diagram 45.


For the rest the diagrams must speas for themselves.
The most 138. It has been trenchantly observed that many of us are very unfor-
 bsia L . is not unimportant to choose the right moment to be born at. The question of the "handicapping of the firstborn" has been dealt with by Professor Karl Pearson.*

It seems clear that the data of the Punjab Family Census would provide some answer to the question "what are the relative chances of survival of a child born in the 1st, 2nd, 3rd and subsequent years of marriage?" The difficulty is to find the appropriate form of analysis. An attempt to examine the problem is made in Appendix 5, to which the mathematical reader is referred.

The results alone are of general interest, and may be briefly summarised here. If we represent by a co-efficient $k_{m}$, the ratio of the likelihood of survival for a given number of years, of a child born in the $m$-th year of marriage, to the likelihood of survival for the same number of years of any person, $\dagger$ then if $l_{n}$ is greater than unity, it is clear that the $m$-th year of a marriage is a favourable year for a child to be born in ; if $k_{m}$ is less than unity the $m$-th year is an unfavourable one to be born in.

| Yoar of marriage. | Rslative chance of <br> Rurvival of child born in <br> that year ol marriage. |
| :---: | :---: |
| 1 | 1.08 |
| 2 | 1.12 |
| 3 | 1.08 |
| 4 | 1.08 |
| 5 | 1.01 |
| 0 | 1.01 |
| 7 | 0.96 |
| 8 | 0.04 |
| 9 | 0.88 |
| 10 | 0.78 |

The figures in the margin give the relative chance of survival for children born in each of the first ten years of marriage. This, of course, affords only a rough indication of the relative prospects of survival of the firstborn as compared with the laterborn children, but serves to show, if the method of analysis is valid, that it is better to be born in the first six years of marriage than later on.

## Section III.-Cousin Marriage.

Contract be-
139. There is hardly any social phenomenon more striking than the tween Hindu cleavage between the Hindu and Musalman in respect of the custom of inbreeding. ${ }_{\text {man }}^{\text {and }}$ Munil. Among the latter community inbreeding is almost enjoined as a duty, in the madflem former it is wholly taboo.

The Hindu must marry, unless he has adopted Arya tenets, within his caste; he must marry within his section; but he must not marry within his gotra or olan. The Musalman definitely seeks a near relation, a first cousin for preference, as his bride.

Here, if anywhere, is a genetic experiment on a large scale, which ought, one may suppose, to decide the vexed problem of the advantages and disadvantages of cousin marriage. As the two great communities, speaking of the Punjab as a whole, live side by side, eat the same food, follow the same pursuits, and, at any rate among the rural population, which forms nearly 90 per cent. of the whole, are scarcely differentiated at all in respect of house accommodation and environment generally, the material seems admirably adapted to show whether cousin marriage is a eugenic or a dysgenic practice.

## Ezquiry into

 140. An essential preliminary is to determine the percentage of cousinpercentise of marriage among Musalmans, and for tlis purpose I had a special enquiry carried consta mar-out by my Personal Assistant, Sheikh Abdul Majid, LL. B., in the districts clage. of Attock, Muzaffargarh and Gurdaspur. He received careful instructions to include all cases, whether the husband and wife were related or not, so as not to exaggerate the percentage of cousin marriage, and these instructions were, I believe, adhered to. In order to prevent mistakes in entering up the relationship of husband and wife, when it existed, a detailed genealogical table was drawn up, and the synopses have been based directly on these genealogies. The total number of cases recorded is 855 for the 3 districts, and the data cover 10 different castes. The data for the Sayad caste alone was recorded in all the three districts.

[^35]CEAP. VII--OIVIL OONDITION.

The summarised resultis are given in the table below:-

Number änd percentage of certain castes who marry relations:


The above summary does not distinguish between marriages of cousins of other grade than first cousins, and for the detail of marriages between first cousins once removed, second cousins and so forth Subsidiary Tables IX-A, IX-B, IX-C and IX-D should be consulted.

Of the 3 districts Attock and Muzaffargarh are distinctively Musalman districts, while Gurdaspur contains exactly 50 per cent. of Musalmans. The variation of the percentage of cousin marriage among Musalmans with the variation in the proportion of Musalmans in the population of the district is very remarkable. The figures are these-

| Dtatrict. |  | Perorntage of Mubamung tho mariy |  | Percentage of Masalmanch total population of district |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Firat Cousins. | Cousina, |  |
| Attook | - | 42 | 60 | 91 |
| Muzaflargarh | - | 86 | 47 | 87 |
| Gurdaspur | -• | 23 | 30 | 150 |

The conclusion is most strongly suggested that in districts where there are relatively fewer Musalmans, their natural preference for marriage with a near relative is modified by contact with the exogamous Hindu. The converse proposition, however, is not true, as may be noted in the Muzaffargarh district, where though there is no less than 81 per cent. of Musalmans, the Hindu population recorded no single instance of a cousin marriage from among 203 cases into which enquiry was made. In the Attock district, from among Khatris, no cousin marriages were observed, though marriage within the section, as well as within the caste, is practically universal. Of the 3 sections of Khatris, the Khokharan, Bâhri and Bunjahi, the first named is a purely endogamous section, but the last two are reported now to beinclined to inter-marry one with the other. We may conclude, therefore, that Findus are uninfluenced in the direction of cousin marriage, or of any kind of endogamy, by their Musalman neighbours.

| DELHI PROVINOE. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Casto. | Desoription of wives. | Marbying tibstcodsins. |  | Marymg coumisb. |  | Total casor |
|  |  | Namber, | Percentago. | Nomber. | Percent. age. |  |
| Jato - $\quad \cdot$ | $\begin{array}{lll}\text { First wife } & \text {.. } & \text {. } \\ \text { Other wives } & . . & .\end{array}$ | 0 | 0 | 0 0 | 0 | $\begin{array}{r} 40 \\ 6 \end{array}$ |
| Meos <br> (Mevatis) | $\begin{array}{lll}\text { First wife } & \text {. } \\ \text { Other wives } & \text {.. } & \text {. }\end{array}$ | $8$ | 1 6 0 | 3 0 | $\begin{array}{r}1 \\ \\ \hline\end{array}$ | $\begin{aligned} & 81 \\ & 18 \end{aligned}$ |
| Pathan . | $\begin{array}{lll}\text { First wife } & \text {.. } & \text {.. } \\ \text { Other wives } & . . & -\end{array}$ | 8 0 | 7 0 | - $\begin{gathered}5 \\ 2 \\ 1\end{gathered}$ | 1 <br>  <br>  <br>  <br>  <br>  | $\begin{aligned} & 41 \\ & 11 \end{aligned}$ |
| Sayads $\quad \because \quad \cdots$ | $\begin{array}{llll}\text { First wife } & \cdots & & \cdots \\ \text { Other wives } & \text {.. } & & .\end{array}$ | 7 | $\begin{aligned} & 14 \\ & 17 \end{aligned}$ | 16 2 | $\begin{aligned} & 80 \\ & .17 \end{aligned}$ | 60 12 |
| - $\quad 1$ | Total $\cdots$ | 15 | 7 | 26 | 11 | 229 |

there is 29 por cent. of Musalmans.
Number and percentage of certain Aruealman castes tho marry relations.
DELHI PROVINCE.

[^36]141. Lastly, among Musalmans it is much more likely that the first wife Fendeney to will be a cousin than the second or later wives. This is to be attributed to the mars mansted greater social importance of, and the closer observance of custom demanded from for int maxa first marriage than from a second. In the first marriage the man follows the riagen dictates of the tribe, in the later marriages he pleases himself,
cancrata 证

 Delmi. IL Proportion of the cexes by Givi Condruos at cernana, Poojab, 1920.21, for marriages for which both huband and wile for malo



 bend and
TABLE i.
main ago-poriod of Lat five Censuses, Punjab and Delhi:


## SUBSIDIARY TABLE I.-conoluded.

Distribution by Civil Condition of 1,000 of asch sex, roligion and main age-poriod of 1921.


CABPTBE VI.

## SUBSIDIARY TABLE II.

Distribution by Civil Condition of 1,000 of each sox at cerisin ages in each Religion and Natural Divinion.-Punjab.


OEAFTRE VIL
gUBSIDIARY TABLEB.


SUBGDIABT TABLRE:
OHAPTER 7IL.

## SUBSIDIARY TABLE III.

Distribution by main ago-periods and.Civil Condition of $\mathbf{1 0 , 0 0 0}$ of each Sex and Religion.


GUBBIDIARY TABLES.

## SUBSIDIARY TABLE III.

Distribution by main age-periods and Civil Condition of $\mathbf{1 0 ; 0 0 0}$ of each Sex and Religion-concluded.


## SUBSIDIARY TABLE IV.

Proportion of the sexes by Civil Condition at certain ages for Religions and Ratural Divisions.


[^37]OHAPTER VII.

subsidiary tables.

TABLE V.
sex at certain ages for selected cantes.

AND AOE BY CIVIL CONDITION.


ORAPTRR VII.


TABLE V－concluded．
sex at earlain ages for selected caster．

AND AGE BY GIVIL CONDITION．
 AGB BY CIVIL CONDITION．
 \％\＆心





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## SUBSIDIARX TABLE VI.

Shawing the daia collected from the Family Census, 1920-21, for marriages for which both husband and wife were alive. Each case corresponds to one marriage.

Oasta Group Nos. 1 to 6.


OHAPTER VII.

## SUBSIDIARY TABLE:VI (1).

Showing the data collected from the Family Census, 1920-21, for marriages for which both husband and wifo were alive. Each case corresponds to one marriage.

Castegroup No. 1.


Pant $\mathrm{II}_{\mathbf{4}}$
Mardiags of 5 ysabs' dubation'and over. Total No. of oases 15,b32.


## SUBSIDIARY TABLE VI (2).

Showing the data collected from the Family Census, 1920-21, for marriages for which both husband and wife were alive, Each oase corresponds to one marriage.

Cabth arout No. 2.


## SUBSIDIARY TABLE VI (3).

Showing the data collected from the Family Census, 1920-21, for masriages for which both husband and wifo wore alive. Each case çorresponds to one marriage.

Cabte group no. 3.


## SUBSIDIARY TABLE VI (4).

Showing the data collected from the Family Census, $\mathbf{1 9 2 0 - 2 1}$, for marriages for which both husband and wift were alive. Each case corresponds to one marriage.

Caste arour No. 4.

Part I.
Totar, No. of cases 7,649.



## SUBSIDIARY TABLE VI (5).

Showing the data collected from the Family Census, 1920.21, for marriages for which both husband and wito were alive. Each case corresponds to one marriage.

Cabtr grout No. 5.


## SUBSIDIARY TABLE VI (6).

Showing the data collected from the Family Census, 1920-21, for marriages for which both husband and wifo were alive. Each case corresponds to one marriage.

Caste group No. 6.

Part I.
Total No. or 0ased $23,035$.


omartiz vil．

## sUBSIDIARY TABLE VII－A．

Statement showing gross fertility for male and female children born alive for varying duration of marriage for caste groups（Punjab Census 1921）．


## SUBSIDIARY TABLE VII－B

Statement ahowing net fertility for male and famale children now living for varying durations of marriage for casto groups（Punjab Census 1921）．

| Doration or yarathos． |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Group I． |  | Group 11. |  | Group 1II． |  | Group IV． |  | Group 7. |  | Group V1． |  | All Groups． |  |
|  |  | 宽 | 8 $\frac{8}{4}$ $\frac{1}{4}$ | $\frac{8}{7}$ |  | 曷 |  | 害 | 豆 | 違 | 雨 | 突 | 产 | 缶 | 惖 |
| 0－1 | － | 0 | 0 | ． 016 | 0 | 0 |  |  |  | 0.013 |  | 0 |  | －010 |  |
| 1－9 | $\bullet$ | 0.12 | 0.08 | 0.81 | －064 | 011 | 0.05 | 0.09 | $0 \cdot 16$ | 0.07 | $0 \cdot 04$ | 0.07 | $0 \cdot 08$ | －08 | ． 07 |
| 2－3 | $\cdots$ | 0.36 | 0.28 | ＇27 | －22 | $0 \cdot 24$ | 0.21 | 0.34 | $0 \cdot 27$ | $0 \cdot 22$ | 019 | $0 \cdot 26$ | $0 \cdot 20$ | $\cdot 27$ | $\cdot 22$ |
| 8－4 | － | $0 \cdot 48$ | $0 \cdot 40$ | 33 | ＇27 | $0 \cdot 32$ | $0 \cdot 25$ | 0.43 | 0.20 | 0.31 | 0－20 | $0 \cdot 37$ | 0.32 | $0 \cdot 26$ | 0.29 |
| －6 | $\cdots$ | 0．54 | 0.47 | －64 | 45 | 0.46 | 0.38 | $0 \cdot 46$ | 0.38 | 0.38 | $0 \cdot 36$ | 0.45 | $0 \cdot 42$ | $0 \cdot 48$ | 0．42 |
| 8－6 | － | 1.03 | $0 \cdot 87$ | $\cdot 85$ | 47 | 0.50 | $0 \cdot 48$ | 0.52 | $0 \cdot 50$ | 0.51 | $0 \cdot 50$ | 0.67 | 0.52 | $0 \cdot 68$ | 0.52 |
| $0-1$ | － | 1.38 | $1 \cdot 87$ | 77 | 05 | 0.60 | 0.62 | 0.67 | $0 \cdot 51$ | $0 \cdot 62$ | $0 \cdot 56$ | 0.65 | $0 \cdot 64$ | $0 \cdot 75$ | $0 \cdot 68$ |
| 7－8 | － | 1382 | 1－25 | －96 | －88 | 0.61 | 0.71 | $0 \cdot 67$ | 0.62 | $0 \cdot 80$ | $0 \cdot 72$ | $0 \cdot 74$ | 0.68 | $0 \cdot 90$ | 0883 |
| 8－9 | ＊＊ | 142 | 1.35 | －86 | ${ }^{783}$ | 0.80 | 0.75 | 0.88 | 069 | 087 | 085 | 0.83 | 0.77 | 0.88 | 0.87 |
| $0-10$ | $\cdots$ | 1.25 | 117 | $1 \cdot 33$ | $1 \cdot 28$ | 1.00 | 0.01 | $1 \cdot 18$ | 0.67 | 1－25 | $1 \cdot 14$ | 0.97 | $0 \cdot 96$ | $1 \cdot 22$ | 1.15 |
| 10－14 | － | 140 | 1.35 | 1.4 | $1 \cdot 30$ | $1 \cdot 34$ | 1.20 | 1.30 | 1－17 | $1 \cdot 33$ | $1 \cdot 23$ | $1 \cdot 23$ | $1 \cdot 12$ | $1 \cdot 37$ | 1.25 |
| 10－19 | ＊＊ | 1.68 | $1 \cdot 38$ | 186 | $1 \cdot 61$ | 177 | 1.64 | 174 | 1．56 | $1 \cdot 45$ | 1.46 | 164 | 1－32 | $1 \cdot 66$ | $1 * 47$ |
| 20－24 | $\bullet$ | 1.88 | 1.64 | 2.02 | $1 \cdot 75$ | 2.05 | 174 | 2－13 | 1.80 | 1.87 | 1.65 | 187 | 188 | $1 \cdot 66$ | 1888 |
| 96－98 | $\because$ | 2.01 | 1.84 | 8.28 | 183 | $2 \cdot 28$ | 1.99 | $2 \cdot 36$ | 2.07 | $8 \cdot 26$ | $2 \cdot 00$ | $2 \cdot 01$ | $1 \cdot 70$ | $2 \cdot 91$ | 1.87 |
| \＄0 sad ovor | － | 206 | $1 \cdot 74$ | $2 \% 8$ | 187 | 2－32 | 190 | $2 \cdot 30$ | 172 | $2 \cdot 20$ | 183 | 218 | 171 | $2 \cdot 23$ | 183 |

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bubsidiary tables.


## SUBSIDIARY TABLE VIII-B.

Statement showing the observed and calculated average net fertility (i. e., for children now living) for varying duration of marriage for different Caste Groups.-(Punjab Census 1921).


SUBSIDIARY TABLE IX－A．
Rolationship of husband and wife（Musalmans），Attock District．

| Onita | Doecription of wivol． | NUMBER OY WIVES OV EMILAR golta WITH enintiosbetr． |  |  |  |  |  |  |  |  |  golra with relationsulp． |  |  |  |  |  |  | TOTAL NUMBRE OT WITES OP BLMILAR AKD DIFYRERNT gotras with enlationghip． |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \text { 品 } \\ & \text { 古 } \\ & \text { an } \\ & 0 \end{aligned}$ |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | － | 10 | 11 | 12 | 13 |  |  |  |  | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 28 | 27 | 28 |  |  |
|  | Firat wifo ．． <br> Socond „ <br> Third＂ <br> Bourth ， | $\left[\begin{array}{c} 72 \\ 2 \\ \\ . . \\ . \end{array}\right.$ |  | ．． |  | 13 |  |  |  |  |  |  | $\left[\begin{array}{c} 2(b) \\ \vdots \\ \vdots \\ \cdots \\ \cdots \end{array}\right.$ |  |  |  |  |  | $\begin{array}{\|l\|} \hline \\ \\ . . \\ \ldots \\ \hline \end{array}$ | $a(b) 6$ |  |  |  |  | （d） 68 （b） 26 54 51 |  | （a）Includee Rajput 1 and Ma－ biare 2. <br> （b）Inoludes Malliar 1. <br> （c）Includes Khattars 2. <br> （d）Includes Khattare 3，Jate 2 <br> Maliara 8 and Rajputa 0. <br> t（a）Includes Rajput 1. <br> （b）Inoludea Khattar 1，Maliara <br> 6，Mughal 1，Rajputa 2 and Sayad 1. <br> $\ddagger$ Inoludea Rajput． 1 <br> §Khättar 1．＇ |  |  |
| maLIAR $\{$ |  | 48 <br> $\cdots$ <br> $\cdots$ | ．${ }_{7}^{7}$ |  | $\square$ $\because$ $\therefore$ | － $\begin{array}{r}8 \\ 1\end{array}$ | ． | $\ldots$ | －．${ }_{1}^{18}$ | ${ }_{8}^{70}$ | ．．${ }^{4}$ | ．．${ }^{1}$ | 吕 | $\because$ | $\ldots$ | －${ }_{2}^{4}$ | ${ }^{20} 8$ | ［ 82 |  | －．．${ }^{2}$ | $\ldots$ |  | $\cdots$ |  |  |  | ＊Includes A man 1，Lohar 1 and Pathan 1. | 总 |  |
| QURESEI | Firat wifo． | 1 | 2 | ． | ．． | 1 | ． | ． | $\cdots$ | 4 | ．． | ．$\cdot$ | ． | $\cdots$ | ．． | ＊1 | ${ }^{*}$ | 1 | 2 | ．$\cdot$ | ． |  | $1 .$. | ．． | ＊ 1 | ＊ 6 | －Ir oludea Arain 1. | E. |  |
| RAJPOT $\{$ | Firat wife ．． <br> Boannd ．， <br> Third＂ |  | ${ }^{1} 8$ |  | ．． | $\cdots$ | $\because$ <br> $\because$ <br> $\because$ | ．． | 1 3 1 |  | $\cdots$ | $1(a) 1$ | $\cdots$ | $\cdots$ | $\cdots$ | $\left\|\begin{array}{rr} \text { (b) } & 2 \\ & 41 \\ . \end{array}\right\|$ | $*$ <br> +1 <br> . | 3 <br> $\because$ <br> $\because$ | $\begin{array}{r} 3(a) \\ 1 \\ . . \end{array}$ | $\xrightarrow{\square}$ | $\cdots$ |  | 4 | $\cdots$ | $\left\|\begin{array}{rr} \text { (b) } & 3 \\ & t_{4}^{4} \end{array}\right\|$ |  | ＊（a）Includes Awan 1. （b）Inoludes Awans 2. $\dagger$ locluder Awan 1. |  |  |
| gayad \｛ | Mrat wile . . <br> Socond， | $\because{ }^{6}$ | $\because$ | $\because$ | $\because$ | 1 | $\because$ | ．${ }^{1}$ | $\cdots$ | 4 | ．．${ }^{6}$ | \％$\because$ | $\because$ |  | 1 | ＊ 2 | ＊${ }_{4}^{8}$ | 12 | $\because$ | $\because$ | $\because$ |  | 2 $\because$ |  | ${ }^{2}$ | $\begin{array}{l\|l\|} 1 & 18 \\ 2 & 48 \\ \hline \end{array}$ | ＊Includer Awan 1. Maliar 1. |  |  |

## SUBSIDIARY TABLE IX-B.

Relationship of husband and wife (Musalmans), Huzafiargarh District.



## SUBSIDIARY TABLE IX-D.

Relationship of husband and wife (Musalmans), Delhi Province.

| Chatr. | Discluption or wives. | Number of wives of similar gotra with relationshif. |  |  |  |  |  | Nmberr of wives or different gota with rblationshif. |  |  |  |  | Total number of wives of stimar and dipferent gotras witi nelationehip. |  |  |  |  |  | Rmmarks. |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\underset{\substack{\dot{G} \\ \stackrel{\rightharpoonup}{\mathrm{E}}}}{ }$ |  |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |  |  |
| Jats $\quad . .\{ \}$ | First wife Second ., Third , | . $\cdot$. | .. | .. | $\square$ <br> $\therefore$ <br> . | .. | .. | .. | .. | .. | $\begin{array}{r} 40 \\ 5 \\ 1 \end{array}$ | 40 8 1 | .. | . . . . | .. | $\cdots$ | $\begin{gathered} 40 \\ 5 \\ 1 \end{gathered}$ | $\begin{gathered} 40 \\ 5 \\ 1 \end{gathered}$ |  |  |  |
| MEOS (MEWATIS) .. $\{\{$ | First wifo Second " Third ", | ... | .. |  | . . . . | .. |  | ${ }^{3}$ | .. | ... | $\left\|\begin{array}{c} * \\ 48 \\ { }_{18} \\ { }^{3} \end{array}\right\|$ | $* 51$ <br> $* 15$ <br> $*$ <br>  <br>  | 3 <br> .. <br> . | .. . . . | .. | $\ldots$ | $\begin{gathered} * 48 \\ \cdot 15 \\ * 3 \end{gathered}$ | $\begin{aligned} & { }^{511} \\ & { }^{15} \\ & * 3 \end{aligned}$ | * Inoludes 1 Moghsl. <br> * 1 Sheikh. <br> - . 1 Faqir. |  |  |
| patalans $\cdot$. $\{$ | $\left\{\begin{array}{l}\text { First wifo } \\ \text { Second ." }\end{array}\right.$ | .. ${ }^{3}$ |  |  |  |  | 40 |  |  | .. | 1 4 |  | .. ${ }^{3}$ | ${ }^{3}$. | $\cdots$ | .. | $\begin{array}{r}38 \\ \hline 10\end{array}$ | ${ }^{41}$ | - Inoludes 1 Sheikh. |  |  |
| SAYADS $\quad . .\{$ | $\left\{\begin{array}{l}\text { Firat wife } \\ \text { Second " } \\ \text { Thind " } \\ \text { Fourth ", }\end{array}\right.$ | . 4 <br> ..  <br> .. .. <br> .. . <br> .  | $4 \left\lvert\, \begin{aligned} & 4 \\ & \\ & \\ & \\ & \cdots \\ & \cdots \\ & .\end{aligned}\right.$ | 1 <br> . <br> $\cdots$ <br> $\cdots$ <br> $\cdots$ | $\|$2 <br> .. <br> . <br> . <br> . | $22 \begin{gathered}21 \\ \\ \\ \\ \\ . \\ . \\ .\end{gathered}$ | $\left\lvert\, \begin{gathered}30 \\ 4 \\ 4 \\ . . \\ .\end{gathered}\right.$ |  | $\left(\begin{array}{l}+2 \\ \\ 1 \\ \cdots \\ \cdots \\ .\end{array}\right.$ | $\left\lvert\, \begin{aligned} & \ddagger 1 \\ & . \\ & \cdots \\ & . . \\ & .\end{aligned}\right.$ |  |  |  |  |  |  |  |  |  |  |  |

OHAPTER VII.

## SUBSIDIARY TABLE X.

Authorised dates of Hindu Marriages for the Punjab, 1910-1921, as given by Pandit Devi Dial Jotshi


# CHAPTER VIII. 

## Literacy.

## BECTION. I-GENERAL LITERAUX.

142. Referenco to statistics. 148. Definition of Literacy. 144. Exient of Literacy. 148. Local distribution of Litoracy. 143. Litoracy by districts. 147. Isteracy by Natural Divisiona. 148 Litcracy by cition and towns. 149. Litoracy by religions. 150. Effect of tho proportions of Hindus and Musalmans in the total population on the literaoy of each commpnity. 161. Literacy by castes. 152. Literney by occupatione.

8ECTION II.-LTERACY AND THE GTATISIICS OF TEE EDUCATION DEPARTMENT,
163. Adult litoracy. 154. Litoracy in 8chools, and oxtra-echolestio literacy. 155. The numbera required to replaco loss of ittorates by death. 156 , Speculative increase in malo literacy in British Territory during the decnde 1021-31. 157. Expansion of Education nince 1901.

## Section 1.-General Literacy.

Roference
to Bratirtios.
142. The figures for education by religion and age are given in Imperial Table VIII; Part A containing the provincial summary, Part B details for districts and States and Part C details for cities and selected towns, and Imperial Table IX, which gives the details of education by certain selected castes, tribes and races. While the Imperial Tables give the absolute figures, the data giving the proportionate amount of literacy per mille of population are contained in the Subsidiary Tables.

Subsidiary Table I gives the literacy per mille, by 4 age-groups, by sex and religion for the Punjab and Delhi separately.

Subsidiary Table II gives the number of literates per mille by age, sex and locality for each district, State and natural division.

Subsidiary Table III gives the literacy per mille by religion, sex and locality for each district, State and natural division.

Subsidiary Table IV gives the same information as Subsidiary Table III for English literacy.

Subsidiary Table V gives the variation in literacy in each of the 5 censuses since 1881-1921 for males and females separately, and for the 3 age-groups $10-14_{\text {r }}$ 15-19 and 20 and over for each district, State and natural division.

Subsidiary Table VI gives the number of literates per mille for each caste, and also literates in English per 10,000 of population.

Subsidiary Table VII shows the growth in the number of educational institutions, scholars and expenditure from 1889-90 to 1920-21, based on the returns of the Education Department; Punjab.
Defintion
Dellotion
143. The instruction contained on the cover of the enumeration book for the 1921 Census, read as follows:-
"Column 14-(Literate or illiterate)-Enter against all persons, who can both read and write any language, the word 'literate'; against persons who cannot read and write any language make a cross in this column."
The supplementary instructions to supervisors, given in Appendix I to the Code of Census Procedure of the Punjab 1921, read as follows:-
"Column 14-A person should not be entered as literate unless he can write a letter to a friend and read the answer to it."
Except for verbal alterations these instructions are exactly the same as those given in 1911, and as pointed out in paragraph 413 of the last Census Report, the definition adopted in the 1911 and 1921 censuses demands a higher standard of literacy than did the instructions at the Censuses of 1881, 1891 and 1901. Comparison of the figures of literacy; therefore, between the last two Censuses of 1911 and 1921 with the literacy obtaining at any of the 3 previous censuses will be misleading. Comparison between the returns of literacy for the 1911 and 1921 Censuses will, however, be feasible, provided no insistence is made on minor differences, which may be the result of inaccurate returns.

[^38]literate．Of the total population of age 5 and over，the numbers of literate per－ sons in the Panjab were 45 per mille；of literate males 74 per mille，and of literate females 9 per milte＂：the corresponding figures for the Delhi Province were $1 \overline{22}$ per mille of literate persons， 180 per mille of literate males and 40 per mille of literate females．The proportion of literacy，therefore，in the Delhi Province is nearly 3 times that of the Punjab，a circumstance associated with the fact that out of a population of about 488，000 in the Delhi Province， no less than 304,000 live in Delhi City itself．Of the literate males in the

| Temmontat Drvinox， | Lerexamem |  |  |  | Lithante ms Brequse． |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1911. |  | 1921. |  | 1911. |  | 1921. |  |
|  | 坴 | 苞 | 室 | 寠 | 六 | 宮 | 宮 | 宮 |
| Brtinh Teuntory Native Btatom | 65 | 6 3 |  |  |  | ． | 12 8 |  | Pumjab， 16 per cent．and of literate females 14 per cent．are literate in English．In the Delhi Province，the percentage of literates in English，out of the total number of literate persons， is 31 per cent．for males and 26 per cent．for females．Comparison of the number of literates and of literates in English per mille for 1911 and 1921 is given in the marginal table．

145．Diagrams 46 and 47 show the local distribution of literacy in the Punjab；the curves of these maps separating regions of literacy of below 50 per cribation ${ }^{\text {D／}}$ mille for males from regions where literacy for males exceeds 50 per mille．These Litoracy． diagrams are based on Tahsil and State figures of literacy and，therefore，most of the kinks，which it may be noticed，are very numerous in the isopleths for 1911， are representative of local variations in literacy，as indicated by the returns．Both the diagrams for 1911 and 1921 presont the same general features，that is to say， that a relatively high standard of literacy obtains in a great part of the North－ West of the Punjab and in its Eastern and Central regions：but between these two regions there is an unexpected strip with a low proportion of literates which covers parts of the Sialkot，Amritsar，Lahore，Sheikhupura，Ferozepore and Montgomery districts，in which literacy is below 50 per mille．There is another region of low literacy which is mainly comprised in the districts of Hissar，Rohtak and Karnal．



The main features of the distribution of literacy in various tahsils of the province, as is exhibited by diagrams 46 and 47, are readily explicable by refer ${ }_{r}$ ence to a map of the Punjab showing the parts of the Province in which there are few or many schools per head of population. A diagram (No. 48) showing the population served by each school has been drawn and is reproduced below-


It will be observed that the area in which there are more than 4,500 persons por school in the centre of the Punjab corresponds fairly closely with the area in diagram 47 in which the literacy falls below 50 per mille. Similarly, there are more than 5,500 persons per school in the Bhiwani tahsil, included in the area of low literacy which sweeps across Hissar and Rohtak: but, conversely, although there are few schools in the tahsils of Bhalwal, Phalia, Hafizabad and

Ohiniot, this is an area in which literacy exceeds 50 per mille. Naturally the mere number of schools in any tahsil is not an exact index of the number of literates to be expected in the general population, and on the whole it is surprising to find such a close correspondence between the two sets of figures as is supplied to diagrams 47 and 48. The figures for the number of schools are those Punjab, and apply to the year 1921-22. Anderson, Director of Public Instruction,
146. The diagram given in the

rgin shows the extent of literacy general-
ly, and of literacy among males per mille by districts, the falling away of the qurves for male literacy and for literacy generally being roughly concurrent, as might be expected in view of the fact that male literacy is over 8 times the extent of female literacy. The extent of literacy in the first 3 districts, namely, Simla, males 211 and females 156 per mille; Rawalpindi, males 120 and females 19 per mille; and-Lahore, 100 per mille for males and 23 per mille for females, is due to exceptional circumstances. Simla contains a very large proportion of Europeans and educated Indians, 'Rawalpindi has a very large Cantonment, and Lahore is the educationl centre of the Punjab. Karnal, Sheikhupura and Hissar are the most backward districts in the Punjab, Sheikhupura being but a newly created district, and Hissar and Karnal remote from the capital of the province. Lyallpur with 52 males and 6 literate females per mille is strikingly backward in spite of the fact that it fairly bristles with schools except in the Chiniot Tahsil.
147. The diagram given in the margin shows the proportionate literacy literacy by
diagram so:
 for males and females by natural divisions, the Sub-Himalayan Area coming first, and the NorthWest Dry Area last in the proportion of literates, both male and feraale. It would be a far cry to correlate the extent of literacy with geological formation or climatic conditions. No diagram is given to indicate the extent of English literacy by natural divisions, and the following observations must suffice. Among males the SubHimalayan tract with 155 literates per 10,000 comes first. The Indo-Gangetic Plain with 128 literate males, the Himalayan with 85 literate males, and the North-West Dry Area with 70 literate males per 10,000 follow in the order named. As regards females the Himalayan Area with 26 per 10,000 comes first, closely followed by the Indo-Gangetic Plain with 25 per 10,000 The Sub-Himalayan Area comes next with 16 literate females per 10,000 and the North-West Dry Area is the last with only 4 females literate in Englisk per 10,000 of population.


| Itteracy by Oittes and Towns． | 148．Th |  | The marginal table sho |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Oty or Town． |  | Literasti per mille． |  |
|  |  |  | Males． | Females， |
|  | Ambals | $\cdots$ | 276 | 62 |
|  | forozepore | $\cdots$ | 248 | 78 |
|  | Lahore | － | 244 | 97 |
|  | Sialmot | － | 234 | 69 |
|  | Jullander | ． | 223 | 68 |
|  | Delhi | ． | 208 | 49 |
|  | Rowalpinil | － | 109 | 87 |
|  | Amritsar | $\cdots$ | 158 | 18 |
|  | Mutien | ． | 114 | 31 | and selected towns．As compared with 66 literate males and 8 literate females in the province as a whole，the 8 cities and selected towns of the Punjab provide us with 213 literate males and 64 literate females per mille and this is an indication of the greater extent of literacy which obtains in urban as compared with rural areas．The reasons for this need no elabora－ tion．

Luteraey by 149．The marginal table gives the number of literates by religion and sex Boliglons．

| Religion． | 181. |  | 1021 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 㟺 | 安 | 雨 | 㤟 |
| All religions | 63 | 8 | 74 | 9 |
| Findus | 95 | 7 | 113 | 18 |
| Silche | 94 | 12 | 93 | 13 |
| Jaina． | 464 | 24 | 508 | 47 |
| Musalmans | 27 | 2 | 37 |  |
| Chriatians ．．． | 235 | 125 | 140 | 83 | per mille at the Censuses of 1911 and 1921. Hindu，Musalman，and Jain religions show an increase in literacy both male and female，while a decrease is exhibited by the Christian religion：Sikhs have remained almost exactly in the same state of literacy as they were in 1911．The decrease of literacy among Christians is undoubtedly due to the inclusion among their number of a large proportion of converted low－caste Hindus and Musalmans． The greatest relative advance is that made by the Musalman community，but it is still very backward in education，and will have to make up a great deal of leeway before it approaches the standard of literacy among Hindus．The educa－ tional stagnation of the Sikhs is possibly due to a real increase in literacy com－ bined with a diminution arising from the conversion of the comparatively illi－ terate Mazhabi to the ranks of Sikhism．However this may be，the fact remains that Sikhs，who were equal to Hindus in literacy in 1911，have now fallen some way behind them．Another factor in the situation is possibly the fact that a knowledge of Gurmukhi is not a key to any Government appointment in the same way as the Urdu language is，and this may to some extent explain the grow－ ing neglect of the national langaage of the Sikhs．From among Christians，Euro－ peans are almost universally literate，the numbers being 905 per mille for males and 933 per mille for females，for ages 5 and over，while among Indian Christians the corresponding numbers are only 46 and 34 per mille．Among the religious communities which only supply a very small fraction to the total population of the province，namely，the Parsi，the Jew and the Buddhist，a very high standard of literacy prevails．Parsis have 723 literate males per mille，and 746 literate females per mille．Jews have 273 males and 286 females per mille，and Buddhists 206 literate males and 18 literate females per mille．The 3 communities，the European Christian，Parsi and Jewish differ from all the other religious communi－ ties of the province in possessing a greater proportion of literate females than literate males．

Efteot of the propor－ lans of Hindus and Musalmans in the total popalation on the liter－ acy of each sommunity．

150．A very striking relationship between the percentage of Hindus in the various districts of the province and the percentage of literacy among Hindus may be noticed．＊The association is this：As the percentage of Hindus in the total population diminishes in going from one district to another so the percentage of literacy among Hindus increases，although the increase of literacy does not bear a linear relationship to the diminution of the percentage of Hindus in the total population．Thus in every district in which the percentage of Hindus lies between 60 and 100 the percentage of literacy is about 5 or 6 ；but in districts with less than 10 per cent．of Hindus the percentage of literacy among Hindus is over 25 per cent．

The most probable explanation of this，suggested by Sheikh Abdul Majid， my Personal Assistant，is that in those districts in which there is a large propor－ tion of Hindus，most of them will be found to be engaged in agriculture，whereas in the districts with relatively few Hindus most of them will be engaged in trades or professions．For Musalmans a similar relationship obtains，that is to say， the proportion of literate Musalmans is greater in those districts where there
are few of them than in districts where there are relatively more Musalmans: but the percentage of literacy among Musalmans does not rise above 10, even in those districts where there are less than 5 per cent. of Musalmans. Considerations of time and economy prevent the reproduction of the very interesting diagrams which illustrate the foregoing argument.
151. The absolute figures of literacy by caste are given in Imperial Table utaracy by IX, while the proportions per 1,000 of literates, and per 10,000 for literates in castes. English are given in Subsidiary Table VI for 1911 and 1921. Imperial Table IX is particularly useful because it differentiates Hindus, Sikhs, Musalmans and Jains in each caste ; the absence of this differentiation in some of the caste tables is a fruitful source of errors of interpretation, as there are so few castes, especially among predominantly Hindu and Sikh castes, which do not contain a large proportion of persons belonging to other religious communities.*

The castes which show the highest proportion of literates are shown in the

| Conte, | 1921. | 1011. | Caste. | 1921. | 1011. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Khatr | 231 | 250 |  | 87 | 74 |
| Aggerwal | 208 | 212 |  | 82 | 80 |
| Arore | 172 | 210 |  | 57 | 58 |
| Brahman | 122 |  |  | 87 | 53 |
| Bayad | 97 |  |  | 63 | 49 |
| Qurcahi | 92 | 77 |  |  |  | margin. It will be noticed, that there has not been much change in the relative position of the castes since 1911, the predominantly Hindu castes being far superior in literacy to the Musalmans. The castes

with a proportion of less than 10 per mille of literates for 1921 are as follows:-

| Bawaria | - | 2 | Dogar | .. | 6 | Malliar |  | 6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Bharai | . | 6 | Dumna |  | 5 | Mallah |  | 5 |
| Baloch | $\therefore$ | 9 | Harni | . | 3 | Meo |  | 6 |
| Chamar | $\therefore$ | 5 | Kumbar | . | 5 | Mochi |  | 6 |
| Ohuhra | . . | 2 | Machhi | . | 4 | Mussalli |  | 1 |
| Dagi and Koli | . | 5 | Mahtam | . | 4 | Teli |  | 1 |
| Dhanak | $\cdots$ | 2 | Mali |  | 6 |  |  |  |

These castes are nearly all low in the social scale, and are engaged in menial occupations or crime. The castes which show a relatively large proportion of female literates are the Khatri (60), Arora (29), Sheikh (25), Sayad (23) and Qureshi (22).
152. The figures of literacy by occupation for the Censuses of 1891, 1911 Luteracy by and 1921 are given in the table noted belowoccupations.

Numagr of herprates per 1,000 .

| Sorial No. | Censte. | 1891 | 1011 | 1821 | Serial No. | Casto, | 1891 | 1911 | 1921 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| I | AORTOULSUR | 14 |  |  |  |  |  |  |  |
| 1 | Arain * $\quad$ - | 7 | 11 | 17 | $v$ | Arrigans ${ }^{\text {Chhimbs }}$ | 20 | 28 | 28 |
| 2 | Awan .. .. | 14 | 13 | 20 | 2 | Kashmiri | 19 | 28 | 33 |
| 3 | Ghirath .. | 8 | 11 | 10 | 3 | Lohar $\quad \cdots$ | 17 | 34 | 39 |
| 4 | Jat | 13 | 17 | 18 | 3 | Nai | 11 | 14 | 17 |
| 5 | Kamboh * .. | 12 | 16 | 16 | 5 | - Sanar | 10 | 13 | 16 |
| 0 | Lsbana ${ }^{\text {M }}$ | 10 | 23 | 80 | 6 | Tarkhan | 76 | 80 | 82 |
| 7 | Moghal . | 30 | 48 | 80 | VI | Carkhan ${ }^{\text {Crminal }}$ - | 15 | 23 | - 23 |
| 8 | Pathan ** | 41 | 53 | 67 |  | Bawsia | $\varepsilon$ | 8 | 3 |
| 0 | Rejput $\quad \because \quad$ | 12 | 26 | 33 | 2 | Bawria - . | 2 | - 4 | . 2 |
| 10 | Baini $\quad \therefore$ :- | 16 | 28 | -35 | 3 | Prami ... | 2 | 3 | - 3 |
| 11 | Paymes And Duvorim | 97 | 107 | 117 |  | Pbinhwara |  | 3 | 17 |
| 1 | Brahman . | 102 | 118 | 122 | 1 | Barwals - | 7 | 10 | 18 |
| ${ }^{2}$ | Bayad | 71 | 88 | 07 | 2 | Bharwals .. | 5 | 7 | 11 |
| IIV | IIdMTERA (MAIKAM) - . | 4 | 8 | 4 | 3 | Jhiwar - " | 2 | 4 | 6 |
| IV | Tradzas .. | 178 | 191 | 177 | 4 | Jogi-Rawsl .. | 8 | 11 | 12 |
| 1 | Arors | 203 | 210 | 172 |  | Jogr-Raws . ' | 17 | 24 | 43 |
| 2 3 | $\begin{array}{lll}\text { Khatri } & \text { Ehoikh } & \text {. }\end{array}$ | 218 | 280 | 231 |  |  |  |  | 4 |

made by agriculturists; artisans come next.

## Section 11 --Literacy and the Statistics of the Education Department.

153. A boy or girl at school, even when literate, is only potentially important: so the value of any system of education is to be tested by the efficiency of adult Litor-

- Among sithe practionlly the oniy important coute which is composed alment
 lom the canto on the ground that they aro really Dhiman Brahosens. The matter been claiming to be emoluded
the adult members of the Community. If, therefore, literacy in the census meaning of the word and social efficiency are correlative, the Punjab has bettered itself but slightly during the last decade. In 1911 from among $7,038,795$ males over the age of 20 in the Punjab and Delhi 665,453 were literate. In 1921 out of 7,308,792 males over 20 in the Punjab and Delhi 705,683 were literate. Thus literacy among adult males rose from 9.45 to 9.65 per cent. during the decade. The difference between these two figures, 0.20 per cent., is less than twice the probable error of the difference, namely, $0 \cdot 135$,* so that however much we may expect adult literacy to have increased in the 10 years between 1911 and 1921, we are not justified in concluding that it has done so, except for reasons other than those based on the census returns. $\dagger$


## Llteracy

 in Sohools and extra Soholastlo Literacy.154. It is desirable to examine the figures for literacy in schools, both in order to determine the extent of extra-scholastic literacy, and also with a view to estimating the likelihood of the extension of literacy in the Province and of the proportion of adult literates which is likely to result in future years from a given yearly outturn of literate scholars by the Education Department. ${ }_{+}$Though there is not complete unanimity, the consensus of opinion in the Department is in favour of treating one-third of the 4th Primary and all of the 5th Primary classes in 1911 as literate ; while in 1921, when the old 5th class had ceased to be a Primary class, two-thirds of the 4th Primary class are to be regarded as literate. We obtain then the following estimate of the number of literate persons (males and females) in Departmental Schools.


Thus while extra-scholastic literates below 20 have decreased by 19,000


Total Males over 20 for the Punjab and Delhi.

| Punjab | . | $7,038,795$ | $7,144,124$ <br> Delhi |
| :--- | :--- | :--- | :--- |
| Total | $\cdot \cdot$ | 7,068 |  | persons, consequent on the closing down of many private educational institutions during the decade, there has been a very slight increase in the numbers of extra-scholastic literates of all ages. The resulto suggest that the efforts of the Department of Education to increase the literacy of the Province have been almost completely nullified by the diminution in private educational enterprise. It is not surprising, therefore, to find that "effective" male literacy, which we may regard as a touchstone of the utilitarian value of education has advanced only from 9.45 to 9.65 per cent. for the whole of the Punjab and Delhi. The relevant figures are noted in the margin.

The num. bers required enter their 20th year of age each yout of a population of $2,122,761$ males, 41,738 we find that out of $11,306,265$ males in British Territory in 1921, 222,305 males will attain their 20 th birth-day each year.

[^39]This is equivalent, in a "stationary " population, to saying that 222,305 males over the age of 20 die each vear. Now the proportion of literate males over 20 to the total number of males over 20 is for British Territory, 1 to $10 \cdot 311$, so that assuming there is no differential death-rate adverse or favourable to literate males as contrasted with illiterate males, the number of literate males over 20 who die each year is 21,560 .

Roughly speaking then, British Territory in the Punjab will require 22,000 literate males of the age of 20 to be turned out each year, in order to maintain the present standard of 9.7 per cent. of male literates over the age of 20 .

In order to maintain a standard of 20 per cent. of literates among males over twenty years of age, it would be necessary to turn out about 45 thousand literate males each year. As the Education Department actually produces 47,000* literate males each year, it would, if its efforts are maintained pro rata with the increase in population, $\dagger$ secure the eventual attainment of 20 per cent. of male literacy in British Territory in the Province, provided that relapses into illiteracy are not too common. As some-educational authorities admit, there is a great proportion of boys who have passed through the primary schools, who are scarcely literate at the moment of their leaving school ; these must relapse into illiteracy in a very short time. Some quotations from the admirable "Report on the Progress of Education in the Punjab during the Quinquennium ending 1921-22" may be permitted. The Inspector of Schools, Ambala Division, writes-
"The boy that passes out of the present day Primary school can hardly be termed literate. He is not even able to carry on correspondence with ease. The parent in the village finds that his boy has gained no accomplishment worth having as a result of four years' or even longer stay at school."
Sardar Bishen Singh writes-
"The existing curriculum, overburdened as it is,...... This coupled with the four class school, has made the boy more liable to relapse into illiteracy."

It seems probable, therefore, that even when the Department is in a position to turn out 60,000 literate boys per annum, the percentage of relapse will always be high. In the argument that follows we will assume that the Education Department is only able to produce 50,000 males of the age of 20 who will be permanently literate.
156. It is perhaps

|  | Burvival rato. | Survivols. |
| :---: | :---: | :---: |
| 1921 | 0790 | 30,700 |
| 1822 | $0 \times 818$ | 40,700 |
| 1023 | 0.835 | 11,700 |
| 1024 | 0885 | 42,800 |
| 1028 | 08877 | 43,800 |
| 1020 | 0.888 | 4,800 |
| 1827 | 0.018 | 45,900 |
| 1928 | 0.839 | 48,900 |
| 1029 | 0.888 | 47,800 |
| 1930 | $0 \cdot 880$ | 49,000 |
|  |  | 443,300 |

worth while to hazard an estimate of the increase
Specalative in literacy among males over 20 in British male littracy Territory, on the assumption of the production in Erifish of 50,000 stably literate males annually during Territory darthe next decade. The figures in the margin cado 1981-81. show the numbers of the literate males of 20 years of age produced year by year who will be alive in 1931.

To this number 443,300, have to be added the survivors in 1931 of the existing male literates of 20 years age and over; these now number 566,323. Adopting the figures of Life Table $P$ we find that a proportion of 0.656 of them will be alive in 1931. This gives 371,508 survivors of males who were literate prior to 1921, and the total number of male literates over 20 in British Territory will be constituted as follows:-

Survivors in 1931 of male literates over 20 in 1921 .. 371,508
Literates produced during the decade 1921-1930 and alive in 1931.
Total .. 814,808

Assuming an increase of population at the rate of 5.5 per cent. during the decade the number of males above 20 in 1931 will be $6,161,000$, so that

[^40]the percentage of male literacy for males over 20 years of age in British Territory will be then 13.2 per cent., as compared with a figure of 9.7 per cent. in 1921.

Too many assumptions are involved to make this prediction of any great certainty, but it does at least afford guidance as to the probable increase of literacy during the next decade consequent on a given educational policy. In particular, if in future years there are less than the assumed annual number of relapses into illiteracy of 10,000 per annum, or a greater outturn of initially literate persons the resultant literacy at the Census of 1931 will be in excess of the 13.2 per cent. calculated above, and vice versa.*
157. I close the chapter by giving two diagrams, which illustrate the growth of the number of scholars and in the expenditure of the Education Department during the last 20 years. Before attempting to discuss the relative increase of expenditure and of the number of scholars, it would be necessary to correct the former figures for the change in the purchasing power of the rupee, and thus the enguiry would lead us too far afield to be pursucd any further here. Mention may however be made of the calculation by the present writer of an index number of prices bascd on the Lahore wholesale prices of 24 leading commoditics which shows that prices have increased from 100 in the year 1910-14 to 202 in 1921 . Since then there has been a marked fall in prices, but even so, more must not be expected from an expenditure of three rupees at the present time than from two rupees before the war. While therefore expenditure on Education expressed in rupees has trebled in the 10 years 1910-11 to 1920-21, the effective expenditure expressed in purchasing power is now probably only about double what it was 10 years ago. Progress during the next decade will indicate to what extent the community is getting a return for its increasing outlay. .

[^41]CHAPTER FIII.


chapter vin.
GUBBIDIARY TABLER.


Nonk-The figures in thin table are for persons of 5 yenrs of age and over only.

OHAPMER VHI
AUBSIDIABT TABLEA.

ogapres 7.


[^42]

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# CHAPTER IX. 

## Language.


#### Abstract

159. Posference to Etatisticy. 159. Ascura'y of the returas 185. Genyral Dietribution of languares 151. Anem. Burmeso grouk 162. Tibeto-Himalayan Branch (Tibetan aroup). 163. Pronominalised Himalasan croup (Weekrn eub-group). 164. The Dravadian family. 165. Eranian branch. 166. Non-Sanskritic mb-branch. (Kwhmiri). 107. Labat ia 168. Sindhi. 109. Marahti 170. Easterp froup 171. Western Hindi. 172. Hindontani. 173. Urdu. 174. Other Hindi. 175. Rajasthani. 178. Gujrati. 177. Puajabi. 178. Standard Puajabi. 179. Dogri. 180. Western Pahari. 181. Simla gruap. 182 Kulu group. 183 Mandi croup. 134. Chambs group. 185. Central Pahari (Garhwali). 180. Eastern Paiari (Naipali). 187. Gypay  101. Tho inflasnoc of Education on local dialcets. 102. Literary achivity in different languagea


158. The statistics of language are given in Imperial Table $X$, where they Refrence are grouped under three main headings, viz., the Vernaculars of India, Vernacu-to statsties lars of other Asiatic Countries, and European Languages. In this chapter the figures will be discussed according to the scheme of classification drawn up by Sir G. A. Grierson, and prescribed by the Census Commissioner: At the end of this chapter will be found the subsidiary tables showing- -
(I) the distribution of the total population by languages,
(II) the distribution of important languages of the provinces by natural divisions, districts and States, and
(III) the number of books published annually in each language.
159. The instructions issued at this census with respect to the entry of icouracy language, were the same as in 1911. The enumerators were required to enter of the returnsthe language ordinarily used by each person in his home. The rule was fully explained to the enumerators, with the result that registration of dialects in place of main languages was generally avoided. The few entries refating to dialects made in the enumeration books inspite of the precautions taken, were classified in the compilation office on the method detailed on the title page to Table $\mathbf{X}$. The statistics must be taken as fairly accurate, as no vitiating tende ney was noticed at the time of preliminary or final ennmeration. Only in the case of aboriginal tribes, whose special languages were described by their caste names in 1911, the figures appear to be somewhat unreliable. 2,521 persons have recorded their language by caste names as against. 12,136 in. 1911. Table XIII (caste) shows that members of aboriginal tribes such as Bawaria, Sansi, Od, etc., are still found in large numbers in many districts of the Punjab, and there is no reason to believe that they have lost or abandoned their special languages. The ouly reason seems to be that the enumerators have not been able to discriminate between them and Punjabi (the difference in vocabulary being very slight).
160. Statistics of the distribution of the main language classified according to Sir G. A. Grierson's scheme are exhibited in Subsidiary Table I. The Distributlon vernaculars of the provinces belong to one or other of the 2 linguistic families, vis., the Tibeto-Chinese and the Indo-European with a sprinkling of unclassed languages. The languages of the Tibeto-Chinese family were returned by about 38,000 persons, or 2 per mille of the population in both the provinces. The languages of the Indo-European family are spoken throughout the provinces, nearly $25,514,000$ persons (or 997 per mille in the Punjab and 990 in Delhi) having returned languages belonging to this head. The languages classed under the head "Indo-European family," helong chiefly to the Sanskritic subbranch of the Indian branch of the Aryan sub-family, the number of the speakers of the Eastern group of the Eranian branch, Aryan sub-family, and of the nonSanskritic language being 4 per mille and less than 1 per mille of the population, respectively. 2,521 persons in the Punjab speak unclassed languages of India, and Persian and English belonging to the Eranian and Teutonic groups of the -Indo-European family, are spoken by 1,686 and 31,443 persons respectively in both the provinces. Persons speaking languages of the Dravadian family. number 2,206 in the Punjab and 437 in Delhi while 6 persons were registered as speaking the Malaya language of the Malayo-polynesian family, in Rawalpindi (1), Patiala (2) and Delhi (3). A majority of the people speak languages of the Western group (Sanskritic sub-branch of Aryan sub-family) which isrep resented by Punjabi, Western Hindi, Rajasthani, and Western Pahari

The Punjabi is spoken by 60.6 per cent. of the population of the Punjab, and Western Pahari which belongs to the same sub-branch is the language of 4.4 per cent. of the population. Western Hindi, which comprises Urdu, Hindostani, and other Hindi dialects used in the Eastern districts of the Punjab and Delhi, is spoken by 14.2 and 94.1 per cent., and Rajasthani by 2.8 and 2.3 per cent. of the population in the Punjab and Delhi provinces respectively.

## Tibeto-Chincse Family.

The Tibeto-Chinese family comprises the Tibeto-Burman languages, which are further divided into Tibeto-Himalayan languages (e. g., Tibetan, Bhotia, Balti, Ladakhi belonging to the Tibetan group and Kanauri, Lahuli, Malani falling

| Languige | Panjab. | Delhi, |
| :---: | :---: | :---: |
| Tmitan orotr, |  |  |
| Tibetan .. .. | 5,074 |  |
| Bhotia (otherr) .. . .. | 3,994 | - |
| Balti * .. ** | 10 | * |
| Ladakhi | 128 | * |
| Total .. | - 0,200 |  |
| Provontrarised Hphamayas GROUP. |  |  |
| Kanaur $\quad . \quad$.. | 29,098 | * |
| Labult | 0,578 | $\because$ |
| Malani | 306 | - |
| - Total .. | - 20,072 | .. | under the Western sub-group of the Pronominalised Himalayan group) and Assami-Burmese languages, such as Assamese and Burmese. The speakers of the languages of this family now aggregate

38,378 as against 41,615 in 1911. The figures
Himalayan group are noted in the margin. The figures against. Bhotia (others) include 2,888 persons, who returned their language as Bhotani. All these persons were enumerated in the Kangra district, where the Bhotia spoken, closely resembles the Tibetan language: so these figures have been shown under the Tibetan group.
 be the Ilbeto-Chinese family which can be classed under the Tibeto-Burman subfamily are spoken by 203 immigrants enumerated in the places named in the margin.
162. This branch is divided into two groups of which the first is the Tibetan group, which includes the Tibetan and Bhotia. The pure Tibetan was returned chiefly from Simla, Kangra, Gurdaspur, Keonthal, Mandi, Patiala, and Bashalir.
The Bliotia was registered in Kangra. The figures of Bhotia also include Balti, Bhotani, and those entries of Bhotia in which there was no specification of the country, and in which caste or tribe of the speakers did not admit of any definite classification.
Pronominal- 163. All the languages of this group that appear in the returns belong ssod Himala- to the Western group,i. e., Kanauri, Lahuli, and Malani. Kanauri is the language yan group Wab of Kanets in the Bashahr State, while Lahuli and Malani is confined to Lahul, group). a tract of the Kangra district. Lahuli was classified at the last census under the Tibetan group as distinguished from Chamba Lahuli; but the characteristics of both the languages being the same, no attempt has been made at the recent census to separate them.
The Drave- 164. The Dravadian languages include Kanarese, Tamil, Telugu, Madclan samily. rasi, and Malayalam. Tamil is the language of 2,314 immigrants of whom 1,923 were cnumerated in the Punjab and 391 in Delhi. In the former province the Lahore district alone contributes 1,310 immigrants speaking Tamil. Telugu was returned by 264 persons in the Punjab and 46 in Delhi:; while Malayalam is represented by 27 persons found in Ambala and Patiala.

## Indo-European Family, Aryan Sub-Family.

165. The only Ianguages belonging to the Eranian branch (Eastern group)

## Eratian

branoh. of the Aryan sub-family are Balochi and Pashto.
(a) Balochi.-Balochi or the language of the Baloch nation was returned by 56,013 persons in the Dera Ghazi Khan district andeso in the Babawalpur State out of 57,145 persons registered in the Punjab as speaking this language. The number of speakers is 13,530 less than in 1911, though the strength
of Balochs by caste has fallen only from 532,499 to 532,148 during the last ten years. This shows that Balochs are giving up their tribal language and prefer to epeak the dialects prevalent in those parts of the Punjab where they reside. The decrease of 12,908 in Dera Ghaii Khan among the Balochi-speaking population seems to be due to the general causes discussed in Chapters I and IV, which have affected the population of that district.
(b) Pasheo.-Pashto is the language of Afghanistan. In the Punjab it is spoken by Pathan settlers in the border districts of Attock and Mianwali. In Attock the Chhachi tract close to the border of Hazara and Mianwali, and the part of the district which lies west of the Indus is inhabited by these Pathans. The different entries found in the enumeration books and classified as Pashto are Pashto (59,494), Afghani (171), Chhachi (32), Kabli (1), and Pathani (5). The namber returned in both the provinces under this head is 59,703 as against 67,174 in 1911. The increase in the Mianwali district from 15,191 to 19,290 speakers is more than counterbalanced by the decreases, occurring in the Attock district and districts of the Lahore Division.
166. The only language belonging to the non-sanskritic sub-branch of the Indian branch of the Aryan sub-family spoken in the provinces is Kashmiri. The branes number of persons spealing this language was 8,523 in 1901 and 7,190 in 1911 ; (Kanhmin). but has now fallen to 4,690 , a fact which shows that Kashminis who have settled ${ }^{*}$ in these provinces have adopted the Punjabi language of their neighbours. This is amply proved if we compare the strength of Kashmiris returned in the caste Table XIII with that shown by the language table. Kashmiri now appears in the return as the language of 4,690 persons though Kashmiris themselves have a strength of 169,701 ; in other words only about 3 out of every 100 Kashmiris

Erala
Kanpre
Lahore
Amritas
Siurdarpur
Hawalpindi Gojranwala Chambe

- 740

| 1. | 451 |
| :--- | :--- |
| . | 647 |

$\begin{array}{ll}. & 647 \\ .-\quad 667\end{array}$

| . | 667 |
| :--- | :--- |
| $\because$ | 485 |
| . | 710 |

$\because 710$ during the immiants who usually rush to the Punjab
$\because 263$ during the winter and earn their living generally by
$\because 300$ cutting wood.

## Horth-Western Group.

167. Lahnda is the name given by Sir George A. Grierson to the language of the Western Punjab. It is difficult to draw any distinguishing line between Lahnda and Punjabi spoken in the Central and Eastern Punjab as it emerges into Lahnda very gradually. In the words of Sir George A. Grierson we may take a conventional line running north and south through the Eastern Central Punjab and call everything to the east of it Punjabi, and everything to the west of it Lahnda, but it must be understood that the change from one language to the other is so gradual that many typical Lahnda peculiarities will be found on the east of the line and many typical Punjabi peculiarities on the west. The conventional line adopted by Sir G. A. Grierson, is illustrated by the map on page 353 of the Punjab Census Report of 1911 and needs no further renarks. The various names under which Lahnda has been registered in different parts of the province are Lahnda (904,098), Dhanni (25), Dhanauchi (103), Jatki (631,914), Jhelumi (7), Kachhri (2), Multani (2,342,954), Peshawari (70), Pothowari (423,802), Thalochari (494), and Ubhechi (2). These names represent sub-dialects of Lahnda, which according to Sir G. A. Grierson, has 3 main dialects, viz., Southern or Standard, North-Eastern, and NorthWestern.

The form of Lahnda which has been designed as the Standard is that spoken in the Doab of the district of Shahpur. It has three sub-dialects, the Standard proper, Multani, and Thali or Thalochari. The Standard proper is spoken in the Shahpur, Jhang, Lyallpur, Montgomery, Gujranwala and Gujrat districts, and the different names by which it goes are Jatki (in Jhang and Lyallpur), and Kachhri (in Kachhi or alluvial portion of the Jhang district). Multani is spoken in the districts of Multan, Muzsfiargarh, Ders Ghazi Khan and in the Bahawalpur State. Multani differs from the Standard of the Shahpur Doab in pronunciation. Thal or Thalochari is found in the districts of Mianwali, Jhelum Shahpur, Jhang, and the north of Muzaflargarh.

North.
Weatera Dialoat.
in The home of North-Eastern Dialect of Lahnda is the Pothowar plain in the Punjab, which consists of the eastern part of the district of Jhelum and the plains portion of the district of Rawalpindi. It is designated by several names based on the tribes using it. The form spoken in the Pothowar is known as Pothowari, and that used in Jhelum as Jhelumi. In the district of Attock it is called Awankari, and across the Indus as Peshawari or Hindko. exte North-Western Dialect beginning in the middle of the Salt Range extends in the Punjab northwards through Western Jhelum into the eastern part of the Attock district. In the Jhelum district it is known as Dhanni.

Lahnda is spoken now by altogether 4,303,479 persons, of whom $3,682,856$ are residents of the Multan and Rawalpindi Divisions. In these divisions it is the language of nearly 50 per cent. of the population and the number of its speakers -has fallen by $0 \cdot 11$ per cent. during the last ten years which is about 7 per cent. less than the rate of increase of the general population. The loss in percentage is due to the influx of large numbers of immigrants from the Central Punjab to the new colonies of Montgomery, Multan, Shahpur and Lyallpur.

- Ginatl. 168. Sindhi as its name shows is the language of the province of Sindh but it extends beyond the borders of Sindh into the south-western corner of the Punjab. It is closely connected with Lahnda, and in the Southern Lahnda
- Dialect, Sindhi pronunciation is usually followed. The largest figures were returned from Bahawalpur ( 16,732 ) where Sindhi is indigenous, and Lahore $(1,162)$ and Multan (350) which receive immigrants from Sindh on account of their being big trading centres.


## Southern Group.

Martatl.
169. 1,511 persons were enumerated in both the provinces as speaking Marhati as against 815 in 1911. The majority of Marhati speakers was returned from Lahore division, which comprises important trading centres like that of Amritsar and Lahore. The different names employed to denote this language in the census returns were Dakhni and Konkani.

## Eastern Grcup.

170. Oriya is returned for 3 persons in the Punjab who were found in abala district, and for 1,177 persons in Delhi. The large number returned as speaking Oriya in the Delhi province is made up of immigrants from other provinces to Delhi on account of its now being a seat of the Government of India.
Bengall - Bengali is spoken by 4,852 persons in the Punjab and Delhi provinces, a 'large increase over the figures of the previous census. The increase is contributed mainly by Delhi 2,037 persons and by Lahore 680 persons, and the reason lies in the increased facilities offered by these places to immigrants for employment as clerks.

## Western Group.

171. The languages grouped under this head are Western Hindi, Rajas- thani, Gujrati, Punjabi, and Western Pabari. Western Hindi, which includes Hindostani, Urdu, and other Hindi dialects, are spoken by 4,020,473 persons of whom 3,560,863 were enumerated in the Punjab. In both the provinces it is the language of 157 per mille of the population and the number of its speakers has risen by 5.07 per cent. during the last ten years, which is nearly equal to the rate of increase of the general population of the provinces.
172. The three principal dialects of Western Hindi differ from one another very little in vocabulary and expression, and hence it is very difficult to define them properly. Hindostani literally means the language of Hindos-

- tan, but in the linguistic survey it is the name given to the dialect whose home is the Upper Gangetic Doab in the country round Karnal, Ambala, and Delhi, but which is commonly used as the lingua franca of India. It is capable of being written in both the Persian and Dev Nagri characters, and the excessive
use of Persian and Sanskrit words is generally avoided when it is used for litera-

| Dintrict. | Hrnoostasr. |  | Urdo. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | 1011 | 1921 | 1911 | 1921 |
| Hisale . | 1,070 | 183 | 7,585 | 14,840 |
| Gurgeon.. | 0,521 |  | 81,938 | 174,960 |
| Dolhi .. | '320,835 | 104,180 | 161,427 | 309,020 |
| Karnal .. | 742,500 | 488,765 | 18,979 | 325,397 |
| Ambala .. | 435,080 | 2 | 2,568 | 407,560 | ture. It now appears as the speech of 624,410 persons or 92,889 less than in 1911. The decrease in the number of Hindostani peakers has occurred on account of the large number of persons having given their language as Urdu in the districts, - noted in the margin where it is supposed to be the spoken

## language of the masses.

173. Urdu, according to Sir George A. Grierson, is that form of Hindos- Urdu. $\operatorname{tani}$ in whose vocabulary Persian words (including Arabic) are of frequent occurrence, and can, therefore, only be written in the Persian character. The name is said to be derived from the Urdu-i-Muallah or Royal Military Bazar outside the Delhi Palace. Urdu has been returned at this census as the mother tongue of $1,610,070$ persons ( $1,301,051$ in the Punjab and 309,020 in Delhi) which shows a large increase over the figures $(494,290)$ of 1911 . The local distribution of Urdu is indicated by the map printed below. It is in fact the most. widely spoken

Dlagram 58.

of all the dialects of Western Hindi, being the speech of 52 and 633 per mille of the population in the Punjab and Delhi provinces respectively. There is not a single district or State where its speakers have not been registered. The increase in the strength of the Urdu-speaking population has been more or less general. throughout the provinces. The districts and States showing notable increases

| Dintriot and Stata. | 1091 | 1911 |
| :---: | :---: | :---: |
| Hievar | 14,840 | 7,585 |
| Robtak | 109,217 | 70,751 |
| Gurgann | 174.060 | 61,938 |
| Knrmal | \$25,307 | 18,989 |
| Ambala | 407,560 | 2,668 |
| Furuzupore | 12,760 | 8,421 |
| Mcontgomery | 4,273 | 2802 |
| Mutian | 4,984 | 188 |
| Nahan | 8,345 | 3,627 |
| Patiala | 22,711 | 0,383 |
| Delhi | 300,020 | 101,427 | in Urdu are given in the margin. The general increase has resulted chiefly from the distinguishing line between the two dialects Hindostani and Urdu becoming indeterminate in the course of years. Modern Urdu is less Persianised than it was somé 30 or 40 years back; and can claim to fulfil the requirements of a ligua franca capable of being understood over the whole of the Delhi Province and a great part of the Punjab. In proof of the above fact the reader is referred to the writings of K. B. Sheikh Abdul Qadir and the late Maulvi Nazir Ahmad which are remarkably free from:

Arabic and Persian expressions. The other cause of this increase is found in the Urdu-Hindi-Punjabi controversy observed in 1911 which resulted in all Musalmans returning their language as Urdu, instead of Hindostani, as distinguished from Hindi, a word adopted by Hindus for denoting Hindostani spoken by them. The publication of Urdu books and newspapers has also influenced the Urdu figures to some extent. One may conclude that the strength of partisan sentiment, and the small linguistic difference between Urdu and Hindostani are largely responsible for the violent fluctuations from census to census of the recorded numbers of Urdu speaking persons; here if everywhere a decision must be reached not by the mere counting of heads but by the refined methods of analysis of ethnographic and linguistic scholarship.

The statement drawn up in the margin shows the districts and States

| District or Btate. |  | Docrease. |
| :---: | :---: | :---: |
| Simls |  | 1,332 |
| Lahore | . | 2,386 |
| Amritanar | .. | 2,600 |
| Sialkot | . | 2,694 |
| Rawalpindi | . | 13,756 |
| Pataudi | . | 16,636 |
| Malerkotla | . | 1,495 |
| Faridkot |  | 1,453 |
| Nabha |  | 6,113 |
|  | 1911 | 1821 |
| Urdu | .. 7,320 | 1,213 |
| Hindi | -. 68,819 | 75,258 | in which important decreases have taken place during the past decade in Urdu figures. The decrease in Lahore and Pataudi seems to be due to the proper care exercised in the filling in of Language column of the schedule, because these two places were specially noted in 1911 for the inaccuracy, so far as the registration of Urdu was concerned. In Rawalpindi the decrease is due to the replacement of Urdu by Hindostani for causes unknown to the writer. In 1911 one person was returned as speaking Hindostani and 16,452 persons as speaking Urdu, while the present figures show 11,574 speaking Hindostani and 2,696 Urdu. In Nabha State where Musalmans are in minority, the decrease appears - to be the natural result of Urdu, Hindi and Tinjabi controversy, the name Hindi having been substituted for Urdu as the figures quoted in the margin will show. The other decreases do not require any special explanation.

$0: 3$ Mind.
174. The entries classified under this head are Ahirwal, Ahirwati, Arya Bháshá, Bangar, Bangaru, Bhasha, Bhojwali, Brigashi, Brij Bháshá, Brijki, Deswali, Dev Nágri, Hariani, Hindi, Hirwai, Jati, Khadri, Nagri, Purbi, Ráná, Bhâshá, Shástri, Shuáwati. Hindi pure can be called that form of Hindostan which contains Sanskrit words and hence can only be written in Dev Nagri charac ters. The chief dialects of Hindi spoken in these provinces are Jati, Deswali, Bangri, Ahirwati, Hariani, and Purbi. The first five names represent the dialect spoken in the Bangar and Kadher tracts which is designated by various names according to locality and caste of the speakers. The tract on the west bank of the river Jumna in the districts of Karnal and Delhi is described in the linguistic survey as Khadir, while the Bangar tract extends right across the Karnal district into the State of Patiala and includes portion of Jind, Rohtak, and Gurgaon districts. Purbi was registered in almost every district or State, and is the dialect of immigrants from the United Provinces. • The gain of 7,116 since 1911 in the Hindi-speaking population is due to the causes discussed under Urdu.

Rajastbani. 175. Rajasthani or the language of Rajputana has been returned by 713,761 persons ( 702,996 in the Punjab and 10,765 in Delhi) as against 725,850. in 1911. Its important dialects are Bagri, Marwari and Mewati whose strength is given in the margin. The other entries found in

|  |  | Pumjab. | Dolhi |
| :--- | :--- | :--- | :--- |
|  |  |  |  | the sorters' tickets and classified under Rajasthani are detailed on the title page to Table X. Of these three main dialects Bagri and Mewati are the only indigenous languages of the provinces. The districts where Bagri is mostly used are Hissar (185,732), Gurgaon ( 60,278 ), Ferozepore ( 44,615 ), Loharu ( 20,232 ), Patiala (138,494), and Jind (2,567). Mewati is the spoken language of the Gurgaon district. Marwari is the language of Marwari immigrants or their descendants. In Delhi alone which is the chief trading centre it is returned for 9,274 persons. In Bahawalpar the figures 23,908 under this head are open to doubt and probably refer to Bagri.

176. Gujrati which is not a vernacular of the province appears in the carati.
 177. Punjabi is the dominant language of the Punjab, and it is spoken
over the greater part of the eastern half of the province with the exception of Simla Hill States and Kulu (district Kangra), where the language spoken is Pahari, and in the Ambala, Karnal, Hissar, Rohtak and Gurgaon districts where the language used is some form of Hindostani. It is now spoken by $\mathbf{1 5 , 2 1 5 , 1 2 0}$ persons ( $15,207,955$ in the Punjab and 7,165 in Delhi) or nearly by 606 and 15 per mille of the population in the Punjab and Delhi, respectively. The map printed below indicates the distribution of Punjabi language by districts and States per $10,000^{\circ}$ of the population.

Map indicating the distribution of Punjabi Lanjuage.
Diagram 54


Its strength has increased by 7.8 per cent. since 1911. The districts and

| Group. | Ditriot. | Inarone. |
| :---: | :---: | :---: |
| 1. | Hoshiarpur | 13,007 |
|  | - Julkandur | ${ }^{18,870}$ |
|  | Forozopore | 184,021 |
|  | Ampremen | ${ }^{80,889}$ |
|  | Shahpur | ${ }_{37,481}$ |
|  | Montgomory | 67,812 |
|  | Lyallipur | 64,783 |
|  | Bituppur | 4.658 |
|  | Kapurthala | 17,092 |
|  | Sind |  |
|  | Nabha | 14,809 |
| 2. | Ambsas |  |
|  | Gujrat | 78,899 |
|  |  | ${ }^{60,172}$ |
|  | (ationwali | 80,428 |
|  | Jhang | 155,174 |
|  | Nalkn | 17,788 |
|  | Nalagarb | ${ }^{26,801}$ |
|  | Ohambe | 16,034 |

States showing considerable increases are grouped in the margin: In the places in group I the increase is more or less equal to the increase in the general population during the period 1911-1921. In Ambala and Faridkot the figures appear to havebeen exaggerated at the expense of Western Hindi, whose figures show a decrease of 28,279 speakers in Ambala and 2,210 in Faridkot. The figures of Gujrat have been effected by the transfer of considerable areas from the Shahpur district. In Rawalpindi, Attock, Mianwali, Jhang and Multan, it seems that probably Punjabi has been wrongly entered in place of Lahnda. The increase in Nalagarhi is accounted for by the proper classification of the dialect knownas Nalagarhi; which is nothing but a species of Punjabi and quite different from Western Pahari. The abnormal increase in Chamba is attributable to wrong classification or mistakes at enumeration.

Important decreases have occurred in the strength of Punjabi speakers in the Kangra $(219,433)$, Sialkot $(38,408)$ and Jhelum ( 53,588 ) districts and Kalsia (11,413) and Nahan (4,755) States. In 1911 all persons in the Kangra district (except the Kulu Sub-division) were classed as speaking Dogri, a dialect of Punjabi : but at the present census no rigid geographical distinction was adopted, and the recorded number of Punjabi-speaking persons in Kangra has dropped from 7,955 per 10,000 in 1911 to 5,125 in 1921. Prior to 1911 only about 4 per cent. of persons are recorded as Punjabi speakers in the Kangra district, the remainder having been shown as speaking Pahari. The apparent decrease in Sialkot has resulted from the transfer of the major portion of Raya Tahsil to the Sheikhupura district. In Jhelum there has been a general decrease in the population, and also most of the population returned in 1911 as speaking Punjabi has been classified as Lahnda-speaking, in accordance with the Linguistic Survey. In Kalsia and Nohan States Punjabi speakers appear to have been erroneously enumerated as Hindi speakers.

Dialocts of Panjebi. Punjabi and Dogri. ing Simer is spoken in the plains of the Punjab and a portion of the neighbourof Sialkot, Gurdaspur and Chamba, which adjoin the Kangra district and Jammu State.
standard Funjab.

Doten

Westorn
Paharl.
178. The purest form of Standard Punjabi, according to Sir G. A. Grierson, is Manjha or Punjabi spoken by Jats of the Manjha, the Sikh tract of the Central Punjab north of the Sutlej. The different entrics in the census schedules designating Standard Punjabi were Punjabi $(14,795,309)$ Bilaspuri $(627)$, Kabhuri (347), Malwai (104), Gurmukhi (26), Lahori (27), Jangli (1), and Nalagarhi (1). Kahhuri or Bilaspuri was returned by 605 persons in Mandi, and by 159 in Suket, while the dialect spoken in Bilaspur itself was returned as "Punjabi": Malwai sub-dialect of Punjabi was recorded in the Ferozepore district. Bilaspuri in censuses previous to 1911 was called Pahari, but now, as has just been observed, is shown as Punjabi. Gurmukhi, which is a script and not a dialect, appears as the spoken language of 22 persons in Gujrat and of 311 in Delhi.
179. The entries classed as Dogri are noted in the margin with their

| Dogri |  | $\ldots$ | 304,450 |
| :--- | :---: | :---: | ---: |
| Jamnali | $\because$ | $\because$ | 845 |
| Kandisli | $\because$ | $\cdots$ | 21,886 |
| Kangri | $\because$ | $\cdots$ | 1,483 |
| Bhatiali | $\cdots$ | $\cdots$ | 4 | respective strength. The aggregate now returned

 $\begin{array}{ccccc}\text { Kandiali } & \because & \because & 21,898 & \text { 1911. The largest decreases have occurred in Kangra } \\ 1,483 & & \end{array}$
 classification under Western Pala already explained in para. 177, is due to the in 1911 as in 1911 as speaking Dogri. In Sialkot and Gurdaspur no differentiation seems Punjabi) been made between Punjandard Punjabi and Dogri (the two dialects of find the, and the word Punjabi was used for both these dialects: hence we ing Punjabi at the last two censuses.
180. Western Pahari, according to Sir G. A. Grierson, is the Aryan language spoken in that part of sub-Himalaya, which extends from the Jaunsar Bawartract of the district of Dehra Dun to Bhadarwah in the Northern Punjab. It is bounded on the East by Garhwali, on the North by the Tibeto-Chinese languages, on the South by Hindostani and Punjabi, and on the South-west by Dogri. Grierson holds that the speakers of Western Pahari are of mixed origin, the original inhabitants of this tract, the Khasa Gujjars, having been conquered and assimilated by Rajput immigrants from the south. Inter-marriage between Rajputs and Khasa Gujjars,and a fusion of the languages spoken by them formed the natural sequence of the invasion; and it is for this reason that Western Pahari and Rajasthani are akin.

The comparative statement in the margin shows the number of persons

| Consus. | Total. | (n) Simla Group. |  |  | $\stackrel{(d)}{\text { Chamba }}$ Group. | $\begin{gathered} (\mathrm{c}) \\ \text { Others. } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & 1021 \\ & 1011 \end{aligned}$ | $1,097,021$ <br> 003,363 | $\begin{aligned} & 427,710 \\ & 405,008 \\ & \hline \end{aligned}$ | $\begin{aligned} & 126,793 \\ & 122,070 \\ & \hline \end{aligned}$ | $\begin{aligned} & 237,934 \\ & 237,377 \\ & \hline \end{aligned}$ | $\begin{aligned} & 139,262 \\ & 136,138 \end{aligned}$ | $\begin{array}{r} 185,322 \\ 91,870 \\ \hline \end{array}$ | speaking dialects of the five groups, viz., (a) Simla Group, (b) Kulu Group, (c) Mandi Group, (d) Chamba Group, and Pahari was divided at this and the last censuses. It is now spoken by $1,097,021$ persons, or 44 per mille of the total population as against 933,363 in 1911. The figures of the present census show an increase of 115,518 or 14 per cent. excluding

the figures in group (e) over the estimated figures $(816,181)$ for 1891 given in the linguistic survey for the above four groups, while the increase in population in Nahan, Jubbal, Bhagal, Keonthal, Kulu, Mandi, Suket andChamba, where Western Pahari is chiefly spoken, is about 23 per cent. since 1891. The difference between these two percentages is due to the classification of some of the Pahari entries belonging to these four groups under "others" for want of the specification of the dialects to which they belonged.
181. The Simla group consists of a number of dialects and sub-dialects simla gronp.

| Kochi | $\bullet$ | $\cdots$ | 62,172 |
| :---: | :---: | :---: | :---: |
| Koonthali | . | - | 62,013 |
| Sirmari | - | - | 56,082 |
| Bhagl | .. | . | 18,804 | detailed on the title page to Table X. Figures of the important dialects are given in the margin for the present census. Kochi is chiefly spoken in the Bashahr State, where 60,678 persons speaking this dialect were enumerated, the other places where its speakers were noted being Keonthal (166), Bhagal (804), and the Minor Simla Hill States (524). Keonthali is spoken in the Keonthal State and the central portion of the States round the Simla district. It was returned by 28,239 persons in Keonthal, and by (23,752) persons in Bhagal. In other places the largest figures ( 9,611 ) were noted in the Minor Simla Hill States. -Sirmuri is the languages of Sirmur or Nahan, and that part of the Jubbal State which adjoins Nahan, while Bhagli is confined to Bhagal and Eunihar States.

182. The dialects included in the Kulu group are Koli, Kuluhi, and Kolugreap. Kulu-Suraji. These dialects are chiefly spoken in Kulu proper and the number of their speakers has risen from 122,970 in 1911 to 126,793 in 1921.
183. The Mandi group includes Mandiali, and Suketi, which are the Mand languages of Mandi and Suket States, and a fevr entries of Mandi, Suraji and groap.
Naraingarhi. This group is now represented by 237,934 persons. Naraingarhi. This group is now represented by 237,934 persons.
184. This group comprises the dialects known as Bhadarwahi, Bhar- Chamba mauri, Chamiali, Chambiali, Churahi, and Gadi, which were recorded mostly in group.
the Chamba State.

## .Northern Group.

185. The term Central Pahari denotes a group of dialects spoken in central

## Ambala Bime

 Kangre Kankiarpur Ramalpindi Rawalpindi Mianwal Multan ${ }^{\text {Punjab Stat: }: ~}$Punjab Stat: ...
Dolai Kamaun and Garhwal in the United Provinces. The strength is shown in the margin. Among the States the largest figures come from Keonthal (169) and Jubbal (289) where the number of immigrants from Garhwal and Teri Garhwal was 160 and 215 respec-
tively. Garhly.
tively.
186. Eastern Pahari commonly known as Naipali or Gorkhali, is the Aryan language spoken in the State of Nepal. At this census, it was returned by 9,301 persons ( 9,243 in the Punjab and 58 in Delhi) while in 1911 its speakers (Maipai). numbered 8,653. The increase is probably due to the increase in the number of Gurkha soldiers employed during the decade. The places returning figures of Naipali speakers above 100 are Kangra ( 2,236 ), Lahore (566), Gurdaspur $(2,581$ ), Rawalpindi (2,591), Nahan (256), Mandi (197), and Chamba (461).
187. The figures for Gypsy dialects represent a decrease of 9,615 as compared. with the 1911 figures but the returns are doubtful, as was noted in the Giappsecls. opening paragraph of this chapter. It is true that most of the members of castes such as Bawaria, Sansi, can understand the Punjabi language, but their mothertongue has undergone very little change. Of the Gypsy dialects enumerated at the present census the most important is Odki spoken by 2,516 members of the "OA" tribe. The Ods are nomads who usually wander about with their familias in search of employment on earth-work, often taking with them enormous herds of sheep and goats.

## Othar Languagas.

188. The speakers of other Asiatic languages aggregate 1,793 as against 2,745 in 1911 in both the provinces. The general falling off under this head is due to the decrease of 685 persons speaking Persian. Arabic has been returned by 45 persons in the Punjab and by 8 in Delhi, but it is not clear whether some of those who have given_their language as Arabic are merely Arabic scholars
or genuine Arabs.

Mon-Aslatio Languagen.
189. English is the only important non-Asiatic language being spoken by 26,829 persons in the Punjab and 4,614 in Delhi. Out of the total of 31,728 persons enumerated as speaking the languages of this group, English speakers now represent $l \cdot$ and 10 per mille of the population of the Punjab and Delhi provinces, respectively. The strength of the language is 202 more than the total number of Europeans, Armenians and Anglo-Indians given in Imperial Table XVI : but for this comparison, 285 persons have to be added who returned other European languages, which means an excess of 485 persons. The excess is explained by the fact that well-educated Indians and Indian-Christians have begun to use English in their homes. The distribution of the English language by districts and States depends mainly upon the presence of military cantonments and big official and business concerns. Hence we find that greatest number of English speakers $(6,706)$ is returned from Rawalpindi where a big cantonment is located. The next in importance are Lahore and Delhi with 4,991 and 4,614 English speakers, both of these places being the Headquarters of the respective provincial Governments. The detail of other languages returned under this head is as follows:-

Portuguese (211), French (18), Dutch (3), Flemish (20), German (1), Greek (12), Irish (8), Italian (11), and Russian (1).

## Miscellaneous,

Remsrks about Lingulstio boundarles.
190. In the Punjab and Delhi provinces, generally speaking, there are no fixed natural boundaries of the kind described in the linguistic survey for the different languages and reproduced in the discussion about each language in this chapter, which act as insuperable barriers to language. The boundaries of language are nebulous and indeterminate, and there is no sharp transition as we pass from one locality to the adjacent one. The result is that any attempt at a deurrcation of boundaries is apt to be misleading; because different dialects ohade off one into another so gradually that it is not always possible to say that dialect A belongs to one language and dialect B to another. It is for this reason that the native of one part of the Punjab can express himself and be understood in another. There are many words and expressions common to the different dialects of the province. The dialects differ from each other in vocabulary rather in grammar and they are, in fact, nothing but variants of the main language as spoken by the different classes, castes or tribes or in different localities.
Tha Infuon-
191. Education has done little to obliterate local dialects but in so far as con of dacai literacy in English has increased owing to its use as a medium of instruction, dlalects. the incorporation of English words and phrases has, in many instances, led to uncouth and hybrid forms of speech. Thus though well-educated Indians with a few notable exceptions still speak the dialects they always spoke, yet it is common to find them using a certain proportion of English and other foreign words in their conversation. Indians use English words and phrases not only when talking to an Englishman, but also to each other; this does not, however, mean that local dialects are not developing in a natural way. The use of foreign words is not confined to Indian languages but such borrowing occurs in every language. It is thus clear that education has so far tended very little, during the past 30 or 40 years, to the unification of languages, and it is unlikely that local dialects will disappear whether we adopt English, Urdu, Hindostani or Punjabi as the medium of Primary Education. At present a boy, who is educated at a school where Urdu is the medium of instruction, does not only not speak Urdu at his home, but never cares to keep his knowledge of it alive after he leaves school. This argument is sufficient to take much of the sting out of the controversy which has raged over the merits and demerits of Hindi, Urdu or Punjabi as the medium of instruction in Primary Schools.

Lterary
192. The number of newspapers and periodicals has risen from 74 in 1891, 166 in 1901, 229 in 1911 to 270 in 1921. Of these 270, 45 are written in English, 181 in Urdu, 27 in Gurmukhi, 13 in Hindi, and 4 in mixed languages. The above figures show that Urdu is the most popular medium for the circulation of news, the number of Urdu papers having increased from 64 to 181 during the past 3 decades. There is a great deal of literary activity in other languages which indicates the general awakening among the masses. Many periodicals are of
a communal character, and these generally deal with matters concerning the commanity in the interests of which they are founded. The comparative statement below shows the increase in the number of newspapers of different languages, since 1891-


These figures, however, somewhat exaggerate the journalistic success, if not the journalistic enterprise of the province, and at the moment of writing (March 1923) the number of "live" papers circulating in the Punjab is only 236, including dailies, weeklies and other periodicals.* Most of these publications have a circulation of under 2,000 copies, the actual total circulation as reported for 1921 being given by the figures in the

Orealation of the Newrpapers and Periodicale in the Punjeb in 1921
 margin. The total circulation of daily papers only amounts to one for every 222 persons in the province. This suggests an ignorance of and indifference to public events and contemporary public opinion, which is far from being the case. Actually for every paper printed or sold there are 20 persons who read its contents, or listen to it being read in the street of the smaller towns, or in the "chaupals" of the larger villages, and the men who listen will in their turn pass on it at least a part of the news to their women folk, or to friends and relations when visiting villages remote from lines of railway or off the main routes.
$\therefore$. $\therefore$ The number of books published during the decade 1912-1921,

| Urda | . | 6,282 | Perrien |  | 156 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Punjabi | . | 6,162 | Sankrit |  | 88 |
| Englinh | . | 1,826 | Peshto |  | 54 |
| Bilingaal | . | 1,354 | Multani | . | 63 |
| Hindi | . | 748 | Kamhmiri | - | 24 |
| Arabio | - | 291 | Polyglot | .. | 21 |
| Trilingaal | . | 174 | Others | .. | 17 |
| Sindhi |  |  | Total |  | 410 |

of the books published. English seemenghish books form about 10.5 per cent. lish seems to have lost ground since 1918 when books in English were nearly 15 per cent. of the whole, but the rise in 1915-1918 was clearly only a circumstance arising from the war, and compared to the prewar years English more than holds it own.

[^43]1. Distribution of total population by language sccording to Census, II. Distribution by language of the population of each district. LII. Showing the number of booka publiohed annually in each language from 1911 to 1821.

## SUBSIDIARY TABLE I.

Distribution of total population by language.-according to Census.

subsidiary tarles.

## SUBSIDIARY TABLE L.

Distribution al total populatien by langage.-According to Census-conchuded.


gUBeIDIARY TABLE8
OHAPTER IX.

## - Subsidiary table m.

Showing the number of books published annually in each language from 1911 to 1921.


## CHAPTER X.

## Infirmities.

BECTION I-GENERAC.

> INSANITY.
> 196. Iocal datribution. 197. Ago-distatibution. 188. Labore Lematic Anylum. DEAPRMUTISM,
299. Looul distribution, 200. Agendistribation,

BLINDNESs.
201. Local distribution, 202. Ago-distributlon, LEPREOSY.
209. Local distribution. 204. Agodiantalbution,

SBCTION II--CONBANGULNTIY.
 ninm,

Section 1 .-General.
198. As at previous censuses the data regarding only four infirmities were recorded. These were insanity, deaf-matism, blindness and leprosy. The statistics relating to these infirmities are given in Imperial Tables XII and XII-A and in six Subsidiary Tables.

Imperiad Table XII gives the distribution of the various infirmities by age and sex for the Punjab, British Territory, Panjab States and Delhi separately, Unfortunately this table contains some serious errors which were only discovered after the tables had been finally printed, and it has not been possible at this stage to do more than note in the text below some of the correotions which are required.

Imperial Table XII-A gives the distribution of infirmities for castes, tribes or races, and single infirmities only are dealt with.

The information contained in the Subsidiary Tables is as follows :-
Subsidiary Table I gives the number of afficted persons per 100,000 of the population at each of the last 5 censuses for each district, State and Natural Divigion.

Subsidiary Table II gives the age-distribution of the infirm per 10,000 infirm persons of each sex for the Punjab and Delhi separately, and for the Punjab and Delhi together for each of the last 5 censusos.

Subsidiary Table III gives the number of afflicted persons for each age-period par 100,000 of each sex, as well as the number of females afflicted per 1,000 males.

Subsidiary Table IV gives the population and number of infirm persons for certain distinctively Findu, Sikh and Musalman castes.

Subsidiary Table $V$ gives the proportions of infirm persons among Hindus and Musalmans, the difference of these proportions, and the ratio of this difference to its standard error.

Subsidiary Table VI shows the number of persons by sex suffering from single and dual infirmities, and must be taken to replace the legend of Imperial Table XII, and to correct pro tanto the contents of that table.

Subsidiary Table VII is a list of certsin Albinos in the Punjab, 1923.
Intructulone
194. The instruction printed on the cover of the enumeration book was as to enumera- follows:insane, or suffering from corrosive leprosy, or deaf and dumb, enter the name of the infirmity in this column. Do not enter those who are blind of one eye only, or whoare suffering from white leprosy only." .

The further instruction contained in Appendix I of the sapplementary instructions to Supervisors contains the following entry:-
"Column 16.-Care is needed to prevent the entry of persons suffering from leucoderma or white leprosy and other infirmities not falling within the scope of column 16.
Persons blind of one eye should not be entered. Only those totally blind of both eyes should be included. A man must be both deaf and mute in order to be included in this column."

These instructions are practically identical with those issued in the censuses of 1901 and 1911 except that with regard to deaf-mutes the enquiry was only reatricted to those born deaf and dumb.*

Dual infirmities were recorded; but, in no instance was any person shown as suffering from triple infirmities. The complete table of single and dual infirmities, so far as it can be reconstructed br the help of the legend on Imperial Table XII, is given in Subsidiary Table VI, and this shows that the number of persons suffering from single and dual infirmities is greater than that shown in the Imperial Table. It is not necessary to discuss here how the error arose.
195. Variation in the number of the infirm per 100,000 of the total popu- Variation

| Infirmity. | Punjal Province. |  |  |  | Delhi. |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1921. | 1911.' |  | 1891. | 1881. | 1921. |
| Trital .. | 380' | 377 | +39 | 504 | 74 | 190 |
| Insano .. | 28 | 26; | 3.9 | 29 | 48 | 16 |
| Drai-muten | 90 | 84 | 80 | 931 | 192 | 33 |
| Blind . | 260 | 254 | 305 | 351 | 529 | 140 |
| Lejers.. | 11 | 13 | 19 | 26 | 4.9 | 2 | lation since 1881 is exhibited in the since 1881. table in the margin. There is probably no significant change in the proportions of these infirmities during the last decade ; but looking to the figures in all 5 censuses together, there seens to be a general tendency for a decrease of recorded infirmities during the last 40 years. Considerations of time prevent the application of the proper statistical criteria for these apparent differences, and without such tests it would be unwise to regard any of the changes as indicative of fundamental improvement.

## Insanity.

196. The local distribution of insanity in the Punjab and Delhi is shown Loeal disin the diagram below. This shows the frequency of the disease in three groups, tribution.


[^44]namely for those districts in which there are less than 20 insane persons per 100,000 of population, those districts in which there are between 21 and 30 insane persons per 100,000 of population, and lastly those districts containing over 30 insane persons, per 100,000 of population. In the preparation of this diagram the figures of Lahore lunatic asylum have been excluded, as it was not possible to refer all the inmates to their districts of birth. It appears that the Central Punjab is more free from insanity than either the Western or the North-Eastern Punjab. The light thrown on the probable causation of insanity by the variation in local distribution is discussed by Rai Bahadur Pandit Hari Kishen Kaul, in paragraph 498 of the Census Report of 1911, but he has not mentioned in this connection the only predisposing cause which is likely to afford an explanation of the moderate to high frequency of insanity in the hills, to wit the existence of hereditary syphilis, known to be prevalent in those regions. In considering the possible effects of consanguinity on the inheritance of the insane diathesis Pandit Hari Kishen Kaul rightly points out that cousin marriage cannot be the sole cause as Hindus do not contract such alliances. The problem is further examined in Section II of this chapter in the present report.

## Age-dibtri-

 bation.Lahore
Lahore Asylum.
197. Diagram 56 given in the margin shows the number of insane persons

BIAGRAM 56
 per 100,000 of the total population for each sex of each quinquennial ageperiod, the figures for which are given in Subsidiary Table III at the end of this chapter. The curve for males shows a steady increase up to 34 years after which there is an irregular decrease. As insanity is not often cured in the Punjab, the age-curve indicates that after the age of 34 mortality among insane males is greater than that among the population at large. Amongst females the most rapid increase is shown from the ages of $0-19$ : and there is also a somewhat notable increase among the older females which may be associated with the hardships to which women in the Punjab who have passed the childbearing age are subjected.

| Year. |  |  | Males. | Females. | Total. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1912 | - |  | 540 | 143 | 683 |
| 1913 | $\cdots$ | $\cdots$ | 571 | 156 | 727 |
| 1914 | - | . | 581 | 161 | 742 |
| 1015 | - | . | 618 | 172 | 790 |
| 1016 | - | . | 651 | 161 | 812 |
| 1917 | . | . | 703 | 172 | 875 |
| 1918 | - | - | 704 | 168 | 872 |
| 1910 | $\cdots$ | - | 694 | 183 | 857 |
| 1920 | - | . | 707 | 147 | 854 |
| 1921 | -. | .. | 678 | 176 | 854 | the figures for inmates both male and female for the 10 years 1912-1921 are shown in the margin. The increasing popularity of the institution rather than any increase in insanity in the general population is indicated by the figures. It seems probable that the common people do not suffer fools as gladly as they did in the past, and are more ready to hand over their insane relatives to proper medical supervision.

## Deaf-Mutism.

199. The local distribution of deaf-mutism in the Punjab is shown in Loeal disdiagram 57. It is shown in Section II of this chapter that Mfusalmans suffer from tribution.

deaf-mutism in 8 significantly greater degree than Hindus, and this would explain the appearance of a relatively large amount of deaf-mutism in the Western Punjab. The greatest amount of deaf-mutism is, however, shown, by the bill States and hill districts of Chamba, Kangra, Simla, Mandi and Nahan where the number of deaf-mutes exceeds 150 per 100,000 of the population. The Central Punjab, as in the case of insanity, appears to be relatively free from this infirmity.

| No. | Natural Divisions. |  | Malce. | Females. |
| :---: | :---: | :---: | :---: | :---: |
| - | Himalayan | $\cdots$ | 329 | 240 |
| 2 | Sub-Himalayan | * | 114 | 81 |
| 3 | North-Wust Dry Ares | - | 107 | 68 |
| 4 | Indo-Gangetio Plain | - | 68 | 41 |
| 5 | Punjab | -• | 106 | 72 |

DIAGRAM 58

NUMBER OF DEAF MUTES PER 100,000 OF TOTAL POPULATION OF EACH SEX FOR .EACHAGE PERIOD.


Deaf-mutism has a very wide range varying from 24 persons per 100,000 in Malerkotla to 372 persons per 100,000 in the Kangra district. The proportion of deaf-mutism per 100,000 persons by natural divisions is shown in the margin. -.
201. Diagram 58Age-distrishows the age-distribu-bulon. tion for quinquennial periods. for males and females separately, the figures being based-on those of Subsidiary Table III,

Blindness.

Locati dis: tetbution.
201. Diagram 59 gives the local distribution of blindness according to

three grades of frequency, per 100,000 of the population, namely, from $0-200$, 201-300, 301 and over. The districts and States with the highest proportion of blindness are comprised in a strip starting from the Hoshiarpur district on the North-East and broadening out to Ferozepore and Hissar on the Rajputana border. Besides this strip the districts of Gurgaon and Dera Ghazi Khan have both over 300 blind persons per 100,000 of population. The actual highest figure for blindness is shown by Pataudi ( 470 per 100,000 ) and it is followed by Gurgaon (419), Dujana (414), Kalsia (406), Jullundur (392), Ludhiana (381), Hissar (367), Hoshiarpur (342), Faridkot (323), Patiala (322), Dera Ghazi Khan (322) and Ferozepore (319).
202. Variation in the proportion of blind from one age-group to another

DIAGRAM 60

is shown for each sex by quinquennial periods in diagram
No. 60 reproduced in the margin. Blindness being essentially a disease of old age, the curves for both males and females rise steadily for the higher age-groups. Only 55 persons, 35 males and 20 females, are recorded as blind for ages below 1 year, and this is evidence of the rarity of congenital blindness.

## Leprosy.

203. The local distribution of leprosy according to 3 grades of frequency sorlibullos is shown in diagram 61 printed below, and as in the case of both insanity

and deaf-mutism the mountainous region of the Himalayas has a relatively large proportion of infirm persons.
204. Diagram 62, printed in the margin, shows the distribution of leprosy AgodustriDancravi' $6 \frac{1}{2}$
 by age in quinquennial age-bation. periods for males and females. separately.

In considering all the diagrams of local distribution of infirmities in the Punjab one ought to bear in mind that there is a tendency to conceal the existence of the infirmities of insanity, deaf-mutism and leprosy, and that therefore it is possible that the apparent carity of these three infirmities in the Central Punjab is due largely, if not wholly, to the greater sophistication of the Punjabi in the Central Punjab as compared to his brethren in the Himalayan region and in the extreme West. This consideration does not apply to blindness, as sufferers from this infirmity are under no stigma: in fact a large number of blind beggars make their livelihood by a successful appeal to the sympathies of the charitable. Whether the greater frequency of recorded blindness in certain portions of the Punjab can be attributed to the concourse of blind heggars attraoted by the benevolence of the inhabitants cannot be positively affirmed, but the possibility should be borne in mind. If this is so the diagram of the distribution of blindness in the Punjab may be indicative of the areas in which reside the pious and the charitable.

## Section II.-Consanguinity.

Comparatiove
205. It has been already remarked in paragraph 139 of Chapter VII that the Hindu and Musalman communities which differ in no practice of evolutionary import so much as in their observance of out-breeding and in-breeding, offer exceptional opportunities for studying the good and evil results of cousin marriage. The data obtained from the special enquiry into over a thousand marriages among Musalmans in the Punjab show that first-cousin marriages form about 40 per cent. of all Musalman marriages in Attock, 36 per cent. in Muzaffargarh, 23 per cent. in Gurdaspur and in Delhi. Possibly for pure Musalman castes, that is excluding those tribes which are recent converts to Islam, a percentage of about 25 of first-cousin marriages would be found throughout the Punjab.*

If there is any genetic effect of cousin marriage we should expect it to be reflected, it may be ever so dimly, in the relative amount of infirmities among Hindus and Musalmans. Unfortunately infirmities have not been classified by religion, and we can make only an approximate reconstruction from Table XII-A which gives the infirmities by castes, by grouping togother the infirm of those castes which consist wholly or almost wholly of Hindus, or Sikhs, or Musalmans. 11 distinctively Hindu caster, 2 Sikb, and 17 distinctively Musalman castes were selected, and the population of each, and the numbers of infirm persons are shown in Subsidiary Table IV. The castes chosen and the percentage of the persons
 belonging to the particular religion are shown in the margin. The list of castes nuay be legitimately criticised on the gromind that among Musalmans $\mathfrak{a b}^{\mathrm{b}}$ few castes such as the Meo and Sheikh include converts from Hinduism: and, further, on the ground that by not comparing the figures for
infirmity for each district separately we are introducing an error owing to the probable association of infirmity with locality. The latter criticism seems of some weight as the distinctively Musalman castes mostly inhabit the NorthWest of the Punjab, whilst Hindus are mostly to be found in the South and East, and the difficulty has been only partially met by dealing separately with each Natural Division of the Punjab. With these limitations in mind the proportion of each infirmity among Hindus and Musalmans will be compared.

It is idle to compare the crude figures of infirmity without taking into account the errors due to the smallness of the samples. For instance, in the Himalayan area there are only 147 insane Hindu males and 78 Hindu females as against 16 insane Musalman males and 14 Musalman females, so that by pure chance, say the chance of death, there might have been temporarily fewer Musalman insane than the average, and this would entirely vitiate a direct comparison unless due regard were paid to the errors of random sampling. $\dagger$ If we are comparing the

[^45]extent of leprosy among Hindus and Musalmans in the Indo-Gangetic Plajn, the crude figures are-

and our first impulse is to conclude that among males, Hindus are more subject to the disease than Musalmans, while among females the reverse is the case. Actually we find on calculation of the standard error of the difference that the conclusion that Hindu males are more often leprons than Musalman males is probably true for the Indo-Gangetic Plain ; but for females there is no significant excess of the disease among Musalmans.

Subsidiary Table V gives in full the figures for the proportions of the infirm among the Hindu and Musalman communities, the difference in the proportions, and the ratio of that difference to its standard error. Wherever that ratio is not at least 3 or over, nosignifioance should be attached to a differential proportion of infirm persons among the two communities. As, apart from the error of random simpling, a difference of the proportionate number of infirm persons may arise from inaccuracies of the record, it will be wise to defer judgment as to the rality of some of the differences which satisfy even the statistical criterion.

Out of 32 cases for the 4 Natural Divisions and 4 infirmities, for males nad females, there is a statistically significant difference in 14 cases, and these are noted below:-

| Infirmity. | Losality. | Sex. | Worse sufferers. |
| :---: | :---: | :---: | :---: |
| Insanity .. | Indo-Gangetic Plaio. | Mules. | Musalmans. |
| Denf-mutism .. | Indo-Gangetic Plain. Himalayan Arua. Sub-Himalayman Area. North-West Dry Aroe. | Females, Fimales. Males. Malcs. | Musalmans. <br> Musalmana. <br> Hindus. <br> Musalmane |
| Blindiners | Indo-Gangotic Plnin. Himalnyan Area. Sub-Himalayon Aren. North-West Dry Area. | Males and Femaleb. Males. Males and Females. Males. |  |
| Inproay | Indo-Gangetic Plain. Himalayan Area. | Males. <br> Mrics and Fomales. | Hindus. Hindus. |

We may provisionally conclude that in the Punjab Hindus suffer more from blindness and leprosy than do Musalmans, but that Musalmans are, on the whole, more liable to deaf-mutism than Hindus. Hindus and Musalmans seem equally liable to insanity, no deduction unfavourable to the latter community being justified from the single instance (out of 8 possible instances) of an excess of Musalman insane among males in the Indo-Gangetic Plain.

So far then as this analysis goes there is nothing to show that consanguinoous marriages are productive of an insane, blind, or leprous diathesis, the Hindu community containing as many as, if not more persons infirm from these causes than the Musalman community.

The question of deaf-mutism is discussed in paragraph 207 below.
In relation to the excess of blind Hindus over the number of blind Musalmans it is necessary to recall that blindness is essentially a disease of old age, and that the Hindu community is slightly more long-lived, judging from the crude figures, than the Musalman. The mean age of Hindus at the present census was $25 \cdot 7$ years (males) and $24 \cdot 1$ (females), as against $25 \cdot 0$ (males) and 24.3 (females) for Musalmans : so this may account for a part of the result observed which is unfavourable to Hindus.
206. Deaf-mutism is dealt with separately in its relation to consanguinity Deal.mustim3 beoause it has been found that its occurrence among the off-spring of related parents is no very different from expectation assuming that deaf-mutism arises from a single pair of recessive Mendelian elements, (vide Proc. Roy. Soo. B., Vol. 84, 1911).* For the analysis that follows the proportion of first-cousin marriage

[^46]of 25 per cent. has been adopted for all four Natural Divisions of the Punjab, this being the average suggested by the special enquiry described in paragraph 140 of Chapter VII (Civil Condition). This assumption leads by the methods of the paper cited to an estimate of the relative rates of production of deaf-mutism from first-cousin $m e$ iages and non-consanguineous marriages respectively among Musalmans; and, as : know the proportion of deaf-mutes among the non-inbreeding Hindu community our results can be tested by comparing it with the amount of deaf-mutism among the off-spring of unrelated Musalman parents.

The results obtained are conveniently exhibited in the following nota-tion:-

Let $D_{M}$ be the obsetved proportion of deaf-mutes among the Musalman population generally.

Let $\mathrm{d}_{\mathrm{m}}$ be the calculated proportion of deaf-mutes who are the offspring of non-consanguineous marriages among Musalmans.

Let $\mathrm{d}_{\mathrm{m}}^{\prime}$ be the calculated proportion of deaf-mutes who are the offspring of cousin marriages among Musalmans.

Let $\mathrm{D}_{\mathrm{II}}$ be the observed proportion of deaf-mutes among the Hindu population generally, a population which does not practice consanguineous marriage.

The calculation has been made for each Natural Division and for each sex separately. All results are expressed as so many cases in a million of population.

|  | - | $\begin{gathered} \text { Indo-Ganaetic } \\ \text { Plain. } \\ \hline \end{gathered}$ |  | Hibtalayay Area. |  | $\begin{aligned} & \text { SUD-HIMALATAN } \\ & \text { AREA. } \end{aligned}$ |  | $\begin{aligned} & \text { NOBTH-WERT } \\ & \text { DRE AREA. } \end{aligned}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Mfrles. | Femalca, | Mnles. | Females. | Males. | Females. | Males. | Females. |
| $\mathrm{D}_{\mathbf{M I}}$ | -• | 774 | 514 | 3,608 | 3,307 | 004 | 818 | 1,137 | 700 |
| $\mathrm{d}^{\prime} \mathrm{m}$ | - | 1,904 | 1,417 | 0,031 | 6,194 | 2,338 | 2,053 | 2,603 | 1,813 |
| $\mathrm{d}_{\mathrm{m}}$ | - | 377 | 214 | 2,600 | 2,340 | 506 | 400 | 628 | 320 |
| $\mathrm{D}_{\mathrm{H}}$ | -• | 710 | 404 | 3,060 | 2,230 | 1,235 | 973. | 750 | 710 |
| Ratio $\mathrm{d}_{\mathbf{m}} \mathrm{d}_{\text {dr }}$ | - | $5 \cdot 2$ | 6.6 | $2 \cdot 6$ | 26 |  | 51 | 42 | $5 \%$ |

This shows that if deaf-mutism can be regarded as a Meudelian unit character its appearance among the non-inbreeding section of the Musalman community is nearly always less than among Hindus, who never marry their relatives. The only apparent exception is for females in the Himalayan Area, when the difference is far too small to be significant. It is highly desirable to make the whole calculations afresh for such diverse values of the percentage of cousin marriage among Musalmans as would be found from a full enquiry in each of the 4 Natural Divisions. The adoption of an all round figure of 25 per cent. of first-cousin marriage for all Natural Divisions is necessitated by the paucity of the material. The results suggest either-
(1) that Musalmans, apart from the practice of consanguineous marriage, are less liable to deaf-mutism than Hindus, or
(2) that deaf-mutism cannot be associated with only a single pair of allelomorphic Mendelian elements. enquiry, has been so frequently attributed to consanguinity, of parentage, that it seemed worth while to attempt to discover if it occurs more frequently among Musalmans than Hindus. A report was asked for from all Deputy Commissioners as to the Alhinos in their districts, and they were supplied with photographs of two typical Indian Albinos.* Unfortunately the replies showed that many cases of "phulberi" or leucoderma had been included, and all these cases, numbering over 500, have had to be discarded with the exception of 13 cases reported by Col. Forster, Director of Public Health, and two cases reported by my Personal Assistant, one of which I saw myself. The results are tabulated in Subsidiary Table VII. 15 cases (one of which from the description of symptoms of itching and spreading of the white patches given by Dr. Rasul, the District Medical Officer of Health, Rohtak, may be leucoderma) are too few to base sure conclusions on. Of the 15 cases 10 are Musalmans, 5 the children of first-cousin parents, and 5 the children of non-related parents, 5 cases are of Hindus, who are of course not the children of related marriages.

I．Number afflicted per 100,000 of the population at each of the last five censuses．IJ．Age distribricn fer 10,000 infirm persons of each sex．LII．Number afficted per 100,000 persons of each age－period and number of females afficted per 100 males．IV．8howing the population and numbers of infism for distinctively Hindu，Sikb and Musaman cas maimans，the of certain selected castes by nstural divisions．V．Showing the proportion of infirmity among Hindus and Musaimans，the diference of these proportions，and the ratios of this difference＇to its standard error．VI．Showing namber of persons by eex sutiforing from single and dnal infirmities，FII．List of certain Albinos in the Punjab 1923.

## SUBSIDIARY TABLE I．

Number aflicted per $\mathbf{1 0 0 , 0 0 0}$ of the population at each of the last five censuses．

| Distaict of gtati and <br> ，Natural Diviaion． | Ingame． |  |  |  |  |  |  |  |  |  | Deap－hities． |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Males． |  |  |  |  | Females． |  |  |  |  | Males． |  |  |  |  | Females． |  |  |  |  |
|  | － | $\underset{-}{\text { g }}$ |  | $\stackrel{\text { \％}}{\sim}$ | $\begin{aligned} & \text { 呙 } \\ & \underset{\sim}{2} \end{aligned}$ | 㭡 | 品 | 蔮 |  | $\underset{\sim}{8}$ | ※ | $\underset{\underset{\sim}{\Xi}}{\dot{\Xi}}$ | $\underset{\sim}{\dot{\circ}}$ | $\underset{\underset{\sim}{\infty}}{\substack{\infty}}$ | $\begin{aligned} & \underset{\sim}{\infty} \\ & \underset{\sim}{\infty} \end{aligned}$ | 평 | $\underset{\square}{\square}$ | ©̈ | $\underset{\sim}{\infty}$ | $\cdots$ |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PUNJAB |  |  |  |  |  |  |  |  |  |  | 06 |  |  |  |  | $72$ |  |  |  |  |
| （Total）． |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2．Loharu Slate | 18 | 20 |  |  | 40 | 10 | 23 |  |  | 48 | 183 | 130 | 135 | 82 | 80 | 93 | 116 | 85 | 24 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4．Dujana Slate |  | 37. | 40 | 36 | 40 | 8 | 8 | 17 | 16 | 28 | 88 | 157 | 64 | 94 | 112 | 49 | 58 | 26 |  | 110 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7．Karnal ． | 28 | 20 | 25 | 26 | 47 | 13 | 16 | 17 | 16 |  | 43 | 29 | 26 | 66 | 54 | 29 | 15 | 17 | 36 | 28 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9．Kapurthala State－ | 27 | 28 | 20 | 35 | 47 | 20 | 19 | 16 | 18 |  | 64 | 83 | 94 | 102 | 69 | 43 | 68 | 50 | ． 66 | 50 |
| 10．Ludhinna ．－ | 24 | 25 | 29 | 32 | 50 | 19 | 14 | 21 | 15 |  | 83 | 58 | 42 | 80 | 135 | 37 | 25 | 31 | 45 | 75 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12．Feruzepore | 31 | 27 | 29 | 34 | 34 | 18 | 19 | 17 | 22 |  | 83 | 59 | 41 | 73 | 68 | 46 | 38 | 23 | 46 | 4 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14．Patiala Slate | 25 | 19 | 11 | 19 | 47 | 12 | 11 | 5 |  |  | 78 | 52 | 39 | 50 | 159 | 48 | 34 | 23 | 27 | 88 |
| 15．Jind State ．． |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18．Amritsar | 18. | 21 | 34 | 20 | 41 | 12 | 13 | 15 | 12 | 19 | 53 | 47 | 37 | 76 | 119 | 30 | 36 | 26 | 37 |  |
| 19．Gujranwala | 17 | 20 | 35 | 36 | 65 | 13 | 17 | 19 | 15 | 29 | 69 | 74 | 59 | 86 | 91 | 43 | 45 | 35 | 47 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 21．Nahan Slata | 30 | 29 | 61 | 92 | 115 | 61 | 38 | 42 | 68 |  | 344 | 216 | 260 | 374 | 40 | 221 | 211 | 239 | 248 | 20 |
| 22．Simia | 13 | 16 |  | 25 | 58 | 20 | 14 | 28 | 18 | 46 | 131 | 109 | 153 | 185 | 26 | 135 | 137 | 169 | 16 | 21 |
| 23．Simla Hill States | \｛33 | 10 | 28 | 27 | 32 | $\left\{\begin{array}{r}17 \\ 8\end{array}\right\}$ | 7 | 8 |  |  | ； 284 |  | 220 | 306 |  | $\{235$ |  | 234 | 253 |  |
| 24．Bilappur 25，Kangra | 210 | 28 | 96 |  | 32 | ［2 |  |  |  |  | 2151 | 181 |  |  |  | （ 92 |  |  | 203 |  |
| 20．Mandi state ．． | 34 | 2 | 5 | 34 | 48 | 17 | 18 | 64 | 30 | 7 | 437 | 437 | 464 | 477 | 481 | 303 | 311 | 356 | 344 | 350 |
| 27．Suket Stata ．． | 24 |  | 41 | 18 | 41 | 17 |  | 10 | 18 | 14 | 18. | 51 | 48 | 177 | 14 | 122 | 37 | 31 | 93 | 9 |
| 28．Chamba Slate | 54 | 34 | 42 | 64 | 148 | 25 | 28 | 4 | 16 |  | 112 | 107 | 17 | 137 | 225 | 51 | 62 | 233 | 41 | 19 |
|  |  |  |  |  |  | 20 | 2 |  |  |  | 315 | 258 | 384 | 46 | 518 | 276 | 242 | 37 | 456 | 4 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20．Ambala | 23 | 36 | 62 | 49 | 57 | 13 | 24 | 37 | 30 |  | 108 |  |  |  |  |  |  |  |  |  |
| 30．Kalaia Stats ． | 31 | 48 | 89 | 40 | 41 | 36 | 93 | 73 | 74 | 55 | 267 | 125 | 273 | 268 | 271 | ${ }^{85}$ | ${ }_{256}$ | 215 | 200 | 100 |
| 31．Hoshiarpur ．＇ | 33 | 24 | 42 | 26 | 4 | 12 | 8 | 25 | 11 | 26 | 128 | 281 | 109 | 132 | 271 | 254 | 256 | 215 | 103 | 201 |
| 32．Gurdap pur ． | 23 | 19 | 30 | 21 | 38 | 14 | 17 | 19 | 11 | 26 | 108 | 115 | 62 | 114 | 210 | 791 | 86 | 50 | － 62 | 136 |
| 33．Sialkat | 17 | 14 | $\because 7$ | 19 | 29 | 12 | 11 | 16 | 10 | 15 | $9{ }^{9}$ | 73 | 46 | 70 | 121 | 56 | 75 | 31 | 43 | 13 |
| 34．Gujrat | 30 | 20 | 40 | 41 | 62 | 18 | 12 | 29 | 29 | 39 | 107 | 96 | 77 | 121 | 162 | 70 | 65 | 45 | \％ | 90 |
| 30．Rewwalpindi | 34 26 | 31 21 | 57 42 | 43 | 67 | 17 | 15 | 32 | 39 | 4 | 140 | 147 | 88 | 143 | 123 | 98 | 99 | 72 | 112 | 83 |
| 37．Attook | 40 |  |  |  | 67 | 21 | 23 | 29 | 32 | 50 | 122 | 144 | 150 | 142 | 138 | 96 | 125 | 110 | 122 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 38．Montgomery <br> 30．Shathur | 33 | 53 | 73 | 59 | 102 | 24 | 31 | 40 | 37 | 55 | 91 | 103 | 158 |  | 117 |  |  |  | 37 |  |
| 10．Mianwali | 34 4 4 | ${ }^{26}$ | 71 | 36 | 88 | 26 | 24 | 43 | 20 | 73 | 98 | 102 | 151 | 150 | 205 | 72 | 79 | 107 | 94 | 13 |
| t1．Lyallpur | 98 | 25 | 27 | $\cdots$ | $\cdots$ | 15 | 17 | 41 |  | ． | 131 | 94 | 142 |  |  | 79 | 69 | 109 |  |  |
| 12．Jhaug | ${ }_{03}$ | 51 | 78 | 85 | 165 | 18 | .19 | 16. |  |  | 71 | － 56 | 67 |  |  | 42 | 36 | 44 |  |  |
| 43．Multan | 43 | 47 | 84 | 5 | 165 | 315 | 36 | 44 | 99 | 85 | 156 | 106 | 155 | 148 | 157 | 98 | 74 | 94 | 78 | 10 |
| t4．Buhavalpur Slata | 49 | 33 | 37 | 58 | 190 | 43 | 38 | 58 | 28 | 67 | 102 | 117 | 156 | 106 | 139 | 64 | 84 | 102 | 76 | 72 |
| 45．Muzatiargarh | 50 | 61 | 79 | 81 | 118 | 43 | $\stackrel{2}{5}$ | 29 | 37 | 55 | 110 | 65 | 102 | 64 | 126 | 69 | 48 | 62 | 43 | 63 |
| 40．Dors Chazi Khan | ¢ |  | 80 | 40 | 127 | 42 | 29 | 49 | 54 35 | 77 | 138 | 119 | 118 | 167 | 140 | 85 | 75 | 73 | 90 | 83 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | － |  | － |  | 32 |  |  |  |  |
|  | 18 |  |  |  |  | 12 |  |  |  |  | 32 |  |  |  |  |  |  |  |  |  |




## SUBSIDIARY TABLE II.

Age distribution per 10,000 infirm persons of each sex.-concluded.

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## SUBSIDIARY TABLE III:

Kumber afficied per 100,000 persons of each age pariod and number of famales afficted per 1,000 males.


## SUBSIDIARY TABLE IV.

Showing the population and numbers of infirm for distinctively Hindu, Sikh and Musalman catea.
population of certain selected castes by natural divisions.

sUBSIDLABY TABLRE.
orapten

## SUBSIDIARY TABLE IV.

Showing the population and numbers of infirm for distinctively Hindu, Sikh, and Musalman castes.-continued.


## SUBSIDIARY TABLE IV-concluded.

Showing the population and numbers of infirm for distinctively Hindu, Sikh and Musalman castos,-concluded

qUBSIDIART TABIES.

- RAFTER $x$.

SUBSIDIARY TABLE V.

chapter x.

## 8UBSIDIARY TABLE VI.

Showing number of persons by sex nuffering from single and dual infirmities.

1. PUNJAB.


Nole.-Figures in bold type are for ningle infirmitien.

SUBSIDIARY TABLE VII.
List of certain Albinos in the Punjab 1923.

| Nemo. | Father's Name. | District, | Cente. | Age. | Relationship of Albinos parents. | Othor Albinca in family. | Roporter. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 8 | - . 4 | 6 | 6 | 7 | 8 |
| Mohammed Ramzan.* | Ghulam Resul | Amritagar .. | Kashmiri (Bheikh.) | -. 44 | None .. | 2 brothers (a), 1 alater (A) | D. P. H. |
| Mohammed Jamil | Abdullah .- | Do. | Kashmiri | -. 18 | Do. .. | 1 brother ${ }^{\text {( }}$ ( $)$, mother (A) . . | " |
| Mat. Jan Bibl .. | Bhola | Sialkot .. | Meshaki | -. 25 |  | 1 brother (A), 2 sisters (a) 1 grand fathor (A). | " |
| Mohanan All .. | Bagah 8hah .. | Do. .. | Sayad | .. 60 | Iat comins | $\left\lvert\, \begin{aligned} & 2 \text { brothers (A), } 1 \text { siater (A) } \\ & \text { father (A). } \end{aligned}\right.$ | ' |
| Talah Husands .. | Abdulah Shah | Do. | Do. | .. 23 | Do. .. | 8 brothen (a), 2 aintom (a) |  |
| Salig Ram* | Kishen Dan . . | Rohtak .. | Shatri | .. 48 | Nore . | No brothens oraisters .. | Lovcoderme. |
| Chanda Lal* .. | Mussadi Lel. . | Do. .. | Mahejan | .. 69 | Do. .. | 2 brothen (a), 2 cistes (a) | $\cdots$ |
| Mohammad 8hafi | Ramak All.. | Do. .. | Sherich | .. 36 | Do. .. | 6 brothon (a) -. | * |
| Gams | Roshan | Ladhians .. | Fuqis | .. 13 | let congins | 2 brothers $(a+\Delta)$, 1 sister (A). | * |
| Hashmat Ulinh .. | Nasurallah .. | Do. | Pathan | . 28 | Do. . | 1 brothor (A), 1 aister (A) .. | $\cdots$ |
| Sundar Singh | Tara Bingh .. | Amballa .. | Jat Bikh | .. 16 | Nono | No brothori or disters .. | $\cdots$ |
| Buggo | Wanlra | Ladhiens .. | Rajpat | .. 40 | Do. . | brothors ( $4+2 \mathrm{a}$ ) $\quad \cdots$ | $\cdots$ |
| Parshottam Des .. | Dwarka Das | Multan | Babra | . 33 | Do. - - | 8 sintan (a) -* |  |
| Mohsomad Hmasain | Mohdi Esaan | Dolhr | Sayad | .. 17 | Do. . . | None $\quad$. | P. A. (coen by me). |
| Amanulloh Khan .. | Nasrullah Khan | Mearnt .. | Pathan | . 27 | 1at cousinat | 1 brother (A), 1 eintor (A) | 0 |

 is an Albino and the other 2 are not Albinou.

## CHAPTER XI.

# Caste, Tribe, Race or Nationality. 

208. Betorence to stetistice 209. Connts Instructions. 210. Caimg tor alterations in elsestification 211. Cherifontion of easten and modorn disintegrating tondobciea, 212. Chief Hindu, Mmatman and Sikh Cesten 213. Clmaification of castes acoording to thoir traditional oocrpations, 214. Varistions sinco 1911. 215. Earopanas and Anglo-Indsanes.
209. The statistics relating to caste, tribe, r 35 e and nationality are to be Reference found in six of the Imperial Tables. The chief of these is Table XIII, which to statistec. shows by sex and religion, the number in each caste for each district and State of the Punjab and Delhi. The other tables are-

Table IX which gives the education by selected castes, tribes or races for 4 main divisions of the Punjab separately, namely, the Eastern Punjab, Central Punjab Hills, Central Punjab Plains, and Western Punjab. The table distinguishes Hindus, Musalmans, and Sikhs in each caste in which there are many representatives of each religion.
Table XII-A gives the Infirmities by selected castes, but unlike Table IX does not distinguish the religious groups. The data for infirmities for selected religions was specially compiled for the purposes of the discussion of infirmities in paragraph 206 of Chapter X.
Table XIV gives the data, for certain selected castes and tribes, of civil condition for quinquennial age-groups, and distinguishes the religions and tribes in each caste.
Table XVI gives the age-grouping of Europeans and Allied Races and Anglo-Indians.
Table XXI gives the occupation of selected castes, tribes or races for the same local divisions as Imperial Table IX.
Proportional figures are given in the Subsidiary Tables as follows:Subsidiary Table I gives the castes classified according to their traditional occupations, and
Subsidiary Table II gives the variation in the number of persons composing the caste, tribe or race since 1881.
209. The instructions to enumerators printed on the cover of the enumera-

Consus Ing.
tractions. tion book read as follows:-
"Column 8 (caste).-Enter the caste or tribe of Hindus, Musalmans, Jains, Sikhs, Aryas, Brahmos and aboriginal tribes, and the race of Christians, Buddhists, Parsis, etc."

The supplementary instructions to Supervisors printed as Appendix I to the Code of Consus Procedure 1921 go into great detail, and only a few paragraphs of these instructions will be quoted here:-
"The castes and tribes in this Province are well known. The names of exogamous groups; or words indicating locality, occupation or titles should not be entered. Thus, Bania is a functional term, including many different castes such as Aggarwal, Oswal, Mahesri, etc. Words like Bengali, Hindustani, Madrasiand Nepali must be rigorously tabooed. Musalmans are divided, not only into racial groups, suoh as Sheikh, Sayad, Moghal and Pathan, but also into functional groups such as Julaha, Penja, etc. Names of functional groups should not be noted as tribes except where they are recognised as separate tribes, e.g., Lohars, Tarkhans.

In respect of Faqirs and Sadhus, who have abandoned their caste, the order to which they belong should he noted in this column......

When a person of low caste wishes to return himself as belonging to a high oaste to which he obviously does not belong, e. g., a "Teli" wishies to return himself as a "Moghal" he should be shown as belonging to the caste or tribe to which he is generally supposed to belong. Again if a "Jat or Sunar" wishes to be entered as "Rajput" he ahould not be entered as a Rajpht if the people do not call him a Rajput. Tray Jata of Isa Khel should, for instance, not be returned as Niaxi Pathans even chough they should very mach/ wish this to be done....

The functional group of Sunars has frequently been treated as a caste, but this should be avoided as far as possible. Persons who have recently joined the profession and are not known as Sunars by caste should be recorded as belonging to their original caste.

Members of the Arya Samaj, who say that they have abandoned caste or do not wish to have any caste recorded, may be entered as Arya by caste.

No Sikh should be pressed to name the caste to which he belongs if he does not wish to do so; in such cases the word "Sikh" may be entered in this column.

Women.-The caste or tribe of an unmarried girl will be the same as that of her father. In respect of a married woman the entry should be as stated by her husband. No enquiry should be made as to the caste or tribe of a woman before her marriage. Her present caste or tribe should be asked and the answer taken down without question. Among Hindus the caste of a woman will be that of her husband. But among Mohamadans the husband may, in some cases, like to have one of his wives put down as Pathani, the other as Jatti, and a third as a Bilochni. ."
In order to eliminate incorrect classification an index of castes and tribes of the Punjab was prepared and circulated for the guidance of district census officers. This index contained the names of castes and tribes recognised as such, $a s$ well as the names of certain sub-castes and clans, so that when only the clan, or goirc was recorded in the schedule, it could always be referred to its proper caste. List B contained 42 local and geographical names and functional terms, for example, Baghban, Beldar, Dogra, Maniar, Paharia, Purbia, Sepi and so forth, which are not true caste designations. List C gave a number of synonyms for the torms used in List A.

While every effort, therefore, was made to prevent wrong entries arising from ignorance, yet a certain amount of inaccuracy was inevitable owing to deliberate misstatement. The common source of error under this head arose from cases in which a group of persons claimed to belong to a higher caste than that in which they were habitually classified.
Claims for allorations in classificatlons,
210. The chief claims for a re-classification of caste which occurred in

| Recognised Caste. |  |  | Caste claimed. |
| :---: | :---: | :---: | :---: |
| 1 | Kanot, Rathis, Raw | and Thakars. | Rajputa. |
| 2 | Nais (representod b Naha Sabha, Lah | aja Brahman | Eaja Brahmana |
| 3 | Nais (represented b tba Thakur Mah | Indrapras. bha, Dolhi). | Rejput or Thakur. |
| 4 | Mahtons | - . | Rajputs. <br> Brahman Bhat or Brahman Rai |
| 5 | Bhat | . | Brahman Bhat or Brahman Rai Brahmans. |
| . 6 | Jangids |  | Brahmans. <br> Mehra Rajput. |
| 7 | Mehra <br> Tamboli |  | Mehra Rajput. Kshatriyas. |
| 8 | Hindu Ramgarhias | . | Dhiman Brahmana. | the present consus are noted in the margin.

The claims were dealt with in the following way:-
(1) A deputation of Kanets, Rathis, etc., who wished themselves to be styled Rajputs was received, and it was decided that there would be no objection to their being included amongst Rajputs if the Ruling Rajput Chiefs of the places where the community has a majority did not object. Differens opinions were received and accordingly with the permission of the Punjub Government the following head was adopted in Chapter XIII.

|  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Rajput. | Kanat. | Rathi. | Thakur. | Rawat. |

(2) Claims 2 and 3 were rejected.
(3) Claim No. 4 was admitted, but it was too late then to issue instructions to district officers, and the tables still record the number of Mahtous.
(4) After discussion with the representatives of the Brabman Roy Sabha it was decided that persons recording themselves as Bralm Batt or Brahman Roi will not be grouped with Bhats, Bhataras, etc., as in 1911.

The instructions to enumerators were-
"Persons whe-described themselves as Brahm Batt or Brahman Roi should be recorded as such, they should not be confused with Bhats or Bhataras."

These instructions had been issued when a protest was received from the Doaba Brahman Bhat ox the ground that many. Bhats who had no connection
with Brahman Bhats or Brahman Rois had taken advantage of the instructions to record themselves as such. During compilation it was found that only $\mathbf{3 , 5 6 6}$ persons in the Panjab and 21 in Delhi had recorded themselves as Brahman Bhat, and these were accordingly included among Bhat Hindus.
(5) The claim of the Mehra Rajputs was also admitted. The deputation asserted that persons belonging to this community were to be found in the districts of Karnal, Ambala, Rohtak and Hissar and in the Jind State, but on compilation it was found that only 2,226 persons returned themselves as Mehra Rajputs, and as these were not in the localities stated by the claimants all of them were included among Jhiwars in Table XIII.

The Kambohs represented by the "All India Kamboj Conference" wished themselves to be classed as Kambojs which, they said, was the correct name and the following instruction was, therefore, issued:-
"Kamboh and Kamboj are different forms of the name of the same caste, which ever term is used by the persons themselves should be recorded."

After compilation it was found that 146,687 persons recorded themselves as Kamboh and 52,038 as Kamboj. In Table XIII therefore, Kambohs have been shown as "Kamboh (Kamboj)". As indicative of the great store which certain communities set on caste may be instanced the fact that the Dhiman Brahmans sent a deputation long after the Imperial Tables had been printed. This deputation claimed that the persons shown in Imperial Tabe XIII as Hindu Ramgarhias, totalling 5,156 males and 4,494 females, comprised mainly in the districts of Hoshiarpur, Jullundur, Ludhiana and Gurdaspur, should be classed as Dhiman Brallmans. The deputation was informed that the head in Imperial Table XIII could not be altered at that late stage, and no useful purpose would be -served by discussing the merits of the claim.
211. The classification adopted in 1891 was based on considerations of ethnology, history, and function, and was discarded in 1901 in favour of a new classification by social precedence. The enquiries that were made for this purpose, and mismegrating though they elicited a considerable amount of interesting information, roused tendenale. here and there a certain amount of resentment.*

In Imperial Table XIII of the present report the various castes are shown alphabetically, and where more than one religion is returned by the members of a caste, separate figures have been given for each. In this connection Mr. Middleton makes some very interesting observations, which I quote in extenso. He says :-
"My intention was to confine these chapters almost entirely to statistics. I was going to point out that the learned treatise on caste included in past census reports (which are in reality quite extraneous and unnecessary as part of the census) has led to a tradition that the census Officer is an arbiter on caste questions. I decline to take up that position. I would have given no decision in caste dis-putos, but, would have mentioned the aspiration of such people as the Ahluwalias with all sympathy. I had intended pointing out that there is a very wide revolt against the classification of occupational castes ; that these castes have been largely manufactured and almost entirely preserved as separate castes by the British Government. Our land records and official documents have added iron bands to the old rigidity of caste. Caste in itself was rigid amongst the higher castes, but malleable amongst the lower, we pigeon-holed everyone by castes and if we could not find a true caste for them labelled them with the name of an hereditary occupation. We deplore the caste system and its effect on social and economio problems, but we are largely responsible for the system which we deplore. Left to themselves such castes as Sunar, Tarkhan and Lohar would rapidly disappear and no one would suffer. The large number of people who have refused to record any caste at this census is a sign of progress and the breaking of customary bonds, it is no reflection on the administration of the census. Personally I am very strongly in favour of all caste statistics being abandoned at the next census, though in this I probably go further than most Europeans. Government's passion for labels and pigeon-holes has led to a crystallisation of the caste system, which, oxcept amongst the aristocratic castes was really very fluid under indigenous rule.

There is no justice in labelling a Government official whose ancestors have worked in similar capacities as a Sunar, a Tarkhan or by any other term denoting reoontod buing dosoribod as Adham Shudis of a mingod origin in the Conses Report of 1911 .
a menial occupation with which his family has no connection whatever. Nor is there any good to be obtained from constant reiteration of the doubtful fact that Ahluwalias are of the distilling and wine-selling castes.

If the Government would ignore caste it would gradually be replaced by something very different amongst the lower castes. It is the inflexibility of the lower castes more than of the higher that paralyses the Indian's effortsat economic salvation, and that inflexibility is not inherent in the caste system itself."

While there is much in Mr. Middleton's argument, it is going too far to saddle Government with the responsibility for maintaining caste distinctions and the recognition of caste is a far too radical and inherent social phenomenon to be materially affected by the more or less academic classification adopted for the purpose of the Census reports. Here and there a printed record of a tradition or historical practice may retain a community in the bonds of an effete institution, but in the case of caste distinctions it is very doubtful whether these would be maintained simply on the strength of the Census statistical tables, were the progress of social evolution to require their abolition. It may indeed be argued, and has been argued that Government, so far from maintaining the caste system, has been one of the chief agencies in destroying it. By the introduction of Western Art, 1 Sciences and ideas, many of the old village industries have become unprofitable, and people from all castes have flocked together in increasing numbers in mills, mines and workshops, with the result that the traditional caste has been abandoned together with the traditional occupation. The increase of trade and commerce and of railway transport, which has brought into contact all grades of the community, has tended towards the same end. Likewise Western Education has fostered the idea of equality, and education no longer remains the monopoly of the higher castes. On the whole, therefore, it appears to be nearer the truth that Government, so far from setting up and maintaining caste barriers, has, by its political, educational and economic activities, tended to produce a disintegration of the caste system.

| Hindu, Musalman and Sisit castes for Ponjab only. |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Chief Finda, Musalman and Silsh Casten. | Caster, |  |  | $\begin{aligned} & \dot{8} \\ & \frac{8}{4} \\ & \text { B } \\ & 8 \end{aligned}$ | Castes. |  |  |
|  | Hindw Castes. |  |  |  | $\xrightarrow[\text { Teli }]{\text { Musalman Castes. }}$ |  |  |
| 1 | Jat | 1,055 902 |  | 12 | Teli | 311 279 | 100.0 |
| 2 | Brahman | 982 974 | 994 85 | 13 | Machhi Pathan | 278 | 100.0 |
| $\checkmark_{4}^{3}$ | Chamar Chuhrs | 974 <br> 603 <br> 08 | $85 \cdot 4$ 92.4 | 14 | Sheikh | 257 | $100 \cdot 0$ |
| 5 | Arora | 595 | $83 \cdot 1$ | 16 | Sayad | 250 | 1000 |
| 6 | Rajput | 521 | 27.7 | 17 | Faqir | 239 | 88.3 |
| 7 | Khatri | 393 | 86.2 | 18 | Mirasi | 227 | ${ }^{95.8}$ |
| 8 | Aggarwal | 325 | 92.1 | 10 | Lohar - | 219 | 67.9 60.7 |
| 9 | Kanet | 280 | $97 \cdot 2$ | 20 | Nai | 219 | 60.7 100.0 |
| 10 | Jhiwar | 220 | ${ }^{60} 8$ | 21 | Karhmiri | 170 | $100 \cdot 4$ |
| 11 | Ahir | 200 | 98-6 | 22 | Dhobi | 121 | 100.0 |
| 12 | Kumbar | 185 | $28 \cdot 7$ | 23 | Qaspab | 114 | $100 \cdot 0$ |
| 13 | Daci and Koli | 168 | ${ }^{60} 4$ | 24 | Meo | 114 | 100.0 |
| 14 | Tarkhan | 163 | $26 \cdot 5$ | 25 | Qureshi | 94 | $25 \cdot 3$ |
| 15 | Gujiar | 159 | 25.3 | 27 | Jhivar | 80 | $100 \cdot 0$ |
| 16 | Ghirath | 136 | $99 \cdot 3$ | 27 | Maliar | 80 | $100 \cdot 0$ |
| 17 | Rnthi | - 118 | 100.0 29.9 | 28 | Khoja - | 87 | 100.0 |
| 18 | Nai | 108 93 | 29.9 98 | 29 | Kamboh | 81 | 40.7 |
| 19. | Mali | 83 87 | 108.0 | 31 | Dagar | 74 | $100 \cdot 0$ |
| 20 | Dhanak | 87 84 | 100 26 | 32 | Mallah | 70 | $94 \cdot 0$ |
| 21 | Lohar | 84 79 | 26.0 61.7 | 32 | Kholthar | 60 | $100 \cdot 0$ |
| 22 | Sunar | 79 73 | 67.0 | 34 | Bharai | 61 | 98.4 |
| 23 | Saini | 73 60 | ${ }_{6}^{67}$ | 35 | Barwals | 60 | 894 |
| 24 | Julaha | 0 | $100 \cdot 0$ | 36 | Sarwh Castes. |  |  |
| 25 | Arya Musalman Oastes. | 02 | 100 | 1 | Jat Sima | 1,823 163 | $33 \cdot 4$ 14.3 |
| 1 | Jat | 2,584 | 473 70.7 |  | Chamar | 140 | 22.7 |
| 2 | Rajput | 1,328 | $70 \cdot 7$ 99 | 3 | Thriman | 118 | 16.5 |
| 8 | Arain | 1,080 | $90 \cdot 8$ 90 | 5 | Kamboh (Kamboj).. | 84 | $42 \cdot 2$ |
| 4 | Julahs | 531 | 100.0 |  | Ramgarhia .. | 68 | 87.2 |
| 6 | Biloch | 486 | 74.2 |  | Unspecified | ${ }^{67}$ | 68.4 |
| 6 | Gajjar | 440 | 100.0 |  | Mazhabi | ${ }_{63}^{64}$ | 88.6 13.8 |
| 7 | Awan $\quad \cdots$ | 428 | 98.4 | 9 | Khatii | ${ }_{63}^{63}$ | 13.8 |
| 8 | Muohi | 388 | 67.2 | 10 | Mahtam | ${ }_{4}^{2}$ | 67.0 |
| $\sqrt{10}$ | Kumhar <br> Musualli | 361 | $100 \cdot 0$ | 11 | Saini $\quad \cdots$ | 68 | 48.2 |
| 11 | Tarkhan | 313 | 50.8 | 12 | Jhimar | 62 |  |

212. The marginal statement shows the castes of the 3 great communities which contribute 50,000 or more to the population of the Punjab province. The actual total strength is shown as well as the percentage of the main religion in each raste. The pure castes, namely, those in which the members of only a single religious. group are comprised are as follows :Hindus.
Rathis, Dhanak, Arya.

Musalmans.
: Biloch, Awan, Mussalli, Machhi, Patisan, Sheikh, Sayad, Kashmiri,
Qassab, Qureshi, Maliar, Moghal, Khoja, Dogar, Khokhar.

There are no pure castes.

The castes which include the fewest of other religions are the Mazhabi ( 98.5 per cent. of Sikhs), Ramgarhia ( $87 \cdot 2$ per cent of Sikhs), and Mahtam ( 67.0 per cent of Sikhs).

Castes which show great admixture of all three religious communities are the Jat ( $19 \cdot 3$ per cent. Hindus, $47 \cdot 3$ per cent. Musalmans, $33^{\circ} 4$ per cent. Sikhs,) Rajput ( 27.7 per cent. Hindus, 70.7 per cent. Musalmans,) Kumhar ( 28.7 per cent. Hindus, $67 \cdot 2$ per cent. Musalmans), Gujjar ( $25 \cdot 3$ per cent. Hindus, $74 \cdot 2$ per cent. Musalmans) and Nai ( $29 \cdot 9$ per cent. Hindus, 60.7 per cent. Musalmans). As was to be expected, the functional castes, such as Kumhar, Tarkhan, Guj= jar, Nai, Lohar and Julaha contain a great proportion of two or more of the main religious communities.

As regards the pure Hindu castes the Dhanak belongs especially to Hindostan and not to the Punjab proper, and is confined to the South-East of the Province. It is a low caste tribe and even the Chuhra is said to look down on: it. The Rathis are said by Mr. Rose to be
(1) a tribe of Jats in Rohtak who are among the old inhabitants of the: tract, and claim to be by origin Tanwa Rajput, or
(2) a caste of Rajputs found in the Kangra Hills and in Chamba.

According to Hutchison the Rathis:-
" as a hill tribe, are older than the Brahmos and Rajputs, who came from the plains at a latter period ; and we may safely conclude that the oldest strata among them are descended, either directly or by the half-blood, from the early Aryan colonists of the hills. The first Aryan immigrants, as we now know, intermarried freely with the aboriginies, resulting in a fusion of the two races from which may have sprung the various low caste tribes now forming such an important part of the population. But the completeness of the fusion was not at all times uniform, and later waves of immigration may have remained more or less isolated, forming the nucleus of the community which now comprises the Thakurs and Rathis. $\qquad$ ..We may, therefore, regard the Thakurs and Rathis as being now a conglomerate people, representing the ultimate product of the welding together of many different contributions to their ranks."

The term Arya refers to those Hindus who have adopted certain religious beliefs, and, therefore, naturally, does not include any Musalmans or Sikhs. Of other nearly pure Hindu tribes the Brahman ( $99 \cdot 4$ per cent), Kanet ( 97.2 per cent), Ahir ( 98.5 per cent.), Dagi and Koli ( $99 \cdot 4$ per cent.), Ghirath ( $99 \cdot 3$ per cent.) and Mali ( 98.9 per cent) may be mentioned. Of the purely Hindu castes, the Rathi, the Kanet, the Dagi and Koli, and the Ghirath are residents of the hills, and wore, therefore, more likely than Hindus in the plains to resist conversion to Islam. On the other hand, the absence of any pure Sikh castes is to be attributed to the fact that Sikhism was a religion adopted by Hindus, who would naturally retain their original caste.
213. As pointed out in paragraph 212 no attempt has been made at this Census to group castes according to their social standing, but in Subsidiary Table tlon olassicasI an effort has been made to classify them as far as possible according to their tradi- acoording to tional occupations. The subject will be dealt with in detail in Chapter XII, and lional oceanit will suffice to refer here to the groups in each province according to occupa-

| Punsat. |  | Detifi |  |
| :---: | :---: | :---: | :---: |
| Treditional ocoupation |  | Traditional ocoupation |  |
| Culeivators | 454 | Cultivatora | 58 |
| Woavore and Cardors | 79 | Tradore and Pedlara | 247 |
| Tradore and Pudlare Lanthor workerg | 77 | Weavora and Cardera | 112 |
| Priuts and Dovotoce | 56 | Priests and Devotcoa | 107 |
| Scerongnta -. | 64 | Astrclogers | 101 |
| Astrolugers $\quad$. | 40 | Cattle rearors | 78 |
| Carpontors $\quad$. | 41 | Scavengors .. | 50 |
| Catto roarora $\quad .0$ | 30 | Confectioners ${ }^{\text {a }}$ | 49 |
| Eishermon and Boatamon. . | 30 | Fish rmen and Boatmon. | 28 |

tional classification. The list is given in the margin.
214. The variation in popula- variations tion of the various castes since whes 1911. 1881, is exhibited in Subsidiary Table II appended to this chapter, and these variations should be compared with a figure of $5 \cdot 6$ per cent. increase in the total population of the provinces, Punjab and Delhi. The more noticeable increases are found in the case of the Kamboh $(+15 \cdot 3$ per cent.), Khokhar ( $+15^{\circ} 4$ per cent.), Mahtam ( +15.3 per cent.), Mussalli ( +16.6 per cent.), Qureshi ( +40.2 per cent.), Rathi ( $+20 \cdot 7$ per cent.), Khoja ( $+38^{\cdot 1}$ per cent.), and Rajput ( $+18 \cdot 6$ por cent.) ; while marked decreases are shown by Chuhra ( $-17 \cdot 4$ per
cent.), Dumna ( -49.0 per cent.), Ghirath ( -19.9 per cent.), Kanet ( -28.6 per cent.) and Sunar ( $-17 \cdot 9$ per cent.).

Whether these variations are significant, and if significant, to what causes they are to be referred, would require more examination than is possible at the present stage.
Baropenus and Anglo. Indlans.
215. Imperial Table XVI gives the data for sex and age of the European and Anglo-Indian population for each district and State in the Punjab. The distribution of Europeans and Allied Races in the various districts of the Punjab

| Distmets oomthibutina pbrbons. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Under 20. | 20 to 50. | 50 to 100. | 101 to 500. | 801 to 1,000 | $\begin{aligned} & 1,000 \text { to } \\ & 2,000 . \end{aligned}$ | over 2,000. |
| Hissar. <br> Karnal. <br> Jheng. <br> Dera Ghazi Khan. | Rohtak. <br> Ludhiana. <br> Sheikhupura <br> Gujrat. | Gurgaon. <br> Kangra. <br> Gujranwala. <br> Shahpur. <br> Jhelum. <br> Montgomery. <br> Lyallpur. | Hoshiarpar. Amritsar. Gurdaspar. Attock. Mianwali. Muzafinar. garh. | Jallandur | Ambala. <br> Ferozopore. Bialkot. Multan. | Simla. Lahore. Rawalpindi. |
| Distribution of Anglo-Indians in the Districts of the Punjab. |  |  |  |  |  |  |
| Bolow $\delta$. | 6 to 20. | 21 to 50. | 51 to 100. | 101 to 800. | $\begin{aligned} & 501 \text { to } \\ & 1,000 \text {. } \end{aligned}$ | over 1,000. |
| Rohtak. <br> Kangra. <br> Heshiarpur. <br> Luthiana. <br> Ferozepore. <br> Attick. <br> Murafargarh <br> Ders Ghezi <br> Khan, <br> Lyallpur. | Karnal. . Jundur. Sheil chupura Jhelum. Montgomery Joang. | Gurdospur. <br> Gujranwala. <br> Gujrat. <br> Shahpir. <br> Mianwali. | Hismar. Gurgaon. Amrituar Sialkot. | Simla. Rawalpindi. Multan. |  | Ambala Lahore. | is shown in the table in the margin. The districts containing the headquarters of Government and then the districts containing military cantonments natturally have the greatest number of Europeans. No othercomment on the figures is $\mathrm{re}-$ quired. The total num- ber of British subjects of European and Allied races, including Armenians was 21,546 comprising, 15,860 males and 5,686 females. Of the total, number of persons 21,154 , or over 98 per cent., reside in British Territory. No definition of the term Anglo-Indian was adopted for the preparation of the Census Schedule. The total number of Anglo-Indians recorded in the Census is 4,499 (2,397 males and 2,102 females). The districts of Lahore, Ambala, Rawalpindi and Multan alone include more than 100 Anglo. Indians each. If the term Anglo-Indian is to include all. those who have Indian and English blood in their veins from their recent ancestry then the census figures seem remarkably small, and there appears to be no immediate prospect of obtaining the correct number of persons who should be classed as Anglo-Indians in this sense. The total number of persons returned as of European and Anglo-Indian descent is 26,454 while the number of persons returning one or other European languages as their mother tongue was 27,075 . The agreement is as close as could be expected.




## CHAPTER XII.

## Occupation and Industries.

gection l-GexEral gurvey of occupations.


#### Abstract

216. Roference to statistica. 217. System of onumeration and nature of information. 218. Saheme of 216. Roforence to statistica. 217. System of onumeration and nature. Projab industries. 221. Delhi lasaifcation. 210. General diatribution of occupations in the provinces. 220. promier position of agriculture. industrien. 222. Economio croas-oleavage of ocoupations. 223. Tho promiar podministration and liberal 224 . Induntries othor than agricustare. arta. 228. Miscallaneous occupations.


SECTION IL-LOCAL DISTRIBUTION OF OCCUPATIONS.
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## Section 1.-General survey of occupations.

216. The statistics of occupation and industries will be found in Imperial Referance Tables XVII to XXII. Table XVII is a general table, showing the number of to statitiles. persons following each group of occupation, according to the scheme of classificabion prescribed-by the Census Commissioner, for each district and State, and for the four cities of Lahore, Amritsar, Multan and Delhi. Table XVIII showis the subsidiary occupation of persons whose principal occupation is agriculture. This table is sub-divided into three parts for (1) rent receivers, (2) rent payers, and (3) farm servants and field labourers.

Table XIX gives the number of persons pursuing certain selected subsidiary occupations combined with certain principal occupations.

Table XX shows the distribution of occupations by religion for each province as a whole, and for the cities of each province.

Table XXI furnishes particulars of occupations of selected castes and races in areas where they are especially numerons or otherwise important. The occupations are arranged under 13 main heads which correspond to the sub-classes of the scheme of olassification.

Table XXII which embodies the results of the industrial census is dividedinto seven parts:-

Part I shows for the province as a whole the number of persons employed in each kind of industry, distinguishing between industrial establishments in which meohanical power is used, and those in which it is not, and classifying them according to the number of persons employed.

Part II gives the district figures without the classification of establishments according to power and number of persons employed given in Part I.

Part III gives the classification of industrial establishments according to the class of owners and managers.

Parts IV and V deal with the caste, race, and birth-place of skilled and unskilled workmen respectively in selected industrics.

Part VI furnishes details of the power employed in factories.
Part VII gives the number of looms in use in textile establishments.
The salient features of the statistics are exhibited in the following two sets of Subsidiary Tables appended to this chapter:-

## Occupational Subsidiary Tables.

I. General distribution by occupation (Punjab and Delhi).
II. Distribution by occupation in Natural Divisions.
III. Distribution of agricultural, industrial, commercial and professional population in Natural Divisions, Districts and States.
IV. Occupations combined with agriculture (where agriculture is the subsidiary occupation).
V. Occupation combined with agriculture (where agriculture is the principal occupa,tion).
VI. Occupation of females by sub-classes and selected orders and groups (Punjab and Delhi).
VII. Selected occupations 1921, 1911 and 1901.
VIII. Occupations of selected castes (Punjab and Delhi).
IX. Number of persons employed on the 18th March 1921 on Railways and in the Irrigation Department, in the Punjab and Delhi.
IX-A. Number of persons employed in the Post Office and Telegrajh Department on the 18th March 1921 in the Punjab and Delhi.

## Industrial Subsidiary Tables.

I. Distribution of industries and persons employed.
II. Particulars of establishments employing 20 or more persons in 1911 and 1921.
III. Organisation of establishments.
IV. Place of origin of skilled employees.
V. Place of origin of unskilled employees.
VI. Distribution of certain races in certain industrial establishments.
VII. Proportional distribution of adult women and of children of each sex in different industries.
VIII. Distribution of power.

Actual entries of occupation returned are given according to groups and in alphabetical order in Appendix B to Part IV of the Census Report.
Systom of 217. The system of enumeration was the same as in 1911. Of the 16 ond naratur ot columns in the census schedule, three were provided for the entry of occupation
 as given in the margin. In column 9 was to be entered the principal occupation or means of livelihood of all persons who actually did work or carried on business whether personally or by means of servants, or who lived on the income of private property or on their pensions, etc. Column 10 was reserved for any occupation which the actual worker, shown in column 9 , might pursue in addition to his principal occupation, or for any supplementary means of livelihood which he might possess. It was specially laid down that column 10 was to be left blank in the case of dependants, or those persons who had no additional occupation. In the case of women, children and old or infirm persons who did not do work or carry on business, either personally or by means of servants, the principal occupation of the bead of the family or other person who supported them was to be shown in column 11. These general instructions were supplemented as in 1911 by special directions issued regarding the filling in of each column. The directions put briefly were:-
" (1) Column 9.-Only those women and children should be shown as workers who help to augment the family income. To illustrate this rule it was stated that a women who looked after
cher house and cooked the food was not a worker but a-dependant, whereas a woman, who collected and sold firewood or cowdung was thereby adding to the family income and should be shown as a worker. Similarly, a woman who regolarly assisted her husband in his work (e.g., the wife of a potter who fetches the clay from which he makes his pots) was an actual worker, but not one who merely rendered a little occasional help.
(2) Vague words like "Labour" or "Service"" or shopkeeping should be avoided. In the case of service, distinction should not onlybe made between the different kinds of service, but the exact occupation followed should be recorded. In the case of clerks, the occupation of their employers must be shown. Persons living on agriculture must be distinguished as rent receivers (malik) and rent-payers (mazariah).
Column 10.-Where a man has two occupations the principal one is that on which he relies mainly for his support and from which he gets the major part of his income. Subsidiary occupation should be entered if followed at any time of the year (whether followed throughout the year or during a part of it),"
In spite of the clear instructions issued, and of the trouble taken by district officers to train the enumerators, the entries returned in the schedules are not free from doubt. In numerous cases, particularly in the Multan district, generic torms like "Labour" and "Service" were used, and such entries for want of exact specification were classified as belonging to the general group. It is for this reason that the number returned under the head "Insufficiently described occupation" is excessive.

The compilation of Table XVII showing occupations of population was very difficult, and every precaution was taken to make it as accurate as possible. An alphabetical index of occupation was prepared in Urdu on the basis of the index supplied by the Census Commissioner. The task of marking the occupation entered in the sorters'tickets of Table XVII with the group number was entrusted to one Inspector, who was placed in charge of a batch of selected compilers trained previously for this purpose. The work of the Inspectors was supervised by the Personal Assistant who was in general charge of the compilation office.

When this branch of the work was finished, the group totals were transferred to the compilation sheets.
218. The table in the margin shows the number of classes, sub-classes,

|  |  | 1891. | 1801. | 1911. | 1821. |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Oressco |  | 7 | 7 | 4 |  |
| Sub-olarsos | .. |  |  | 12 | 12 |
| Ordors | $\cdots$ | 24 | 24 | 55 | 56 |
| Groupe | . | 478 | 820 | 169 | 191 | orders and groups into which occupa-

Scheme of classilieation.
altoration was made after Imperial Table XV class D instead of class $\mathrm{C}_{\text {. . Thinted, an }}$ the fir 1013 to 1,018 printed, and in consequence figuguros in that table in col figures in the corresponding columns 1,203 to 1,208 of sub-class 9 : the corresponding columns for the totals in olass $D$ must be increased by the same figures.

The only change in the orders is the addition of order 56 "other unclassified non-productive industries". When we come down to the groups however there is a considerable increase in their number as well as a shuffling of occupations between the groups. It is clear, therefore, that while comparison between the numbers of persons engaged in the various classes, sub-classes, and orders of ccoupations for the years 1911 and 1921 is feasible, it is very difficult indeed to make a comparison of the oconpations in the different groups. So far' as progressive changes are concerned we are not in a position to make a comparison with
the conditions obtaining prior to 1911 .

## General dis-

 ributuan of 219. The statement noted below exhibits the actual and proportional occapations In the pro vinces. thistibution of population of the provinces by occupational classes and sub-classes, the supported population including both actual workers and dependants.| Class and sug-olasg. | Punjub. |  | DriII. |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Population (eupported) (Bupported). | No. pcr lone poof the popla. tion. | Population (supported). | $\left\{\begin{array}{c} \text { No. por } \\ \text { oo poo of } \\ \text { the popala- } \\ \text { tion. } \end{array}\right.$ |
| A.-Production of baw materi |  |  |  |  |
| 1.-Exploitation of animals and vegetation | 15,191,205 |  | 143,050 |  |
| II.-Exploitation of minerals .. | 20,297 | 0 |  | ${ }_{2} 29$ |
| B.- Prerparatton and supply of material gubstanors | 7,044,618 | 281 |  |  |
| III.-Industry .. | 4,834,248 | 193 | 160,768 | ${ }_{309}$ |
| IV, - Trangport $\quad \because \quad \because$ | 487,660 | 10 | 160,762 | ${ }^{309}$ |
| V.-Trade - .. | 1,722,710 | 69 | 75,622 | 155 |
| O.-Publio Admintistration and Liberal abts | 958,411 |  |  |  |
| VI.-Public force. . . | 263,268 | 11 | 35,141 <br> 0,560 | 72 |
| VII.-Publio Adminitutration | 158,828 | 3 | 8,742 | ${ }^{20}$ |
| VIII.-Professions and Liberal Arta | 636,314 | 21 | 16,830 | ${ }^{18}$ |
| D.-Miscrllanbous | 1,884,529 | 75 |  |  |
| IX.-Persons living on their incomo | 1,83,915 | 3 | 4,376 | ( $\quad 1$ |
| XI.-Insufficiently desoribed ocounations | ${ }_{572}^{639,103}$ | - 25 | 23,688 | 18 |
| XII.-Unproductive .. .. | 608,577 | 23 <br> 4 | 19,988 $\delta, 830$ | 12 |

The above distribution is exhibited graphically in Diagram 63 below :-


Punjab In dustries. which agriculture holds among the industries of the province is clearly emphasised, 60.5 per cent. of the population depending on agriculture for their means of subsistence. Out of a total of $15,213,502$ persons supported by the production of raw materials no less than $15,191,205$ persons are supported by the exploitation of animals and vegetation ; of the persons engaged in the exploitation of animals and vegetation $99 \cdot 9$ per cent. depend on pasture and agriculture for their livelihood, and 0.1 per cent on fishing and hunting. The total number of workers and dependants supported by ordinary cultivation (as distinct from the growing of apecial products and market gardening, forestry and raising of farmstock) is $14,775,303$. Over $12 \frac{1}{2}$ millions, or almost exactly half of the population, are ordinary cultivators ; just over 1 million, or 4 per cent., live on the incomne from
the rent of agricultural land; 2 per cent. of the population or 506,000 are farmservants and their dependants, and 628,000 ( $2 \frac{1}{2}$ per cent.) belong to the group field-labourers and their dependants. Only 39.5 per cent. of the population depend on employment other than agriculture for their means of livelihood; of these 19 per cent. are engaged in industries of different kinds ( 5 per cent. in industries of dress, 4 per cent. in textile industries and the remainder in other industries).
The number registered under the head Transport is 487,060 ( 2 per cent. of the population). Of the total population supported by transport as a means of occupation 408,333 persons ( 84 per cent.) are employed in transport by road and rail; trade supports nearly 7 per cent. of the population; public administration and liberal arts 3.8 per cent. The miscellaneous class accounts for 7.5 per cent. of the population. Professional beggars alone number 585,186 or nearly four times as many as public servants, civil employees and their dependants), and it actually exceeds the total number of persons $(536,314)$ supported by all the professions and tiberal arts put together.
221. The population of the Delli Province recorded for the 1921 census Delm induswas 488,188 , of whom no less than 304,420 live within the limits of the municipality, the Imperial Area, old and new cantonments and civil lines, thus less than 38 per cent. of the Delhi Province lives in rural areas, and it is not therefore surprising to find that only 29 per cent. are dependent on cultivation. Industries support 31 per cent. of the population, trade 15.5 per cent., and miscellaneous occupations 11 per cent., of which domestic service accounts for 4.8 per cent., and professional beggars less than 1 per cent., compared with $2 \cdot 3$ per cent. of professional beggars in the Punjab. Whether this disproportion in the number of beggars in the Punjab as compared with the Delhi Province is due to the absence of charitable sontiments in the latter place, I am unable to say.
222. National prosperity is generally measured by the value and variety of a country's material possessions, its food, and houses; by the mechanical power at its disposal, its instruments of precision in use for scientific research and for the practical arts of navigation, medicine, surgery, and warfare : by its objects of luxury and virtue, its books, its paintings, its music, its ornaments, and by its games.

Now the material resources of no country, even of such vast extent as the United States of America, provide all the requisites of modern civilisation in its highest form, and some of them have to be brought from abroad. As imports have to be paid for by exports, it is clear that unless a country has the most exceptional variety of natural resources it cannot be prosperous without exports. It is conceivable for example that America endowed as she is with coal, iron, cotton, wood, and water-power, would be fairly prosperous without exporting anything ; but the Punjab, for half a century at least, is hardly likely to produce a tithe of the various articles which modern civilisation demands, and without exports would have to forego most of the benefits which modern civilisation confers on the nation which can buy outside the confines of its own borders.

Thus from the stand-point of natural welfare the various occupations may be grouped into (1) occupations concerned wholly or partially with exports, (2) occupations concerned solely in the production of articles of local consumption. It would be foolish to assert that one group is more important than the other; both groups contribute to the natural well-being: but it is the occupations that lead to export that are the safer gauge of that surplus production of wealth which every nation must secure if she is to be prosperous.

This conception leads to the economic cross-cleavage by virtue of which all occupations may be regarded as productive of an exportable surplus or not. It may be objected that theoretically there is no economic distinction between the labour of a man who grows 5 acres of wheat of which one acre is exportable surplus, and that of a man who grows tobacco for his own consumption, both add to the gross wealth of the province; but only the former adds to its net wealth, that is to its transferable capital. As it is the accumulation of capital which enables great developments in industries to proceed, the distinction appears to be valid, in spite of its resemblance to the doctrines of the Physiocratic School.

Now taking the figures for 1920-21 the value of all the articles exported from the Punjab was about 40 crores of rupees of which only 3 groups of articles suppliod exports of over 1 crore of rupees, these being grains and pulses ( 23 crores) oilseeds ( $1 \frac{1}{2}$ crores) and raw cotton ( $4 \frac{1}{2}$ crores). Thus these three agricultural

Eenomila Cross-clear. age of ocerpations.
products (food-grains, cotton and oilseeds) together provide about 75 per cent. of the total value of the poovincial exports. Of the remaining 10 crores of rupees. worth of annual exports, raw materials form the larger proportion. The only important articles manufactured in the Puujab which are exported are chemicals ( 11 lacs), leather ( 11 lacs), iron and steel ( 48 lacs) and sugar ( 82 lacs). Thus the province has moved but a very little way towards the preparation of its natural products for immediate human use, and we are justified, therefore, in saying that the exportable surplus, and, in consequence, the wealth of the province is dependent almost wholly on agriculture, and that without the production of that excess quantity of raw material the annual increase in the wealth of the province crores would be diminshed by nearly 35 crores of rupees. If, therefore, the Punjab is to forego the value of its exported agricultural produce, while maintaining its annual income, there would have to be a gigantic development of industrial enterprise so as to balance the loss of 30 crores or more which is annually exported from the province as raw material. Such a development seems to be out of the question during the next decade.
The Pro-
223. It has already been noted that agriculture supports over 00 per a country of peasant proprietors, and according to Mr . Calvert, there is an increasing tendency for it to become a country of petty landlords living on rent. This tendency is very marked in the figures of the last decade, as the number of persons living on income from rent of agricultural lands has increased from 626,000 in 1911 to $1,008,000$ in 1921 . On the other hand the numbers of farm servants and field labourers has actually decreased from $1,192,000$ in 1911 to $1,134,000$ in 1921. Mr. Calvert writes:-
"I am inclined to think that the increase in rent-receivers is to a considerable extent covered by persons who are able to represent themselves as living on rent owing to the rise in prosperity. Rawalpindi and Jhelum have amassed large sums during the War; Lyallpur, Shahpur and Gujrat have amassed wealth by the rise in price of agricultural produce. The decline in labourers and the increase in the number of tenants indicate a tendency to rent the land rather than cultivate through hired labour."
Mr. Calvert estimates the number of owners of holdings of over 48 acres to be about 200,000 . If we take the number of persons per family as $4 \cdot 5$, that is to say, equal to the number of persons per occupied house in the Punjab, the number of persons supported by the rent of agricultural lands will be about 900,000 , which agrees very closely with the 886,000 shown for total workers and dependants by the census figures.
Indastries $\quad 224$. When the importance of agriculture to the wealth of the province Iodurtrles
othor
ariculture, has been appreciated, the fact that other industries exist in the Punjab may be noted. Some of these are actually important, but the majority of them can only be regarded at present asin their infancy, and are therefore only of potential value to the province. Of the 28.1 per cent. of persons engaged in the preparation and supply of material substances just over two-thirds are engaged in industries the proportion of workers and dependants among the different industries being. as noted in the margin. Thus the most important industries at the moment are

Proportion of persons in different industries in the
Pmjab.

|  |  |  |
| :---: | :---: | :---: |
|  |  |  |
| animsl lingdom | 10.5 | " |
| Wood | 4.9 | " |
| Motal .- $\quad$ - | 4.9 7.8 | " |
| Ceramion .- * | $3 \cdot 2$ | " |
| Chemical produots . ${ }^{\text {a }}$ | 4.4 | " |
| Food industries $\because{ }^{\text {a }}$ (he toilet ${ }^{\prime \prime}$ | $20^{4}$ | " |
| Industries of dresa and the toile | $0 \cdot 5$ | " |
| Furnitare industrice $\quad$.. | $3 \cdot 3$ |  |
| Building industrics .. ${ }^{\text {and }}$ undefined | 3 | $\cdots$ |
| other miscellaneous and undenised induetries | 170 | * | those that come under the head "industries of dress and the toilet," textiles, wood, ceramics and metal industries. Of those engaged in industries of dress and the toilet, shoe: boot and sandal makers provide no less than 51.2 per cent., while barbers, hairdressers and wig makers provide 26.1 per cent., and tailors, milliners, dress makers, darners and embroiderers of linen $12 \cdot 2$ per cent. Washing, cleaning and dying provides for 14.6 per cent. of persons, under this head.

The chief textile industry is that of cotton-ginning, spinning, sizing and weaving which provides for no less than 93 per cent. of persons engaged in the manufacture of textiles. The only other textile industry of present importance is that of the manufacture of rope, twine and string; but the industries of fibre preparation, wool-carding and spinning, silk-weaving and spinning, and the preparation of lace, crepe, and embroideries are all probably capable of a large amount of development, and are potentially important.

Of those engaged in wood industries, carpenters, turners and joiners provide $80 \cdot 1$ per cent., while basket-makers and thatchers and workers in bamboo and reeds support $17 \cdot 4$ per cent. of persons.

Of those engaged in ceramics the vast majority are provided by the potters and earthen-pipe and bowl-makers ( $79 \cdot 4$ per cent.) and brick and tile makers ( 10.4 per cent.), while there are 0.9 per cent. of persons engaged in themanufacture of glass bangles, glass beads, and necklaces and glass earstuds. The glass industry generally, which had a splendid opportunity during the war and the absence of Austrian competition, has failed to make much, if any, progress.

Of the workers in metal the vast majority are employed in the manufacture of implements and tools of iron ( 88.4 per cent.), while next come the workers in brass, copper and bell-metal ( 10.1 per cent.). Workers in other metals except precious metals (tin, zinc, lead, quicksilver, etc.) provide only 0.5 per cent. of all workers in metal. The number of goldsmiths and silversmiths has not been recorded independently and they appear under order 18, group 98, as "workers in precious stones and metals, enamellers, imitation jewellery makers, gilders, etc." As this group comprises no less than 175,696 persons, it seems likely that goldsmiths and silversmiths and their dependants exceea 100,000 in number.

The production of chemicals may be referred to as a potentially important and growing industry for which there may be a great future in the Sub-Himalayan region when the supply of electric power from the Himalayan foothills has become an accomplished fact, at anything like the cheap rate ( 150 rupees per kilowatt year) estimated by the experts. In particular the production of nitrates from atmospheric nitrogen may become a source of great wealth, to the province. At the present moment the vast majority ( $94 \cdot 4$ per cent.) of persons engaged in chemical industries depend on the manufacture and refining of vegetable oils. The manufacture of soap, candles, lac, cutch, perfumes, and miscellaneous drugs account for 2.1 per cent., the manufacture of matches and explosive materials for 1.7 per cont., and the manufacture of aerated and mineral waters and ice 1.3 per cent. of the persons supported by the manufacture of chemical products.
225. The total number of workers and dependants under the head transport Transport, is 487,060 , and these form $8 \cdot 9$ per cent. of those engaged in the preparation and supply of material substances.

Of those ongaged in occupations under the sub-class transport, workers and their dependants engaged in trunsport by road account for just over one-half, while railway employees account for one-third; the remaining one-sixth being made up of workers and their dependants engaged in transport by air ( 0.1 per oent.), transport by water ( 11.8 per cent.), and workers and their dependants in the post office, telegraph and telephone services ( $4 \cdot 4$ per cent.). Of those engaged in providing transport by road the major portion are owners and drivers of camels, mules, asses and bullocks, who form $64 \cdot 3$ per cent. of all transport workers. The owners, munagers and employees of country-carts and other vehicles account for 13.0 per cent. of transport workers.
226. The sub-class trade includes 22.4 per cent. of the workers and their Trade dependants engaged in the preparation and supply of material substances, and occupations under this sub-class are divided into 17 orders and 34 groups. The largest order is that of "other trades in food-stuffs" which covers the large number of retail shopkeepers of oil, salt, fruit and vegetable sellers, grain, pulse, and tobacco sollers, and dealers in sheep, goats and pigs, hay, grass and fodder. In the present oensus the ordinary nun-tel-seller has been included under the order "other trades in food-stuffs," whereas in 1911 he did not appear under thi shead, so that the number of workers aud dependants ofthe petty slopkeeper typeappearsto haveincreased from 5,248 in 1911 to 675,477 in 1921. Actually we must look to group 135 of the 1911 census to fiud the data for the numbers of petty food-sellers under the head "shopiceepers otherwise unspecified". As these were found to number 676,945 in 1911, the , un-tel-seller would not appear to be thriving. But the two census figures are not strictly comparable.

After the petty shopkeeper the most important trader is without doubt the money-lender. The term bania which is the ordinary equivalent for moneylender covers a much wider range of occupations than mere money-lending. According to the classification adopted at the present census, bank-managers, money-lenders, exchange and insurance agents, money-changers and brokers and their employees form a single group comprising $9 \cdot 3$ per cent. of those engaged in trade, while group 122 includes brokers, commission agents, commercial travellers, warehouse owners and their employees accounting for $1 \cdot 5$ per cent. persons engaged in trade. The variation in the numbers of money-lenders is examined in paragraph 237 below. After money-lending, trade in textiles occupies the most important position finding support for 7.5 per cent. of those engaged in trade. In addition, trade in skins, leather and furs supports 1.5 per cent. of those engaged in trade, and trade in wood 1.2 per cont. Trade in chemical products includes the preparation and sale of drugs, dyes, paints, petroleum, explosives, etc.

Trade in clothing and toilet articles furnishes support for 1.4 per cent. of those engaged in trade, while dealers and hirers in mechanical transport, motors, cycles, carriages, carts, boats, elephants, camels, horses, cattle, asses and mules, form 3.8 per cent. of all traders. Less than 1 per cent. of all traders are engaged in trade in metals, pottery, bricks and tiles, trade in building materials occupies 0.1 per cent. and dealers in fuel form 0.4 per cent. Traders of other sorts form 15.5 per cent. of the transport workers, and these are mainly general shopkeepers and shopkeepers otherwise unspecified.
 227. These occupations provide for the support of only 4.1 per cent. of arts: tration ( 15.5 per cent.), professions and liberal arts ( 52.3 per cent.) and persons living on their income ( $6 \cdot 3$ per cent.) Thus only just over 1 per cent. of the persons tion is engaged on the protection of the province from external aggression and in the maintenance of internal law and order. These numbers can certainly not be said to be excessive. The total Imperial Army at the last census is given to be '74,614, which is only 0.36 per cent. of the population of British Territory, while the army of Indian States includes 9,515 males which is only 0.22 per cent. of their population. The total police force of the province, including village watchmen, is 27,357 for British Territory and 5,697 for the Punjab States, which is only $0 \cdot 13$ per cent. of the population both for British Territory and the Punjab States. Including village watchmen the actual numbers in the police were 33,054 which is less than 1 policeman for every 4 square miles of British Territory. In view of this and the preceding figures it can hardly be argued that the Punjab is overpolicen.

The professions and liberal arts support 536,314 persons, or just over 2 per cent. of the total population.

Of those supported by the professions and liberal arts, religion accounts for 16.8 per cent., law 3.4 per cent., medicine 8.6 per cent., instruction 10.3 per cent., and letters and arts and sciences $16 \cdot 7$ per cent. The strong appeal which religious sentiment has for the most of people in the Punjab is well emphasised by these figures; indeed for the most part the people seem to prefer vicarious to personal religious exercises and observances. This conclusion must not be interpreted as implying an absence of deep religious fecling; on the contrary there are undoubtedly many devout and orthodox Hindus, Musalmans, Sikhs and Christians to whom religion means something more than mere adherence to dogma; but it is unquestionably true that religion is not merely symbolised by the idol, the prayer or the priest but is the religion itself in the eyes of the vast majority.

The number of lawyers of all kinds including Kazis, law agents and Mukhtiars is 2,477 actual workers or just under 1 for every 10,000 inhabitants of the Punjab. This does not seem an unduly large number and it is to his prominence in the educated and political life of the community rather than to his numerical strength that the lawyer owes his apparent ubiquity.

Medicine accounts for 8.6 per cent. of the persons supported by public administration and liberal arts. This includes medical practitioners of all kinds, dentists, occulists, and veterinary surgeons, midwives, vaccinators, compounders, nurses, masseurs, etc.

Instruction accounts for the support of 10.3 per cent. of the persons engaged in the professions and liberal arts, school teachers forming a greater proportion of these.

The letters and arts and sciences support 89,516 workers and dependants. This would seem to be a satisfactory state of affairs until it is observed that 68.2 per cent. of these persons are music composers and masters, players on all kinds of musical instruments, singers, actors and dancers; while no less than 17.2 per cent. are conjurors, acrobats, fortune-tellers, and the like. The actual number of well-educated persons engaged in the pursuit of letters and arts and sciences is small, and is included in the groups 176 (architects, surveyors, engineers, and their employees) and 177 (authors, editors, journalists, artists, photographers, sculptors, astronomers, meteorologists, botanists, astrologers, etc.). These two groups together supply 4,350 male and 108 female wonkers. There are scarcely 20 research workers in the Punjab, so great is the neglect of the advancement of knowledge in the province.
228. The miscellaneous occupations of the province suffice for the support miscellanoof 7.2 per cent. of the population, pretty equally divided between domestic service, ous occopainsufficiently described occupations, and unproductive occupations. Domestic tons, service need not be enlarged on, but among the insufficiently described occupations there are a certain number of persons who should be shown under the sub-class of trade or industry. The vast majority of this sub-class is provided by ' labourers and workmen otherwise unspecified ' (group 187).

Of the unproductive occupations, inmates of jails, asylums and hospitals form 2.6 per cent., while beggars, vagrants and prostitutes account for the remaining 97.4 per cent.

If we add to the unproductive persons ( $2 \cdot 4$ per cent. of the population) the numbers of persons living on their incomes we find that only $2 \cdot 7$ per cent. of the population are not contributing to the national income or are not dependants of those who do contribute. On the whole, therefore, the Punjab may be regarded as a nation of workers.

## Section II.-Local Distribution of occupations.

229. In this section it is proposed to examine the loval distribution of a Introductory few of the more important occupations of the Punjab, namely, of agriculture, industry as represented by a few specified groups of occupations, trade, the distribution of the money-lending class, of priests and ministers, and finally of the unproductive group of beggars, vagrants, witches and wizards. Diagrams based on the percentage of persons supported by each of these industries were prepared from the tahsil figures of occupations, and the isopleths were drawn. Unfortunately the exigencies of time and economy prevent their reproduction, and a verbal description must suffice.
230. As is well-known agriculture is a universally prevalent occupation, local dsand only in one tahsil in the Punjab, that of Lahore, is less than one-third of the tribution of population supported by agriculture. Between Lahore 25 per cent. and Kulu 03 per cent. there is, however, a considerable diversity in the percentage of persons supported by agriculture. The regions in which the percentage is below average are those which are favourable to industry and trade; the tahsils in which reside the greatest percentage of persons supported by agriculture are in those zones where no alternative occupation is possible, namely, in the Sub-Himalayan region and in the tracts lying outside the area of perennial canal irrigation. If in fact we exclude the Sub-Himalayan Area the apparently anomalous conclusion is reached that the area which is most favourable to agriculture has the smallest proportion of persons ongaged in this pursuit, while the unwatered deserts of the South-East Punjab, Dera Ghazi Khan and the Thall support a very high percentage of persons by agriculture.

The explanation is simple. Agriculture is the primitive industry of the Pumjab, and in those areas in which agriculture flourished in the past trade sprang up, roads were built, and there resulted that surplus of wealth which has always formed the londstone of ability and enterprise. Where agriculture flourished industries have most readily flourished too. Put in other words we may say that surplus wealth is essential for industrial development, and each country can most readily obtain a surplus of wealth by following the path which its natural rosources makes easiest. In future years, as in the past, the prosperity of Punjab industries is likely to depend on the prosperity of the basic occupation of agriculture.

A very notable area in which there is a ligh percentage of agricultural occupation, in spite of the fact, that it is well served by perennial irrigation is the Lower Bari Doab Colony, the explanation being of course that this colony is of recent development, and though many mandis and cotton-ginning factories have been set up, agriculture still supports more than 60 per cent. of the population. It would not be surprising if 10 years hence the number of persons supported by agriculture in the Lower Bari Doab Colony is less than 60 per cent., and approaching the 55 per cent. which obtains in the Lyallpur and Chiniot tahsils of the Lower Chenab Colony.

The same tendency is bound to be perceptible in the Ferozepore district, and the Bahawalpur State where the extension of irrigation from the Sutlej Valley Project will be an accomplished fact in the near future. The 08 per cent. and 69 per cent. of persons engaged in agriculture in the Fazilka and Muktsar tahsils, respectively, cannot fail to be very much reduced before long by the influence of perennial irrigation. To sum up, therefore, we may say that canal írrigation draws people away from agriculture toward trade and industry. Paradoxical as it may seem the Punjab Canals are the chief industrialising agents of the province.

Looal dis231. The groups named in the margin have been selected as representative Industriss. ${ }^{\text {of }}$ of the industries of the Punjab. The groups support $2,144,379$ persons, being
industries.
 8.2 per cent. of the total population and being over 44 per cent. of the persons engaged in all industries. The local distribution stands out very clearly on the map as a $T$-shaped distribution, the head of the T stretching along the North-Western Railway from Rawalpindi to Ambala and the leg of the T down the Lyallpur Colony. As has been remarked in the previous paragraph, Punjab industries are flourishing in just those areas where agriculture flourishes and where good railway communications
have been developed as a matter of course.

| Local dstrtrbution oftrade. |  | 232. The occupations | specified in |
| :---: | :---: | :---: | :---: |
|  |  | Group. | Total work- ens and de. <br> pendants |
|  | 121. Banks, establishments of credit, exohange and insurance (bank chango and insuranco agents, money ohnagers, and brokers <br> 123. Trade in toxtiles (trado in piecegoods, wool, cotton, sills, hair, <br> 132. Grocurs and sellers of vegetable <br> 152. $\begin{gathered}\text { oil, sant and oreal store-teopers and shop. } \\ \text { Genepers othervise unspecified }\end{gathered}$ |  | 161,483 |
|  |  |  | 130,020 |
|  |  |  | 075,477 |
|  |  |  | 254,126 |
|  |  |  | 1,221,109 |

Shahpur, Lyallpur, Mianwali, Multan, Muzaffargan, Sialkot, Gujrat, Gujranwala, several isolated places like. Pathankot, Amritsar, Dipalpur, Ludhiana, and Bhi wani, together with a narrow stretch of territory. between Anmbala and Sonepat along the Ambala-Delhi Chord Railway.

Of the castes which are engaged extensively in trade the Aggarwal (79:1 per cent.), Arora ( $65^{\cdot 1}$ per cent.), Khatri ( 58.0 per cent.) are Hindu and the Khoja ( 50.2 per cent.) alone is a Musalnan caste ; so trade is a distinctively Hindu occupation, and it is not, therefore, surprising to find the greatest proportion of traders in the North-West Dry Area where Musalmans predominate. In the rest of the province where Hindus and Sikhs are more numerous than Musalmans the trading instinct of the Hindus is of smaller commercial value.
233. ${ }^{\text {Th }}$ The Sub-Himslayan Area contains the greatest proportion of priests Loen ab and ministers, under which head are classed Sadhus, Parohats, Mahants, Mullahs pribets and or Naulvis, Mujawars and Fakirs and others, these being more than 20 per mille mindstare of the total population in Daska, Zaffarwal Pasrur and Raya of the Sialkot district, and in Pathankot and Shakargarh of the Gurdaspur district, and also in the tahsils of Hoshiarpur, Una, Garhshankar of the Hoshiarpur district, Samrala of the Ludhiana district, Naraingarh of the Ambals district, and Hamirpur of the Kangra district. Most of the Central Punjab contains between 10 and 20 priests and ministers per mille of population, while a very large tract of land in the North-; West Dry Area and in the South-East contains less than 10 priests and ministers per mille of population. Thus priests and ministers prefer the old settled districts to the colony areas, but are showing a tendency to migrate towards the latter. Priesta and ministers as a class may be said to avoid areas in which famines were prevalent in the past and where scarcity of food nay sometimes obtain even under present conditions.
234. The total number of persons under group 189 is 590,514 ; of whom Lheas disthe actual workers are $\mathbf{2 0 8 , 7 8 4}$ males and $\mathbf{4 1 , 6 3 1}$ females. The profession of beg- fribgtion of ging is one that apparently can be adopted at an early age, and it seens probable ranas, witebes that the number of actual workers must exceed the number of dependants although ${ }^{\text {and }}$ wiearth. this is contrary to the figures given by the census report. The local distribution ${ }^{\text { }}$ of beggars corresponds very closely with what we know of the distribution of material wealth in the Punjab, the canal colonies showing the largest proportion of beggars and the South-East, extreme North, and the Himalayan region the smallest proportions.

The general agreement between the ascertained local distribution of occupations and the distribution that might be anticipated a priori is evidence of the general relative accuracy of the occupational tables. In other words the amount of misclassification of occupations which occurs in the tables is probably roughly proportionate to the total population of each district or tahsil. The oxtent of systematic misclassification, however, cannot be determined from the consideration of the local distribution.
235. The main features of the distribution of population by main heads ottribu.

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of occupations is shown in the ral divisions
accompanying diagram which shows for each of the natural divisions the relative number of persons engaged in agriculture, industry, commerce, professions and other occupations. As already noted in paragraph 230 agriculture provides a relatively large proportion of occupations in the Himalayan region; industry flourishes in the SubHimalayan tract ; trade is very strongly . represented in the North-West -Dry Area; while professions are most common in the Sub-Himalayan and IndoGangetic Plain West and are least important in the Hima layan tract.

## Section III. - Comparison with Previous Censuses.

236. It has already been pointed out in paragraph 218 that an entirely new scheme of classification was introduced in 1911, 4 classes and 12 sub-classes replacing the 7 classes of 1901 , the number of orders being increased from 24 to 155 and the number of groups reduced from 520 to 169 . In spite of the complete change of classification an attempt was made at the last census to compare the number of persons supported for each group in 1901 and 1911, and the results are shown in Subsidiary Table VII of Chapter XII of the 1911 census. This table shows more conclusively than any amount of argument, how impossible it is to trace the variation of persons engaged in different occupations at two epochs it there has been any change in classification. If we were to accept Subsidiary Table VII of the 1911 Census at its face value the only conchasion would be that within the 4 major classes of occupation Punjab labour and industry was most remarkably fickle and volatile. Nothing could be further from the truth, as it is well known that it is the hardest thing in the world for a Punjabi to break loose from the bonds of his traditional

Table showing change in occupation botween 1001 and 1011 from the Subsidiary Table VII of Chapter XII, Censur 1911.

1. Inoome from ront of agrioul. tural land
2. Ordinary cultivators
3. Agents, managers of landed ostates (not planters), clorks and colloctors, otc. ort
4. Tea, coffoe, oinohona, rabber and indigo plantations biel, vino, arecanut, oto., growers +15.8
5. Wood cutters, etc. occupation. Some alteration in the numbers of persons engaged in the occupational groups would be expected during the course of a decade, but it is quite impossible that variations of the extent noted in the margin can be genuine. The figures chosen are not selected for their particularly high percentage of variation, and prove simply that comparison by groups from one census to altered in any way, is out of the question. The difficulty exists, even if in a slightly less pronounced form, in comparing

| Class and sub-class. | Population supported per 1,000 of the total population in |  | Variation per cont. in strength since 1911. |
| :---: | :---: | :---: | :---: |
| A.-Production of raw matrrial $\cdot$ - | 001 | 600 | $+5 \cdot 6$ |
| I.-Exploitation of animals and vegotation. <br> II.-Exploitation of minerals | 800 | 590 | $+5 \cdot 7$ -36.2 |
| R.-Preparation and supply of ma- | 208 | 283 | $+1.7$ |
| tarial ajbstanobs. |  |  |  |
| III.-Industry | 203. | 105 | $+1.4$ |
| IV.-Transport | 30 | 20 | $-27.0$ |
| V.-Trade $\quad$. | ${ }^{65}$ | 70 | $+16 \cdot 6$ |
| C.-Publio administration akd | 12 | 30 | -4.4 |
| LIbERAL ARTS. |  |  |  |
| VI.-Public Force ato | 11 | 11 | $+2 \cdot 7$ $+11 \cdot 1$ |
| VII.-Public administration ${ }_{\text {VIIL }}$ | 25 | 28 | +11-2 |
|  | 69 | 76 | +35.6 |
| IX.-Porsons living on their income | 2 | 3 | $+15.8$ |
| X-Domestic service .. .- | 21 | 26 | $+30 \cdot 8$ |
| XI.-Insufficiently desoribed occupations. | 11 | $\stackrel{23}{ }$ | $+124 \cdot 1$ |
| XII.-Unproductive .. | 26 | 24 | $\underline{+28}$ | the 1911 figures with those of 1921, and the marginal table which gives the proportional distribution of the population of the provinces under the main heads of occupation, and the percentage variation during the decade must not be regarded as exact. The increase of the number of persons supported .by the production of raw material, namely, $5 \cdot 6$ per cent. agrees closely with the increase of the total population. Most of the other changes are somewhat dubious. For example, the strength of sub-class 2, exploitation 36,132 to 23,037 . The decrease vagueness in the description of is undoubtedly due to increasing vaguenes great increase in the numbers under sub-class 11 "insufficiently described occupations" in which the number of persons has increased by 124 per cent. Nor does


| Groap. | $\begin{gathered} \text { Sctual } \\ \text { workers } \\ \text { (malest). } \end{gathered}$ |
| :---: | :---: |
| 19. Coal mines $\quad \ddot{\square} \quad \ddot{\square}$ | 1,107 |
| 21. Mines and metallic minerals (gold, iron, |  |
| 22. Other minerals (jade, diamonds, limestone, | ,565 |
|  | 88 |
| 24. Extraotion of saltyetre, alum, and other subtances soluble in water | 3,167 |
| Total | 8,631 | the number :of persons $(3,427)$ employed in mines as determined at the Special Industrial Census, taken only 2 months after the general Census, tally with the figures of the Census itself, for which the numbers of actual workers are shown in the margin. Then again the falling off occurring in the number of transport workers is inexplicable except on the

assumption that a certain number of persons engaged in that occupation have now preferred to describe themselves as traders, in which the percentage variation in strength is $+15 \cdot 6$ per cent.
237. Partly as illustrative of the foregoing arguments, but mainly because change in of its own intrinsic interest, a comparison between the number of money-lenders and datribuin different districts at the last 2 censuses has been attempted

In 1911 money-lenders were included together with oank managers, exchange and insurance agents, mozey-changers, brokers, etc., in group 106 while in 1921 they are included in group 121 which comprises also bank managers, exchange and insurance agents, money-changers and brokers and their dependants. In 1911 the total number of workers and their dependants was 193,890 as compared with 106,960 in 1921, from which one might conclude that the number of money-lenders has very much decreased during the last decade. The possibility, however, suggests itself that some money-lenders (who will usually describe themselves as "banias," have been entered under group 107 (brokers, commission agents, commercial travellers, warehouse owners and employees) in 1911, corresponding with group 122 in 1921. Comparing these two groups we find an increase of 10.3 per cent. The safest course, therefore, to adopt is to add together groups 108 and 107 in 1911 and compare it with sum of the groups 121 and 122 in 1921. The sum of the two groups shows a decrease of 10.4 per cent., and there is a strong probability, therefore, that the number of money-lenders in the Punjab has decreased during the 10 years 1911-1921.

If we study the local distribution of this decrease in different parts of the Punjab we find that most of the province has shared in it, the only districts in which there is an increase of over 10 per cent. being Rawalpindi, Lahore, Ferozepore, Hissar, Karnal and Rohtals and the States of Kalsia, Nahan and Nabha. The greatest increases of all (over 50 per cent.) are shown by the districts of Hissar and Rohtak. Mr. Calvert believes that the growth of the Co-operative Credit Societies in the Central Punjab has driven the money-lenders away towards the canal colonies. That the money-lender is disappearing from Hoshiarpur, Jullundur where the number of Co -operative Credit Societies is largest is undoubted, but the Census evidence, so far as it goes, shows that the money-lender prefers to migrate to the South-East Punjab rather than to the colonies. The districts of Lahore and Ferozepore show a marked increase in the number of money-lenders in spite of the fact that there are over 300 Credit Societies in both these districts. On the other hand the number of money-lenders has decreased very much during the last decade in the districts of Dera Ghazi Khan, Muzaffargarh and Multan where the growth of the co-operative movement is less rapid than in must parts of the Punjab.
238. To sum up, there has been very little change in the main occupations of the province during the decade and the observed variations are probably almost entirely due to errors of classification. Thus agriculture then, as now, supported just over 60 per cent. of the population. The persons engaged in the preparation and supply of material substances has nominally fallen from $29 \cdot 7$ per cent. to 28.1 per cent.: the persons engaged in public administration and liberal arts has diminished from 4.5 per cent. to 4.1 per cent.: while the miscellaneous class has increased from $5 \cdot 7$ per cent. to $7 \cdot 2$ per cent. The only conclusion we can draw from these figures is that there has beenfro significant ohange in the occupations of the province. The same conclusion applies to most of the ocoupations under the different orders, though, here and there, there may be a significant change : for example, the percentage of persons engaged in the perparation of chemical products out of those engaged in industry has risen from 2.6 per cent. to 3.2 per cent. The percentage engaged in the industries of dress and boilet from 23.3 per cent. to 26.4 per cent. of those engaged in industries. The dimiuution in the number of those engaged in general transport and in transport by road, in particular, has already been commented on, and possibly is a real decrease off-set by the increase in transport by rail from $21 \cdot 0$ per eent. of all transport workers in 1911 to $33 \cdot 2$ per cent. in 1921. Under the head "brade" the nun-tel-seller is the disturbing element, and the diffioulties of olassifying lim prevent any detailed comparison under the different occupational orders of this sub-class. Under "public administration and liberal arts" the proportionate number engaged in "public administration" has increased from 14.0 per cent. to $15^{\circ} 5$ per cent., and this is doubtless
a real increase, as also is the increase in the number of those engaged in instruction from 6.7 per cent. to 10.3 per cent. Finally the increase in the miscellaneous class from 5.7 per cent. to 7.2 per cent. of the population is due to the greater use of the sub-class "insufficiently described occupations" in which are put all doubtful cases.

Thus the census figures alone throw but little light on present day industrial tendencies.

## Section IV.-Occupations by Caste and Female Occupations.

Prinelpal ocoupation of each caste.
239. The statistics of occupation of selected castes, tribes, or races are given in Imperial Table XXI, and this discriminates between the religion and locality dealt with ; while Subsidiary Table VIII shows the proportion of persons in each caste dependent on the various forms of occupation for a livelihood, and also the percentage of the number of female workers to male workers. Of the 80 castes, races and tribes examined cultivation of all kinds is the principal occupation of 32 castes. Only one caste has, as its principal occupation field-labour and wood-cutting, and that is the Chubra Sikh, of whom $34 \cdot 8$ per cent. are engaged in these occupations. The castes whose principal occupation is that of

Percentage of persons of each casto who are artisans or workmen.

| Barwala (Mftsalman) | . 34.8 Kumhar (Musalman) | .. 63.2 |
| :---: | :---: | :---: |
| Chamar (Hinda) | . 48.2 Lohar (Hindu) | - $53 \cdot 8$ |
| " (Sikh) | . 51.0 (MInsalman) | .. 71.3 |
| Chhimba (Hindu) | . 69.5 Mnssalli * | .. 41.8 |
| " (Sikh) | . 58.3 Nai (Hindu) | . $75 \cdot 2$ |
| (Musalman) | . 61\% " (Sikh) | . 662 |
| Chuhrs (Hindu) | . 87.7 " (Musalman) | . $80 \cdot 2$ |
| (Sikh) | . 31.8 Qassab | $\cdots{ }^{-} 48.4$ |
| Dhanak (Hindu) | . 35.3 Sunar (Hindu) | $\cdots 86.1$ |
| Dhobi (Musalmen) | . 74.0 , (Musalman) | $\cdots$ - 47.7 |
| Julahe (Hindu) | . 463 Tarklıan (Hindu) | -. 81.1 |
| " (Mnsalman) | . 78.2 " (Sikh) | .. 61.0 |
| Kashmiri * | . 54.7 \# (Musalman) | - $72 \cdot 5$ |
| Kumhar (Hindu) | . 53.9 Teli | 56.3 | artisans or workmen are shown in the margin. The trading castes are the Aggarwal Hindu, of whom $79 \cdot 1$ per cent. are engaged in trade; the Arora Hindu and Sikh of whom $65 \cdot 1$ per cent. and $63 \cdot l$ per cent. are engaged in trade : the Khatri; Hindu and Sikh of whom 58.0 per cent. and 45.9 per cent. are engaged in trade, and the Kashmiri (Misalman) $\because$. Kumbar (Hindu) $\ddot{\partial}$ ars enste in marginally noted are engaged in trade. The

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publio service.

| Aggarwal (Findu) | . 1.3 per cent. |
| :---: | :---: |
| Arora (Hindu) | . $2 \cdot 1$ per cent. |
| Arors (Sikh) | . 2 2 per cent. |
| Brahman (Hindu) | . 1.9 per cent. |
| Khatri (Hindu) | . $4 \cdot 7$ per cent. |
| Khatri (Sikh) | . $4 \cdot 0$ per cent. |
| Mughal (Musalman) | . $2 \cdot 0$ por cent. |
| Paithan (Musalman) | . $2 \cdot 9$ per cent. |
| Qureshi (Musalman) | . $2 \cdot 6$ per cent. |
| Saysd (Musalman) | $3 \cdot 3$ per cent. |
| Sheikh (Musalman) | . 3.6 per cent. | cent. of their numbers in public service.

4.6 per cent. of Europeans and 11.8 per cent. of Anglo-Indians have occupations in public administration. Of the castes which have a certain number of persons who live on their income, the Aggarwal Hindu, Sikh Arora, the Khatri both Hindu and Sikh, and Anglo-Indians are the most prominent.


Domestic service is the principal occupation of the Barwala and Jhiwar. Begging or criminal occupations are the chief means of livelihood of the Bharai, the Fakir, the Harni, the Mirasi, the Pakhiwara and the Sansi.

The highest percentage of persons engaged in some of the chief occupations are noted in the margin.
240. Statistics of the actual number and proportion of male and female workers in selected orders and groups are given in Subsidiary Table VI separately for the Pumjab and Delhi provinces. The orders and groups selected are those in which female workers exceed 100 per mille of their total population or in which the proportion of female workers to male workers is high.

In the Punjab 11 per cent. and in Delhi 10 per cent. of the persons returned as actual workers were women. 58 males out of every 100 are actual workers in both the provinces, while the corresponding percentage among females is 9 . The list of occupations in which female workers are specially numerous in the Punjab is given below :-

| Groap. | Occupation. | Number of females per 1,000 male workers. |
| :---: | :---: | :---: |
| $B$ | Tea, offle, oinchons, rubber and indigo plantations | 32 |
| 16 | Bird, beoe, ota. |  |
| 21 | Minee and motallic minerals (gold, iron, manganeee, etc.) | 750 |
| 28 | Cotton-upinning -. | ,880 |
| 29 | Rope, twine, and atring -. | 296 |
| 31 | Wool carding and apinning | 1,244 |
| 38 | Leco, aropo, ombroiderios, fringes, otc., sad insufficiently described textile industries.. | 1,616 |
| 65 | Rico poundors and huskers and flour grinders .. | 2,358 |
| 06 | Baken and biscuit makons | '409 |
| 67 | Grain parohers, otc. .0 .. .. ... | 1,225 |
| 78 | Hat, cap and tarban makers . $\quad$. 0 .. .- -0 | 1,046 |
| 87 | Stono cutters and drossers | 462 |
| 101 | Others, inoluding raanagers, persons (other than performers) omployed in theatres and other places of publio entertainment, emplojees of pablic societies, race course sorvico, huntamen, eto. | 307 |
| 102 | Contractors for tho disposal of refuso dust, oto. .. .. | - 803 |
| 108 |  | 667 |
| 135 | Cardsmom, betel-leaf, vegatablea, fruit and areosnut sollers - .. .. ... | 350 |
| 130 | Dealers in hay, gresa and fodder .. .. .. | 458 |
| 172 | Midwives, vacoinators, compounders, nurses, masseure, eto. .. | 1,616 |
| 100 | Proouren and prostitates .. .. men | 8,946 |

There are certain occupations in which women considerably outnumber men, as for example cotton-spinning, rice-pounding and flour-grinding, and grainparching.

In connection with the relative paucity of female workers in the ranks of aotual workers foulid in both the provinces, the remarks made by Mr. Calvert in his book "Wealth and Welfare of the Punjab," are very suggestive. In discussing the economic causes of Punjab. poverty he writes :-
"There is a vast waste of female labour, due primarily to custom and prejucice. In most other countries the proportion of female labour to the whole is high; while its effcienoy is equal to the tasks performed; the contribution to the national dividend resulting from this forms an appreciable part of the whole. If there were in Western countries a movement aiming at the exclusion of female labour from all except purely domestic tasks, that movement would endanger the whole economio fabric, and, if successful, would involve those countries in ruin. The Punjab discards what in England and elsewhere is an absolutoly necossary element in the maintenance of their civilisation. The fact that there are tribes, such as Brahmans and Rajputs, which do not allow their womeufolk even to work in the fialds is alone sufficient to explain their poverty. The work of woman as clerks, shopkeepers, post and telegraph operators, factory hands, etc., and in connection with the fish industry, market garden, pit-tops, eto., has no countorpart here. In the course of generations the loss from this waste alone must have made matarial progress almost impossible. No European country could maintain its present standard of living without the assistance derived from female labour."

I suspect, however, that a very large part of the apparent want of employment of female labour arises from the fact that the classification of occupations was drawn up by men and not by women; many women appear as unemployed when they should be classed as actual workers engaged in domestic duties, in cooking, grinding of grain, drawing water from wells, taking food to their families in the field, preparing and mending clothes, and last but certainly not least in child-bearing. In fact the occupational tables will have to be completely revised before a fair comparison of the extent of male and female occupations can be drawn.

## Section V.-The Industrial Census.

Nature of
241. The statistics relating to the number and type of industrial estabthe statistlos lishments and the employees therein are embodied in Imperial Table XXII. The data were based on the information supplied on two special schedules filled up by the owners or managers of all concerns in which at least 10 persons were employed on any normal working day between the 14th March and 14th May 1921. Schedule A included descriptions of the mine, factory or other industrial establishment, the nature of the article produced in it, the nature of the ownership and the number, sex, race or nationality of the owners or directors and of the managers, supervisors and clerical staff, the number and nature of the power engines, state of the industry, whether perennial or seasonal, and the number of looms in actual operation in textile establishments. Schedule B was used for recording the caste, race and birth-place of skilled and unskilled labourers together with their occupations. The detailed instructions for filling in various columns of the schedule were as follows :-

Schedule A.-
Column 1.-State what the nature of the establishment is, e. g., jute-press, jute mill, woollen carpet, weaving factory, glass works, etc.

Column 2.-A general description only is required of the principal commodity manufactured, e. g., coal, cotton, goods, glass-goods, vegetable oil, etc.

Column 3.-Where any important bye-product is manufactured which has a distinct commercial value this should be entered in this column, e.g., coke, or coal gas. If the same establishment turns out several distinct classes of goods or one class of goods at one season and another at another season, the most profitable should be entered in column 2 and the other or others in column 3.

Column 4.-Ownership.-State whether the establishment is owned by (a) Government, (b) a local authority (i.e., municipality, port trust, etc.), (c) a registered company, (d) is privately owned. If a registered company state the name under which it is registered.

Column 5.-Number, sex and race or nationality of directors or owners;
(a) This column will be blank in the case of establishments owned by Government or a local authority.
(b) Give the total number of directors or owners. Enter the number of British or Anglo-Indians. In the case of others give the nationality of Europeans and foreigners, e.g., American, Swiss, Chinese, etc. For Indians state whether, Hindu, Sikh, Mohammadan or "others." In the case of foreigners who are British subject enter the letter B in brackets after the nationality; Give separate figures for females, if any.
Specimen entry:-Directors total 10, one British, one Anglo-Indian, one Sviss (B), one American, two Mohammadans, one Parsi, three Hindus.

Column 6.-Race or Nationality of Manager.-Enter as in the preceding column. If a female, state this.

Column 7.-For supervising and technical staff the number by sex and race.-This heading will include assistant manager, heads of departments and sections, inspectors, engineers, special technical experts and advisers, etc. It should not include Foreman, Mates or Mukkaddams who are of the same. general class as the operatives.

Column 8.- Clerical Staff-Enter the particulars for all persons employed on clerical work in the establishment, such as clerks, accountants, writers, copyist, etct

Column 9.-Number and nature of power engines with horse power-
(1) In the case of power engines other than electric generators or motors enter how many engines of each class (steam, oil, etc.), there are in use and the horse-power of each engine, e.g., three steam-one 25 horse-power and two 20 horse-power: four oil-three 15 horse-power and one 10 horse-power, etc.
(2), Electric power is either (a) generated or the premises by steam, water or oil primemovers, or (b) .supplied from outside by agreement. In the case of (a) enter (i) how many (steam oil, etc.), primemovers there are in use and the horse-power of each and, (ii) how many electric dynamos there are in use and the power (in Kilowatts) of each.
In the case of (b) enter how many electric motors are installed and their total horse-power.

Column 10.-State of Industry.-Enter whether the establishment works-
(a) throughout the year, or
(b) during a part of the year only.

In the case of (b) state the months during which or during part of which the establishment works or is likely to work in the census year.

Column 11.-Number of looms.-To be filled up in the case of cotton, silk, woollen or jute mills and establishments only.

Sohedule B.-
Oolumn 1.-Enter the name of each person ${ }_{i}$
Column 2.-Enter the sex, male or female.
Column 3.-Adult means 14 years or over ; child means under 14 years. In the case of children, enter the actual age in years after the word "child."

Oolumn 4.-Ask each person what his caste is and enter what he says if he gives an intelligent answer. If he says Mohammadan, Parsi, Sikh, enter this. If he says Hindu ask him his caste Brahman, Koshla, Chamar, etc., and enter it. If he is an aboriginal he should give the name of his tribe Gond, Kol, etc: If he is an Anglo-Indian or Indian Christian enter this. If he is a foreigner enter his nationality, e.g., Ohinese. 1: $: 1$
Column 5.-Enter the district or State in which he was born and if the district or State is outside the province of enumeration enter also in brackets the province or agency. If a foreigner, enter his country.

Example.-Jullundur, Lahore, Howrah, (Bengal), Mirzapur (United Provinces), China, Jaipur State (Rajputana).

Column 6.-Enter skilled for those who are employed on works requiring spocial technical skill and training and are paid above the rates for unskilled labour. For the rest leave blank.

Column 7.--Enter their actual personal occupation in the establishment at the time in the case of skilled operatives only, e.g., fitter, cotton-weaver, enginedriver, carpenter, etc.

The statistjes of the Industrial Census are probably fairly reliable as the informattion was supplied by the owners or managers themselves, but a comparison of the annual report on Factories 1921, with Census Table XXII shows that 21 registered factories were omitted from the census record. The list is given below:-

| Distriot. | Number of Estab. lishmenta. | Desmiption | Average daily number of persons employed. |
| :---: | :---: | :---: | :---: |
| Foroxoposo | 1 | GOVERNMENT AND LOCAL FUND FACTORIES. |  |
| Lathore | 1 | Arsanal Aaroplane workahö $\quad$ - . . | 1,698 |
| Lahore | 1 | Aaroplane workshop | 216 |
| Gujranmals | 1 | Railway engineoring workhop | 70 |
| Rumalpind | 1 | Gea vorks .. | 240 43 |
| Mianwall | 1 | Railway engineeing workshop $\quad \ddot{\square}$ | 32 |
| Bisarar | - 1 | Railway workshon OTHER EACIORIES. |  |
| Qujranwale | 1 | Ioe, minoral and sarated watar fectory ${ }^{\text {a }}$ | 60 |
| Girjiranivala | 1 | Rice mill and serated water factory .. | 80 |
| Multan | 4 | Deepatah box and hospital furniture manifsotory | -32 |
| Rohtak | 1 | Cotton gioning, aleaning and presing factories ${ }^{\text {a }}$ | 161 |
| Farozopors | 8 | Oil mill . | 52 20 |
| Lahare | 1 |  | 140 |

Number of Industrial estestablishments in the Punjab and Delhi is 801 and the total labour employed is trablishmenta. and 61,771 males and 4,755 females : of these 31,652 males or half the total number are skilled labourers, and 908 females, or one-fifth of the number of female workers are skilled workers. The type and number of industrial establishments is shown in the marginal bable together with the number of employees, male and female.

| Industrial eatablishments. | Total Nu. ostablishmente. | Total or persoze EMPLOXED. |  |
| :---: | :---: | :---: | :---: |
|  |  | Malos. | Females. |
| Growing of apecial producta | 34 | 1,720 | 303 |
| Mines $\quad .$. | 17 | 3,356 | 72 |
| Quarries of hard ronks . .- | 24 | 1,967 | 199 |
| Textile and connceted industries | 203 | 11,804 | 1,731 |
| Loather induatric: .. | 15 | 418 | 9 |
| Woodindustrics *-. .- | 8 | 601 | $\cdots$ |
| Motal industrics $\quad . \quad$. | 37 | 3,324 | 2 |
| Glass and earthenware industries | 7 | 317 | 24 |
| Indnatries connectod with ohemical producta. | 14 | 257 | 15 |
| Food industries ** | 116 | 4,658 | 132 |
| Industries of dress . . | 9 | 620 | - |
| Furniture industries ${ }^{\text {a }}$ - | ${ }_{109}$ | 334 |  |
| Industrics connocted with buildinge. . | 199 | 8,150 | 2,258 |
| Railway Workshops .- | . 32 | 17,809 | 8 |
| Production, application and transmission of physical forces. | 16 | 1,738 | 1 |
| Printing presses . .- .. | - 62 | 4,733 | 0 |

It will be noticed that the railway workshops alone engage more than one-fourth of the total industrial workers in the two provinces: industries connected with textiles employ more than onefifth. The other industries which engage more than 3,000 persons are mines, metal industries, food industries, print-ing-presses and industries connected with building. The highest proportion of children, viz., 449 per 1,000 adults, is found in the glass and earthenware industries ; tes factories also contain a fair proportion of children, there being 20 children to every 100 adults.
Looal der
$\underset{\text { tributlon }}{\text { Looal }}$
Industrien

| No. | Distriot or State |  | No. | Wistrict or State. |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | Lahore | 121 | 21 | Hissar | 9 |
| 2 | Amritsar .. | 87 | 22 | Karnal $\quad$ O | 9 |
| 8 | Rawalpindi . . | 80 | 23 | Simla . ${ }^{\text {a }}$ | 8 |
| 4 | Patiala State | 60 | 24 | Sheikhupura | 9 |
| 5 | Shahpur .. | 43 | 25 | Mianwali .. | 9 |
| 6 | Kangra .. | 32 | 26 | Jind State . ${ }^{\text {a }}$ | 9 |
| 7 | Ambala -.. | 28 | 27 | Hoohiarpur .. | 8 |
| 8 | Ludhiana .. | 28 | 28 | Jullundar .. | 8 |
| 9 | Lyallpar .. | 28 | 29 | Faxidkote 8tato | 8 |
| 10 | Gujrat .. | 27 | 30 | Kaparthala State | 8 |
| 11 | Montgomery.. | 25 | 31 32 | Ferozopore .. | 7 |
| 18 | Mandi State ${ }^{\text {a }}$ | 22 | 33 | Gargeon .. | 8 |
| 14 | Gardespur .. | 18 | 34 | Attock .. | 2 |
| 15 | Jhelum .. | 16 | 36 | Jhang ${ }^{\text {a }}$ | 2 |
| 16 | Nabha State.. | 13 | 36 | Muzafargarh | 2 |
| 17 | Multan $\quad \ddot{\text { a }}$ | 11 | 37 | Nahan ${ }_{\text {Delhi }}$ 8tata.. | 38 |
| 18 | Bahawalpur Stato Rohtale | 11 10 |  | Dolhi | 38 |
| 20 | Dera Ghazi K̈han | -10 |  | Total | 801 | turing concerns is given in part II of Table XXII and a summary of it is reproduced in the margin.

Of the total number of 763 industrial concerns, Lahore, Amritsar, Rawalpindi, Patiala State and the Shahpur district provide not less than 351, the reasons being that conditions favourable to the growth of one industry are likely to be favourable to the growth of another, the existence of railway facilities, the supply of power, whether by coal, oil, water or electricity, and the proximity of connected industries being of prime importance. These considerations explain the position of Lahore and Amritsar in the marginal table.

In Ambala of the 28 concerns employing 1,421 persons, 6 are connected with cotton, 3 are flour mills, 3 flour mills and kikar khas factories, 7 brick kilns, 3 railway workshops, 2 ecience apparatus works and 3 printing-presses and 1 is a glass faotory. In Kangra, there are 28 tea factories, 3 slate quarries aud 1 carpet factory, the number of operatives at work in these factories and quarries being 2,345 .

In Ludhiana 11 factories are connected with cotton, 1 is a flour mill, 8 are brick kilns, 2 ice factories and 6 tailoring establishments, the total number of employees being 793. In Sialkot, which is well known for its manufacture of sporting goods and metal works, no less than 18 factories employing 827 persons were registered under these heads. In Gujrat out of 27 factories 5 are wooden furniture factories and 19 brick kilns. In Shahpur there are 14 factories connected with cotton, 3 flour mills, 22 lime kilns, 2 petroleum wells, 1 salt mine, and 1 coal mine. The total labour force is 1,493 . In the newly colonised districts of Montgomery and Lyallpur where cotton is grown on a large acale 32 factories,
or more than half the total number found in both the districts, are engaged in cotton-ginning and pressing. In Mandi State there are 6 tea factories and 16 slate quarries.

As regards the districts of Lahore, Amritsar, and Rawalpind;, Patiala State and Delhi province, which contain large cities and towns, the distributions of factories is as given below:-

|  | Indus |  | Lahore. | Amritsar, | Rawne pindi. | Patiala. | Delhi. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Lanther dyeing |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Dreas . .. .. |  |  |  |  |  |  |  |
| Furniture | - | - |  |  | . 1 | 13 | 1 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Luxury | - | " |  |  | 1 | -• | -2 |

Lahore exemplifies most types of industrialism except the silk and wool industry. The prominence of Amritsar depends mainly on textile and connected industries; it contains the only silk-reeling factory and dyeing factory found in the province employing more than 10 persons. In Rawalpindi and Patiala the high figures are due to the existence of many brick kilns. In Delhi the extensive building operations, consequent on the transfer of the seat of the Government of India to that city, alone accounts for half the number of factories enumerated there.
244. The marginal statement contrasts the number of establishment employ-

| Establishments. | Numere in |  |
| :---: | :---: | :---: |
|  | 1911. | 1821. |
| All Industrial Eatablishmenta | 443 | 538 |
| Growing of spodal produce .. | 41 | 23 |
| Mines ${ }^{\text {a }}$, | 10 | 17 |
| Quarrice of hard rockn ${ }^{\text {a }}$, | 5 | 20 |
| Toxtilo and connoated industrioa | 104 | 154 |
| Wood induatrios | 3 | 10 |
| Motalindustrice $\quad .$. | 37 | 19 |
| Glagn and oarthonwaro industrics | 2 |  |
| Industrics connootod with ohomioal pro. duots. | 1 | 3 |
| Food Industrice .. .. | 01 | 80 |
| Induatrios of dresa | 10 | 5 |
| Furniture industrios $\quad \therefore$ | 4 | 6 |
| Industrios connootod with building -. | 97 | 141 |
| Conatruotion of moans of transport ${ }^{\text {Produt }}$ | 24 | 27 |
| Produotion, applioation and transmisaion | 6 | 11 | ing 20 or more persons in the Punjab in nd and Delhi at the last two censuses. menising 20 or These figures suggest a far greater in-more perrons dustrial development than do the census ${ }_{1921} 1011$ and custrial development than do the census 1921. figures proper. The general prosperity of the cotton trade, consequent on the high prices ruling during the war, and of the wide extension of the staple American cottons is emphasised by the number of new mills set up in Shahpur, Montgomery and Lyallpur. The growth of the building industry is also indicated by the figures and, it can hardly be doubted, represent the facts better than do the census figures which show an actual falling off in the total number of workers and dependants from 272,168 in 1911 to 159,261 in 1921. An important feature of the decade has been the exploitation of the petroleum fields in the Attock district.

245. The details of the number and kind of industrial establishments classified according to the caste or race of the owners and managers is given in part III of Table XXII and shows that the Khatri, Aggarwal and Sheikh in the order named have the greatest number of pers
 noted in the margin. It will fogures are that the Khatri and Aggarwal castes together furnish owners and managers of about half the total number of industrial establishments in the Punjab. . This is no doubt due in part to the organising ability of the Khatri and Aggarwal, but is also a consequence of their commanding a large proportion of the floating capital of the country.

The caste, race or birth-place of skilled workmen is given in part JV of

|  | Casto. |  |  |
| :---: | :---: | :---: | :---: |
| Sheich |  |  | ${ }_{4}^{4,239}$ |
| Arain | : |  | ${ }_{2,418}^{2,900}$ |
| Khatri | . |  | 1,700 |
| Tarkhan | . |  | 1,620 |
|  |  |  |  |
| Rajput | .. |  | 1,380 |

Statement showing nubiertoal gtrenath and caste of diseiligid workens.

| Caste. |  | Nambor. |
| :---: | :---: | :---: |
| Shcikh | . | 1,985 |
| Brahman | . | 1,075 |
| Arain | . | 1,944 |
| Rejput | . | 1,768 |
| Jat | - | 1,763 |
| Chamar | . | 1,683 |
| Khatri* | . | 1,398 | Table XXII, and it shows that out of 28,442 skilled workmen (male, female, children and adult,) 15,777 or over 55 per cent. are provided by 7 castes alone. The numerical strength of skilled workers in these castes is noted in the margin. Unskilled workmen are for the most part drawn from the same class as skilled workmen, Sheikh, Brahman, Arain, and Rajput contributing large numbers of workers both skilled and unskilled. The chief castes providing unskilled workmen are noted in the margin.

Thus it will be seen that the Lohar (ironsmith) and Tarkhan (carpenter) form the typically skilled labour castes, while the Jat and Chamar provide the typical unskilled workman. The Sheikh, Arain, Khatri, Brahman, and Rajput provide both skilled and unskilled workmen in considerable numbers.

Most of the skilled workmen are born in the province, only $11 \cdot 3$ per cent. coming from outside the Punjab, most of them from the United Provinces. As the Punjab contains only $2 \cdot 5$ per cent. of foreign-born people, it is clear that the skilled workmen is definitely nore ready to migrate than the average person.


246 Out of 801 factories in both the provinces, 414 in the Punjab and 16 in Delhi use mechanical power. The marginal table slows the number of factories employing the various forns of power generation. The total horse-power used in factories amounts to a little over 40,000 . The details are given in the margin.
247. A record of all handlooms in use in the Punjab and Delhi provinces was obtained, distinguishing between those on which the ordinary shuttle (nal) and the fly-shuttle (Japani nal) are used.
The instructions issued in this connection were as follows:-
"During the preliminary enumeration the enumeralor will record on the block list opposite the house of any cotton-weaver, or of any other person employing cotton-weavers, the number of looms (khadi) used by such person, and will record separately the number of looms with the ordinary shuttle (desi nal) and those with the fy shuttle (Japani nal) which is worked by the foot. On the completion of the preliminary anumeration each enumerator will report the number of looms of each sort in his Circle to the Supervisor, who after collecting all such reports for his circle will forward them to the Chayge Superintendent. The Charge Superintendent will prepare a return in the following form which he will send to the Tahsildar, before the 1st March :-

Dittriot.


The Tahsildar will prepare a similar return for the Tahsil as a whole and forward it to the District Census Officer. The complete return for the District should reach the Provincial Superintendent before 15th March 1921."
The statistics collected from these reports show that cotton-weaving as a domestic industry is carried on by means of hand-looms in nearly every village of the Punjab and Delhi provinces. The total for the Punjab is 268,169 with ordinary shuttles and 2,338 with fly-shuttles ( 21,418 with ordinary shuttles and 1,559 with fly-shuttles for urban areas and 246,751 with ordinary and 779 with fly-shuttles for rural areas) and for Delhi 1,066 and 1 respectively.

## Section VI--Conditions of Labour and Cottage Industries.

248. As desired by the Census Commissioner, the Deputy Commis- Introdus. sioners of districts and Census Superintendents of States were asked to send ${ }^{\text {tory. }}$ a brief note on the economic conditions prevailing in their districts and States under the following heads :-
(i) Economic conditions and movements of labour.
(ii) Density and overcrowding of labourers in towns and other centres of trades.
(iii) Cottage industries.
(iv) The influence of caste on industrial development.
(v) Conditions of female labour in industries.
(vi) Rural trade.

The summary of the information thus collected is given below for referonce.
249. Inadequacy of Iabour is reported in Amritsar, Sialkot, Sheikhu- Economio pura, Lyallpur and Muzaffargarh districts and Suket, Loharu and Nahan States. condillons of In all other districts and States of the province a sufficiency of labour. both skilled and unskilled, is reported. Agricultural labourers are usually drawn from low castes like the Chamar, Teli, Nai, Lohar, etc. The small number of agriculturists, who have become landiess through want oft brift, enter into partenerships in cultitrion with their well-to-do brethren or work as agricultural labourers; but they regard it as beneath their dignity to do earth-work as in the excavation of canals and in the construction of rail and road embankments. Women and children help their own relations in cultivation, and are sometimes employed as agricultural labourers, specially at harvest times. The agricultural labourer is probably much better off than he used to be.

The old system of begar (forced through remunerated labour) has almost disappeared. The kamin or village labourer is no longer content with his hereditary dues, and the custom of payment in kind has soved the agricultural labourer from the effects of the rise in prices which has been going on more or less steadily during the last 60 years.
250. The conditions in which operatives live in large towns are probably overcrowdmore unhealthy than that of the average resident of a village. The remarks of ing of labothe District Census Officer, Amritsar, which is a great industrial centre, are illuminating. He writes:-
"There are at this time nearly 4,000 regular labourers working in 79 industrial .establishments in this city. Nearly 500 of these are permanent labourers, the others are constantly changing. The average number at normal times is 3,000 and rises to nearly 5,000 in the busy season. The labourers working in trade-marts are generally unskilled. As for their housing conditions, pormanent labourers are sometimes provided with free quarters by the faotory owners. Nearly all outside labourers have got free quarters ; other labourers live in such houses as they can afford to rent, skilled labourers generally living in healthier surroundings than.the unskilled. A great number live in narrow lanes. Their social status is low; an ordinary baboo getting Rs. 30 per mensem in an office claims superiority over a skilled labourer who is earning Rs. 100 monthly. The condition of unskilled labourers is still worse, the most fortunate among them get free quarters to live in factories and mills, others hire common shops in batches of 10 or 20. The remaining are houseless and sleep their night away on platforms of closed shops."
251. Cotton-weaving is generally done by means of handlooms by Chamars, cottare inDhanaks and Julahas in all the villages. The village looms weave khaddar, dutrtrie durries, towels, khes, dhotis and other articles of ordinary use. The thread
used for fine cloth is usually a mixture of Purbi and Desi, while Desi thread is used for coarse cloth. The Purbi thread is imported from Cawnoore and Bombay and the Desi thread is manufactured locally. Village weavers generally weave for individual customers who supply their own yarn which is ordinarily home-spun. The weaver is paid either in cash or in kind. In certain cases cloth woven is sold by the weaver to the middleman who makes a profit of 6 pies per rupee and the weaver gains Rs. 5 to Rs. 8 per cent. of his outlay. The length of cloth woven per day by an ordinary weaver on a Desi loom is 8 to 10 yards, and on looms of Japani Nal 15 to 25 yards. The cost of an ordinary loom is from Rs. 12 to Rs. 20. The weavers usually 'work from 8 to 10 hours and are assisted by their wives and children in the preliminary stages of getting the thread ready for the work. After the warp is set up the weaving is done by men only. The standard of comfort amongst weavers is the same as that of agriculturists.

Other fairly common cottage industries are silk-worm-rearing which is being developed under the control of the Department of Agriculture, mainly in the districts of Gurdaspur, Amritsar and Sialkot; rope and string-making, curing of hides, pottery, oil-pressing and sugar extraction and shoe-making. Cottage industries generally are probably well-suited, within strict linitations to the present stage of the Punjab's industrial development, but many of them have inevitably to be crushed sooner or later by the more efficient system of mass production.
speculativo. ducing a considerable surplus of wealth. This surplus is an essential condition of industrial organisation, and for many years to come the profits from agriculture must be relied on to supply the capital for the establishment of industrial concerns. When cheap power becomes available and capital less shy than it is at present, it is possible that the Punjab may remain prosperous without having recourse to surplus production and to the export of agricultural produce. But this state of affairs, if it is to be permanent, must come about with a minimum of interference with healthy economic conditions. It is a mistaken belief to $v=$ eppose that wealth derived from manufactures is in itself more desirable than wealth derived from agricultural pursuits.

GUBSIDIARY TABLIES.
Chaptiz III.

1. General distribation by occapation (Punjab and Delhi). II. Distribution by ocoupation in Natural Divisions. III. Distribution of agricultarst, industria, commercial and profemional population in Natural Divisions, Districta and States. IV. Occupations oombined with agricoltare (where agriculture is the suborary occupation) V. Cecupated orders and groups (Punjab ture (where agriculture is tho principal ocoupation). and Dothi). VII. Selectod socupations 1921, 1911 and 1901. VIII, Occupations of evected cast in the Punjaband Deihi. IXA. Niomber of patmona omployed on the 18 in
(OCCUPATIONAL)-SUBSIDIARY TABLE I
Goneral distribution by occupation.

| Clast, But-clase and Ordir, | Nongrer PER 10,000 of total popthaTION. |  | Perometage in bagh Cuass, 8ob-chass and Order of |  | Parcentage <br> of dependante to antual workers. |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | Persons supported. | Aotual workers. | Actual workers. | Dapendants. |  |
| - I | 2 | 3 | 4 | 5 | 6 |
| PUNJAB- |  |  |  |  |  |
| OLABS A.-PRODUCTION OF RAW MATERLALS . . | 6,061 | 8,181 | 85 | 85 | 188 |
| GUB-CLA 88 L L-EXPLOITATION OF ANIMALS AND VEGETATIONS | 8,058 | 8,117 | 85 | 05 | 188 |
| Orier 1. Pasture and Agrioulture .. .. | 6,046. | 2,116 | 36 | 65 | 186 |
| (a) Ordinary oulivation (b) Orowers of epecial producte and markel gardening | 5,886 12 | 2,022 | 34 | 68 58 | 191 |
| (b) Arowera of epecial producte and markel gardening .. (c) Forestry | 12 9 | 6 4 | 48 | 63 | 118 |
|  | 139 | 84 | 80 | 40 | 68 27 |
| (e) Baising of small animals ... | $\cdots 6$ | $\cdots$ | 78 84 | ${ }_{68}^{22}$ | 127 |
| Ordor 2. Fiohing and Hunting .. .. .. | 6. | 2 | 84 | 68 | 188 |
| SUB-CLABS [I.-EXPLOITATION OF MINERALS .. | 9 | 4 | 48 | 57 | 188 |
| Order 3. Mines .. | 1 |  | 418 | 69 | 142 |
| Order 4. Quarriee of hard rooles | 3 |  | 48 | 64 | 117 |
| Ordor 5. Salt, oto. .. | 4 | 2 | 41 | 50 | 144 |
| OLAES B.-PREPARATION AND BUPPLY OF MATEBIAL 8UB- | 8807 | 1,020 | 88 | 6. | 175 |
|  | 1,988 | 716 | 87 | 68 | 170 |
|  | 1,04, | 1 ! |  |  |  |
| Ordor 8. Textilen ... .. $\quad$. | 405 | 159 | 39 | 61 | 154 |
| Ordor 7. Hides, skins and hard matoriala from animal kingdom | 27 | 9 | 34 | 66 | 198 |
| Ordor 8, Wood .. .. .. .. | 202 | 69 | 34 | 68 | 192 |
| Ordor 9. Metals | 95 | -31 | 82 | 68 | 209 |
| Ordor 10. Ceramica .. .. .. | 147 | 51 | 35 | 65 | 188 |
| Ordor 11. Chomical producta properly socalled as analogous | 62 | 21 | 33 | 87 | 202 142 |
| Ordor 12. Frod industries .. | 86 | 35 | 41 | 59 | 148 |
| Order 13. Industrice of drees and the toilet .. .. | 809 | 176 | 35 | ${ }^{68}$ | 189 |
| Ordor 14. Furnituro industrios -. .. | 2 | 1 | 33 | 87 | 1199 |
| Onler 15. Bulding industries ... .- | 63 | 25 | 39 | 61 | 156 |
|  |  | -• | 43 | 87 | 134 |
| Ordor 17. Produotion and transminaion of physioal foroes (heat, light, eleotricity, motivo power, oto.) | 1 | - | 38 | 62 | 163 |
| Ordor 18. Other mincollanoous and undefined industriea | 327 | 137 | 42 | 68 | 138 |
| BUB-OLAES IV.-TRANEPORT .. . .. | 184 | - 78 | 38 | 68 | 185 |
| Ordor 10. Transport by air - $\quad$. | $\cdots$ |  | 49 | 61 | 105 |
| Order 90. Transport by wator .. .. | 23 | 8 | 38 | 64 | 178 |
| Order 21. Transport by road .. .- | 88 | 35 | 38 | 64 | 180 |
|  | 64 |  | 41 | 69 | 143 |
| Order 98. Poat office, telegraph and tolephone eerrices .. | 9 | 3 | 87 | 63 | 169 |
| SUB-CLAS8 V.-TRADE .. | 686 | 888 | 84 | 66 | 185 |
| Ordor 94. Banke, cotablishment of aredit, exahange and inaurance | 64 | 18 | 28 | 72 | 263 |
| Ordor 26. Brokerage, oommindion and export .. .. | 18 | 4 | 35 | 65 | 188 |
| Order 26. Trade in toxtilon $\quad . \quad$ - | 62 | 16 | 31 | 69 | 218 |
| Ordor 27. Trade in skins, lenther and fum .. | 10 | 4 | 36 | 64 | 180 |
| Ordor 98, Trade in wood . ${ }^{\text {a }}$, | 8 | 3 | 36 | 64 | 180 |
| Ordor 29. Trado in motala . ${ }^{\text {a }}$ ( ${ }^{\text {a }}$ | 2 | 1 | 38 | 08 | 163 |
| Ordor 90. Trado in pottery, bricke and tiken |  |  | 41 | 59 | 144 |
|  | 11 | 4 | 33 | 67 | 199 |
|  | 4 | 2 | 40 | 60 | 150 |
| Ordor 34. Trade in olothing and tojlet artiolet $\quad \because \quad . \quad$. | \$86 | 127 | 36 | 85 | 188 |
| Order 35. Trade in farniture ${ }^{\text {30, }}$ | 5 | 8 | 37 | 68 | 170 |
| Order 38. Trads in building matoriala .. - .. | 1 |  | 32 | 68 | 212 |
| Ordor 37. Trade in manse of transport $\quad$ - $\quad$. | 26 |  | 33 | 67 | 204 |
|  | 3 | - 1 | 38 | ${ }_{68} 1$ | 157 |
| Ordor 30. Trade in articlee of luxary and those pertaining to lotions and the arta and soiences. | 7 | 8 | 37 | 63 | 169 |
| Ordor 40: 2rudo of othor sorte .. ..ie $\quad$. | 107 | 87 | 85 | 45 | 188 |


| (OCCUPATIONAL)-SUBSIDIARY TABLE I. Gonaral distribution by occupation-continued. - |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Otass, Eus-class and Ordiay. | Number prar 10,000 OF TOTAL FOFULAt10x. |  | Peroentraceiteragh Cluss, Bub-clase ast Ordis ol |  | Peroentage of de. pendenta to sotad workers. |
|  | Pentons supported | Actand workers. | Actual workens. | Dopend anta. |  |
| PUNJAB-concluded. . 1 | 2 | 3 | 4 | 5 | 6 |
| CLABS C.-PUBLIC ADMMISTRATION AAD LIBERAL ARTS | 888 | 150 | 89 | 61. | 106 |
| SUB-OLASB VL-PUBLIC FORCE . | 105 | - 47 | 45 | 55 | 124 |
| Ondar 41. Army | 70 | 34 | 48. | 52 | 109 |
| Order 42. Navy $\quad \therefore \quad . . \quad . \quad$. | 7 | .. ${ }^{3}$ | 87. | 33 | 109 50 |
| $\begin{array}{lllll}\text { Order 43. } & \text { Air-force } \\ \text { Order 44. } & \text { Police } & \text {. }\end{array}$ | .. ${ }^{5}$ |  | 74 | 28 | 36 |
|  | 85 | 13 | 38 | 2 | 163 |
| BUB-CLASS VII.-PUBLTO ADMINISIRATION (Order 45) | 68 | 28 | 88 | 64 | 180 |
| BUB-CLASS VIII.-PROFESSIONS AND LIBERAL ARTB | 814 | 80 | 87 | 68 | 188 |
| Order 46. Roligion .. .. .. .. | 130 | 48 | 37 | 03 | 172 |
| Order 47. Law | 8 | 2 | 29 | 71 | 248 |
| Order 48, Medicino $\quad$. . . $\quad$. $\quad$. $\quad$. | 18 | $\begin{array}{r}7 \\ \hline\end{array}$ | 38 | 62 | 101 |
| Order 49. Instruotion | $\stackrel{22}{36}$ | - 9 | 39 39 | ${ }_{61}^{61}$ | 155 163 |
| CLASS D,-MISCELLANEOUS -. | 750 | 888 | 48 | 67 | 188 |
| SUB-CLAES IX,-PERSONS IIVING ON THELR INCOME (Order 5i) | 25 | 10 | 87 | 68 | 167 |
| SUB-CLASS X,-DOMESTIC SERVICE (Order 62) .. | 255 | 111 | 44 | 58 | 129 |
| BUB-CLARS XI,-INSUFFIOIENTLY DESCRIBED OCCUPATIONB. | 228 | 85 | 42 | 58 | 180 |
| (Order 53. General terms which do not indicate a definite ocoupation). .. |  |  |  |  |  |
| BUB-CLABS XII-ONPRODUCTIVE | 248 | 106 | 44 | 56 | 180 |
| Order 54. Inmates of jails, asylams and almb-honsei -. | 6 | 6 | 84 | 10 | 18 |
| Order 55. Beggars, vegrante, prostitutes ... | 236 | 100 | 42 | 68 | 136 |
| Order 56. Other unspecified non-productive industrice .. , .. | - | . | 40 | 60 | 150 |
| DELEI- |  |  |  |  |  |
| OLASS A.-PRODUCTION OF RAW HATERIALS | 2,080 | 808 | 81 | 69 | 223 |
| SUB-CLAES L-EXPLOITATION OF ANIMALS AND VEGETATION | 2,915 | 904 | 81 | 69 | 228 |
| Order 1. Pasture and Agriculture .. .. .. | 2,803 | 901 | 31 | 69 | 222 |
| Order 1. (a) Ordinary cullvalion. $\quad \begin{aligned} & \text { ( }\end{aligned}$ | 2,775 | 840 | 30 | 70 | 230 |
| (b) Growere of special prcducts and markes gardening | 66 | 27 | 41 | 59 | 142 70 |
| (c) Forestry (d) Ratsing of Farm stnek | 13 49 | 8 26 | 69 63 | 41 | 70 |
| (d) Raising of Farm stnck <br> (e) Raizing of small animale | 49 | . 26 | 63 | 47 | 88 |
| Order 2, Fiohing and Hunting $\quad . \quad$. ${ }^{\text {a }}$ | 12 | 3 | 26 | 74 | 200 |
| SUB-CLASB II.-EXPLOITATION OF MINRRALS | 15 | 4 | 87 | 78 | 274 |
| Order 3 <br> Mines |  |  | 43 | 67 | 133 |
| Order 4. Quarries of herd rooks $\quad$ O $\quad$.. | 7 | 3 | 40 | ${ }_{90}$ | 147 |
| Order 5. Bolt, ote. .. .. .. .. | 8 | .1 | 15 | 85 | 673 |
| CLASS B.-PREPARATION AND SUPPLY OF LATERLAL SUBSTANCES | 5,250 | 2,240 | 48 | 67 | 184 |
| 8UB-CLASS III-INDUSTRY .. .. | 8,088 | 1,258 | 41 | 59 | 197 |
| Order 6. Textile .. .. .. ... | 358 | 140 | 39 | 01 | 155 |
| Order 7. Hidea, akins and hard materials from animal lingdom | 116 | 65 | - 47 | 63 | 112 |
| Order 8. Wood .. .. .. .. | 142 | 63 | : 44 | 58 | 127 |
|  | 201 | 77 | 38 | 62 | 161 |
| Order 10. Coramics .. .. . . .. | 207 | 86 | 42 | 58 | 140 |
| Order 11. Chemical producta properly so called and analogora | ${ }^{96}$ | 35 | 37 | 63 | 174 |
| Order 12. Food industriea .. .. .. .. | 162 | 59 | 39 | 61 | 169 |
| Order 13. Industries of dress and the toilet- .. .. | 802 | 279 | 85 | 65 | 187 |
| Order 14. Furnituro industries .. .. .. | 19 | 989 | 47 | 63 82 | 112 |
| Ordor 15. Building industries . .- .- | 373 7 | 180 8 | 48 | 62 55 | 1108 |
|  | 7 81 | 8 <br> 18 | ${ }_{68}^{46}$ | 48 | 123 |
| Order 17. Production and transmission of physioal forces (heat, light, electricity, motive power. oto.) <br> Order 18. Other miscellanoong and undefined induatios | 81 886 | 18 250 | 48 | 67 | 185 |

GRAPTHE XI.


OHAPTER XII.
8UboIDIARE TARLEE


CHANTH
surgmiary tabizg. .


OHAPTER XII.
8UBSDIARY TABGES


OHAPTER XII.
bOBSIDIARY TABLEAS:



## ORAPTER EII.

. .

## (OCCUPATIONAL)-SUBSIDIARY TABLE VI.

Occupations of females by sub-classes and selected orders and groups-coned.


## (OCCUPATIONAL)-SUBSIDIARY TABLE VL.

Occupations of females by sub-classes and selected ,orders and groups-concluded.





| (OCCUPATIONAL)-SUBSIDIARY TABLE VII. <br> olecied aceupations 1921, 1911 and 1901-continued. |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{array}{\|c\|} \hline \\ \text { ch } \\ 0 \\ 2 \\ 2 \\ 0 \\ 0 \end{array}$ | OCCUPATION. | Puxjab, | Deximi | Pus | Jab AND DI | InHt. | Petcontago |
|  |  | $\begin{gathered} \text { Population } \\ \text { anpported } \\ \text { in } 1921 . \end{gathered}$ | Population anppotted in 1921. | Popalation supported in 1921. | Popalation supported in 1911. | Popalation supportod in 1901. | $\begin{aligned} & 1011- \\ & 1921 . \end{aligned}$ |
| 107108 | 1. | $\begin{aligned} & 2 \\ & 487,680 \\ & 67,358 \\ & 239 \end{aligned}$ |  | 4 | 5709,120108,140491 | 6 | 7 |
|  | EUB-CLAES IV.-TRANSPORT |  | 20,926 | 617,688 |  | 455,800 |  |
|  | Ondze 20--Tran |  |  |  |  | 510 | - 51.3 |
|  | Ship owdefe and their omptoyees, dhip biokom, shpo | $30,047$ | 8 |  | 491 |  |  |
| 108 | Pergons (other than labourers) employed on the maintenance of atreame, harboure, docks, rivers and carials (inclaching conrerciotion). | 6,444 | 225 | 30,665 | $\} 86,101$ | 31,703 | $-566$ |
| 109 | Lsbourers employed on the comatraction and maintanance of streams, harbourn, docke, rivers and caach. |  | 225 | 6,869 |  |  |  |
| 110 | Bosi ownors, bostmen and towmen .. .. | 20,647 | 45 | $\begin{array}{r} 20,692 \\ 259,804 \end{array}$ | $\begin{array}{r} 21,148 \\ 227,750 \end{array}$ | $\begin{array}{r} 21,650 \\ 288,484 \end{array}$ | $\begin{array}{r} -2 \cdot 2 \\ -39 \cdot 3 \end{array}$ |
|  |  | 246,506 | 13,298 |  |  |  |  |
| 121 | Pomona (othor than labourors) employed on the construotion and maintensnce of rosds and bridgem. <br> Labourors omployod on roads and bridgea | 2,608 6,521 | 88 89 | 2,697 | \} 41,347 | 22,838 | -77.6 |
| 113 | Ownom, managots and omployees (oxeloding personal sorvants) connoeted vith machanically driven vehicles (including trams). | 6,521 | $\begin{array}{r} 89 \\ \mathbf{1 6 0} \end{array}$ | 164 | $\begin{cases}68,918\end{cases}$ | 40,211 | $-36^{2}$ |
| 114 | Ownots, managers and employece (ozcluding pernonal mer- | 31,960 | 6,042 | 38,002 |  |  |  |
| 0 | Pslkj, otu., bearefs and ownens .. | 1,492 | 1,881 | $1 \times 3,379$ | 2,231 | 2,044 | +51.1 |
| 110 | Prok, olophent, camol, mult, ate eud ballook ovmess and | 158,519 | 2,953 | 161,472 | 213,618 | 203,228 | -24샛 |
| 117 | drive |  | $\begin{gathered} 2,116 \\ 13,824 \\ 8,292 \end{gathered}$ |  |  |  |  |
| 117 |  | 161,827 |  | 175,651 | 1149,453 | $\begin{aligned} & 18,009 \\ & 98,819 \end{aligned}$ | $\begin{aligned} & -57 \cdot 4 \\ & +17 \cdot 5 \end{aligned}$ |
| 118 | Rainmy employees of all kinds other than coolies | 126,384 |  | 134,606 | \} 149,493 |  | +17\% |
| 110 | Isbourers omployod on rilway constectotion and maintonance and coolion and portote omployed on railway promisen. | 35,443 | 8,002 |  |  |  |  |
| 120 |  viors. | 21,650 | 1,916 | 23,572 | $43,787$ | $18,953$ |  |
|  | GUR-CLAES V.-TRADE | 1,728,710 | 75,622 | 1,798,882 | 1,555,601 | 1,599,214 | . +150 |
| 121 | Oadear 24,-Banics, matablibiniznts of credity, ex- <br>  <br>  OIIANOERG ANV BHOKERES AND TILERR EMPLOYERS.) | $161,486$ | 6,474 | 166,960 | 193,890 | 179,501 | . $-18 \cdot 8$ |
| 122 |  <br>  WARM-IOUSE OWNERA AND FMPLOYTRES). | 30,759 | 1,760 | 32,519 | 26,282 | - 46,017 | +23'7 |
| 123 | Oadie 36.-Trader in tyaxtury-(Trade in pieoo-gooda, wool, cotton, silk, hair and other toxtilet). | $\begin{array}{r} 180,020 \\ 26,280 \end{array}$ | 12,312 | 122,338 | 113,260 | 58,77\% | +257 |
| 184 | Oadze 27,-Trade in sxixs, zeathise AND yoks-(Trado in akiny, leachor, fum, fantiens, hotn, oto, and articios mato from theeo). |  | - 749 | 27,029 | 29,762 | 6,482 |  |
| 128 | Oadme 28.-TBADM us wood-Prado in wood (not firowood) pork, barls, hamboo, thatoh, oto. and artiolos | 20,160 | 917 | 21,077 | 17,427 | 18,254 | $20 \%$ |
| 120 |  |  |  |  |  |  |  |
| 128 | ohinary, kenives, toole, eto), | $\begin{gathered} 4,565 \\ 26,593 \end{gathered}$ | $\begin{array}{r} 640 \\ 2,145 \end{array}$ | $\begin{array}{r} 6,205 \\ \cdot \\ \hline 8,738 \end{array}$ | 6,918 | 486 |  |
| 198 |  olernical produota (druga, dyos, painto, potroleum, oxploalve, oto). <br>  |  |  |  | 49,420 | 11,610 | 32•8 |
| 129 | Vendots of wine, liquors, aorated wator and jeo, eto. $\quad \therefore$ | 7,928 | 810 | 11,006 | $9,474 \times 12 ; 057$ |  | +16.8 |
| 180 | Ownere and managore of hotols, cootshopa, astale, oter, and theit amployens. | $2,267$ | - 183 | $\mathbf{8 , 4 5 0}$ |  | $\begin{aligned} & 3,940 \\ & 8,117 \end{aligned}$ | +17 +12 |
| 181 | Oadme 39,-Others jrada in mood seutis .. . | $\begin{array}{r} 916,228 \\ 1,476 \\ 675,477 \end{array}$ | -28,250 | $\begin{array}{r} 944,478 \\ 1,492 \end{array}$ |  |  |  |
| 188 |  |  | -13,834 |  | 271096 | 717,711 | +2397 $+127 \%$ |
| 1138 | ments. <br> Sollers of milk, batter, gheo, poultry, egis, oto. |  |  | $\begin{array}{r} 1,492 \\ \hline 89,312 \end{array}$ | - 0,248 | 55,364 | $+13,034 \cdot 7$ |
| tist | Eollers of mwoetmonts, nugar, gur and molasach | $34,816$ | 2,728 | 37,544 | 45,629 | 61,489 | - -176 |
| 138 | Cartamom, butel heaf, vegotablea, fruit and arconut mollon - | 34,816 7,889 | 1,216 | 9,185 | 11,695 | 34,314 | -21.7 |
| 1186 | Gruin and pulso dealors ... .. .. | $\begin{gathered} 86,432 \\ 69,351 \end{gathered}$ | $\mathbf{8 , 7 0 2}$ $\mathbf{2 , 1 8 7}$ | 93,184 71,488 | 91,240 | 162,388 | . $+2{ }^{+21}$ |
| 187 | Tobecoo, opium, graja, oto, collors $\quad .$. | 7,580 | 2781 | 71,488 | $\begin{array}{r} 80,807 \\ 7,047 \\ 0,006 \\ 18,168 \\ 34,969 \end{array}$ |  |  |
| 138 | Doabre in choop, goate, plge .. .. | 15,021 |  |  |  | $\begin{aligned} & 10,006 \\ & 36,048 \\ & 48,849 \\ & 25,968 \end{aligned}$ | $\begin{aligned} & +91 \\ & +78 \\ & +130 \\ & +28 \end{aligned}$ |
| 138 | Drekore in hay, grue, foddor $\quad \therefore \quad \therefore$ | 17,536 | 818 | 18,656 |  |  |  |
| 140 |  Trado in ready-made olothing and othor artiolies of drosa and tho toilot (hats, umbrellay, looka, resdy-made shoce, parfumen, ote). | 28,864 | 78,679 | 18,645 |  |  |  |

(OCCOPATIONAL)-SUBSIDIARY TABLE VII.
Solected occupations 1921, 1911 and 1901-continued.


CHAPITR 711
sUbgidiary mabies.

|  | (OCCUPATIONAL)-SUBSIDIART TABLE VL. <br> Solecied occupations 1921, 1911 and 1901-concluded. |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 容 | OCCUPATION. | $\xrightarrow[\substack{\text { Popalation } \\ \text { supported } \\ \text { in } 1821 .}]{\text { Possis. }}$ | $\xrightarrow[\substack{\text { Popalation } \\ \text { supported } \\ \text { in } 1921 .}]{\text { Drenzi. }}$ | $\qquad$ <br> Po pulation oupported in 1821. |  |  | Persontage of variation $19 n 1-$ 1921. |
| 180 | CLASA D.-MISOEXLANEOUS <br> SOB.OLASS IX.-PERSONS LIVING ON THEIR INCOME. Oadir Sl,-Peasoms hivivo priderPALLX OK THITM IROONT- <br> Proprietors (othor than egricaltural land) fund and echolarmip-boldets and ponsioners. <br> SOB-OLASB X.-DOMESTIC SREVIOE-OADEE (52) <br> Cooky, wator carrien, doorksepens, watchmon and other Indoor servante. <br> Private grooms, conchmen, dog boys, eta. <br> Privito motor drivers and oleaners... <br> SUBGLASS XI,-INSUFPICIENTLY DESCRIBND OCOUPATIONS-(ORDRE E3.-GEseral timbs <br>  <br> Manufecturer, buinowsmen and contracton othorwise unpocifiod. <br> Canhion, acoountanty, book-keopers, cleribs and amploycea in? unspecified oflioes, warehousce and shops. <br> Iabourers and workmon othorwiso unspecified. . <br> SUB-OLASS XII,-ONPRODUCTIVE <br> Onder bs.-Imyates of Jails, asyions, and hospmats <br> INAATES OF JACH, $\angle S Y L O M A$, AND ALMSHOUSES. <br>  <br>  yrrsis, |  | 3 <br> 58,683 <br> 4,870. <br> 88,688 <br> 20,379 <br> 3,199 110 <br> 19,988 <br> 1,487 <br> 2,252 <br> 16,246 <br> 5,680 <br> - 42 2es <br> 6,388 |  |  | 594,878 <br> 688,010 <br> 26,862 <br> 855,164 <br> 16,084 <br> 35,048 <br> 747,874 <br> 810,864 <br> 18,076 <br> 792,788 |  |



OHAPTAR 2 II .



CRAPARE IT.
gUBSDIARY TABLE8.



## (OCCUPATIONAL)-SUBSIDIARY TABLE VIII.

Occupations of selected castes-conlinued.



ORAPTER SII.
gUBSIDIABY TABLE E.



OGAPIER 2II.

## (OCCUPATIONAL)-SUBSIDIARY TABLE VIII.

Occupations of selected castes-conlinued.



Capptzr XII.
SUESDIIARY TABLES.


（OCCUPATIONAL）－SUBSIDIARY TABLE IX－A．
Number of persons employed in the Pont Office and Telegraph Department on the 18th March 1921 in the Punjab and Delhi．

| Crase of personf employed． | Posx 0 <br>  | TOR． <br> 荡 | Telsora <br> PABTI <br> 家宽 <br> 宛 <br> 8 <br> 定里 <br> 回 | De－ T． $\qquad$膏 学 | Rmanta |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 5 | 6 |
| （1）POSTS AND TELEGRAPHS． <br> Total persons maptoxed ．． |  | 11，140 | $386$ | 962 |  |
| Supervising officers（including probationary euperintendents and inspectors of post offices and assistant and doputy superintendents of telegraphs and all officers of higher rank than these） | $\begin{aligned} & 10 \\ & 11 \end{aligned}$ |  | $\ldots 8$ |  |  |
| Signalling establishment including warrant officers， officers，military telegraphists and other employees | ．．． | 2，039 |  | $\begin{array}{r}300 \\ - \\ \hline 144\end{array}$ |  |
| Miscellineous agents，sohoolmasters，station masters，etc．．． | 14 | 1，967 |  | 144 |  |
| Mlerks cf all kinds $\quad$ ．$\quad . \quad$ ．$\quad .$. | ．． | 3，418 |  | － |  |
|  | ＊ | 657 |  | $509$ |  |
| Road establishment consisting of overseers，runners， agents，boatmen，syoes，ooaohmen，bearers and others <br> （2）RAILWAY MAIL SERVICE． | － | 2，114 |  |  |  |
| Total Prisoms EMPLOYED | － | 21 10 | $\cdots$ | $\because$ |  |
| $\begin{array}{lllll}\text { Supervising oticers } \\ \text { Clerke of all kinds } & \text { a }\end{array}$ |  | 543 |  | $\cdots$ |  |
|  |  | 381 |  |  |  |

1. Dintribution of indastrien and penone employed. II. Particolars of establishments employing 20 or more persons in 1821 and 191I. III. Orga niastion of esteblishmenta. IV. Place of origin of skilled employeos, V. Place of origin of anakilled labourer. Vi. Diatribgtion of cortain races in certain industrial establishmonts. VII. Proportional distribution of adalt women and of children of owch sex in diftorent industries. VIII. Distribation of power.
(INDUSTRIAL)-SUBSIDIARY TABLE I.
Distribution of industries and persons amployed.



OEAPTER 2 ITI.
substolary tablezs.



Place of origin of akilled employees.



(INDUSTRIAL)-SUBSIDIARY TABLE VII.
Proportional distribution of adult women and of children of each sex in difforent Industries.

(INDUSTRIAL)-SUBSIDIARY TABLE VIII.
Distribution of Power.


## APPENDIX 1.

 BABLE HYPOTHRSIS AS TO THE ERRORS OF THE CENSOS.


Let ws call the number of persons recorded as immigrants at any census as $I_{n}^{\prime}$, where $n$ is the year of the Census. We will call the recorded number of emigrants $\mathrm{E}_{\mathrm{n}}$.


Let $I_{n}$ be the number of immigrants in the nth year.

| $\mathrm{E}_{\mathrm{n}} "$ | $"$ | emigrants | $"$ | $"$ |
| :--- | :--- | :--- | :--- | :--- |
| $\mathrm{~B}_{\mathrm{n}} "$ | $"$ | births | $"$ | $"$ |
| $\mathrm{D}_{n} "$ | $"$ | deaths | $"$ | $"$ |

Then if the inter-censal rise in population is $R$,

$$
\begin{gather*}
R=S u m\left(I_{n}+B_{n}-E_{n}-D_{n}\right) \\
B-D=R-n(I-E) . \tag{I}
\end{gather*}
$$

provided that $I_{n}$ and $E_{n}$ are constant throughont the decade and equal to $I$ and $E$ respectively.

Now assum migrants enter at the mid-point of the year, we have

$$
I_{n+10}^{\prime}=I_{n}^{\prime} s^{20}+I_{n+1} e^{9 \frac{1}{2}}+I_{n+2} s^{8 \frac{1}{2}}+\ldots \ldots \ldots+\cdots, \ldots \ldots \ldots+I_{n+10} s^{\frac{1}{2}}
$$

where $s$ is equal to the proportion of survivors after one year, and assuming a constant death-rate.
Hence

$$
\dot{I}_{n+10}^{\prime}=I_{n}^{\prime} s^{10}+s i\left(I_{n+10}+s I_{n+}+\ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots{ }^{9} I_{n+1}\right)
$$

assuming that immigration is constant from year to year and equal to $I$ per annom.

$$
\begin{align*}
& \mathrm{I}_{\mathrm{n}+10}^{\prime}=\mathrm{I}_{\mathrm{n}}^{\prime} \mathrm{s}^{10}+\mathrm{I}^{\frac{1}{2}}-\frac{\mathrm{s}^{10}-1}{8-1} \\
& \text { or } I=\frac{s^{20}-I}{s^{\frac{2}{2}}\left(s^{20}-1\right)}\left(1_{n+20-I_{n}^{\prime}}^{\prime} s^{20}\right) \text {. } \tag{II}
\end{align*}
$$

Similarly

$$
E_{n+10}^{\prime}=E_{n}^{\prime} s^{10}+E_{n+1} s^{0}+E_{n+2} s^{8 \frac{1}{2}}+\ldots \ldots \ldots \ldots \ldots+E_{n+10} s^{\frac{1}{t}}
$$

assuming as before equal survival rates, and again assaming constant emigration,

$$
\begin{equation*}
\mathrm{E}_{n+10}^{\prime}=\mathrm{E}_{\mathrm{n}}^{\prime} \mathrm{s}^{10}+\mathrm{E}^{\mathrm{s}^{\prime} \mathrm{s}^{10}} \frac{\mathrm{~B}-1}{1} \tag{III}
\end{equation*}
$$

Where $E$ is the annual rate of emigration.
Thus

$$
I-E=\frac{8-1}{B^{\frac{1}{2}}\left(9^{10}-1\right)}\left\{I_{0+10}^{\prime}-E_{n+10}^{\prime}-8^{20}\left(I_{n}^{\prime}-E_{n}^{\prime}\right)\right\} .
$$

Call the inter-censal gain by migration $M$,
Then,

This result (IV) gives the naloulated gain from migration from the number of persons recorded at each census as having been born inside a given area and enumerated outside it ( $\mathrm{E}^{\prime}$ ) and born outside it and enumerated inside it ( $\mathrm{I}^{\prime}$ ).

The assumption made of a survival proportional to the number of persons living at each age is probably not so true as tho assumption of a definite constant decrementof population, especially between the ages of $36-76$ (vide page 92, Census Report of England and Wales 1911). Call the annual decrement 8. Then our equations become

Writing as before

$$
I_{n+10}^{\prime}=I_{n}^{\prime}(1-10 \dot{\partial})+I_{n+2}\left(1-9 \frac{1}{2} \hat{c}\right)+I_{n+2}\left(1-8 \frac{1}{2} 8\right)+
$$

immigration

$$
I_{n+2}=I_{n+2}=I_{n+2}=I_{n+4} \ldots \ldots \ldots \ldots \ldots=1 \text { for the annual }
$$

$$
I_{n+10}^{\prime}=I_{n}^{\prime}(1-10 \delta)+I(10-508)
$$

$$
\begin{equation*}
10 I=\frac{I_{n+10-I_{n}^{\prime}(1-10 \delta)}^{1-5 \delta}}{.} \tag{IIA}
\end{equation*}
$$

$$
\begin{equation*}
10 \mathrm{E}=\frac{\mathrm{E}_{\mathrm{n}+10}^{\prime}-\mathrm{E}_{\mathrm{b}}^{\prime}(1-108)}{1-5 \delta} \tag{IIIA}
\end{equation*}
$$

these equations give the total migration (emigration and immigration) during the decade. If we put $\delta=20 / 1000=1 / 50$

$$
\begin{aligned}
10 \mathrm{I}=\left(\mathrm{I}_{\mathrm{n}+10}-\mathrm{I}_{\mathrm{n}}^{\prime} 4 / 5\right) /(9 / 10)=10 / 9 . & \mathrm{I}_{\mathrm{n}+10}^{\prime}-8 / 9 . I_{n}^{\prime} \\
& =1 / 9\left(10 . I_{n+10}^{\prime}-8 . I_{n}^{\prime}\right)
\end{aligned}
$$

We have seen how an approximate calculation of the immigration and emigration during an inter-censal decade may be made, leading to formulae II and llI based on a geometric decrease of population, and to formulas II A and III A based on an arithmetio decrease of population, with age (Middleton's assumption.)

Let us write the total immigration and- emigration in a decade as i and $e$ respectively, then if $b$ and $d$ are the true number of births and deaths and $\mathbf{R}$ the inter-censal rise in population

$$
\begin{equation*}
R=b+i-d \longrightarrow \tag{IV}
\end{equation*}
$$

so that $\mathrm{b}-\mathrm{d}=\mathrm{R}-$ ( $\mathrm{i}-\mathrm{e}$ )
Let $B$ and $D$ be the total number of inter-censal births and deaths from the records of vital statistics. Then in general the recorded number of births and deaths will be less than the trae number of births and deaths, so that $b>B$ and $d>D$, and we may write

$$
b=B+k \quad \text { and } d=D+k^{\prime}
$$

where $k$ and $k$ are both greater than zero.
Hence $k-k^{\prime}=(b-d)-(B-D)$
Thus the error in (B-D) is $k$ - $\mathrm{k}^{\prime}$; but this alone gives us no information as to the error of B or D separately, and the deduction (made in para. 25 of Chapter I of the Report) that when $k-k^{\prime}$ is positive $k^{\prime}$ is zero, and when $k-k^{\prime}$ is negative $k$ is zero, is not justified.

It is now necessary to re-examine the whole question from thep oint of view of the probable errors of the census returns.

For convenience let us write the total number of immigrants and emigrants during the decade as ' $i$ ' and ' e' respectively, and the immigrants and emigrants enumerated at the two censuses as $i_{0}, i_{1}, e_{0}, e_{1}$. Then we have from the previous equations (II $A$ and III A.)
and

$$
\begin{aligned}
i= & \frac{i_{1}-i_{0}(i-10 \delta)}{1-5 \delta}=l i_{1}-m i_{a} \\
e & =\frac{e_{1}-\theta_{0}(i-10 \delta)}{1-5 \delta}=l e_{1}-m e_{0}
\end{aligned}
$$

where $l=1 /(1-5 \delta)$ and $m=(1-108) /(1-5 i)$,
then

$$
b-d=R-l\left(i_{1}-0, l\right)+m\left(i_{0}-e_{0}\right)
$$

from (IV)
Oall the excess of immigrants over the emigrants $s_{0}, s_{1}$ at the respective censuses.

$$
b-d=R-l s_{1}+m s_{0}
$$

or $\quad \mathrm{b}-\mathrm{d}=\mathrm{p}_{1}-\mathrm{p}_{0}-\mathrm{ls}_{1}+\mathrm{ms} \mathrm{o}_{0}$
Oall $\theta_{r}$ the standard error of any variable $x$, then ( $r$ being the correlation between the ertors in any pair of variables)

$$
\begin{aligned}
& \theta_{b-d}^{2}=\theta^{2} p_{2}+\theta^{2} p_{0}+l^{2} \theta 2_{B_{2}}+m^{2} \theta s_{B_{0}}-2 r \theta p_{1} \theta p_{0}-2 r l \theta p_{2} \theta_{s_{1}}+2 r m \theta p_{1} \theta \mathrm{~B}_{0}+
\end{aligned}
$$

Let the proportionste standard errors be

$$
\begin{aligned}
& v \text { for } p_{0} \text { and } p_{1} \\
& w \text { for } s_{0} \text { and } s_{1}
\end{aligned}
$$

and let $r$ be the same for all pairs of variables.
We assume that there is no error in $l$ and $m$, so
where all the $p^{\prime} s$ and $s$ 's are mean values.

$$
\begin{aligned}
& \theta_{0}{ }^{2}=\nabla^{2}\left(p_{0}{ }^{2}+p_{1}{ }^{2}+2 r p_{0} p_{1}\right)+w^{2}\left(l^{2} s_{1}{ }^{2}+m^{2} s_{0}-2 r l m s_{0} s_{1}\right) \\
& -2 r v w\left(l p_{1} s_{1}-l p_{1} s_{0}-l p_{0} s_{1}+m p_{0} s_{0}\right)
\end{aligned}
$$

Let us take a special case and put

$$
p_{0}=p_{1}=p \text { and } B_{0}=s_{1}=8
$$

then

$$
\begin{array}{r}
\theta_{b}^{2}-d=2 \nabla^{2} p^{2}(1-r)+W^{2} s^{2}\left(l^{2}+m^{2}-2 r l m\right)-2 r v w p s(l-m-l+m) \\
=2 v^{2} p^{2}(1-r)+w^{2} s^{2}\left(l^{2}+m^{2}-2 \mathrm{rlm}\right)
\end{array}
$$

Now we may write $\theta_{b-d}^{3}-\theta_{b}^{3}-\theta_{d}^{3}-2 r^{\prime} \theta_{b} \boldsymbol{\theta}_{d}$ and $\boldsymbol{r}^{\prime}$ being the correlation in assuming the error in the births and deaths are errons of the birth and death proportionate to their numbers

$$
\theta_{b-d}^{2}=a^{2}\left(b^{2}+d^{2}-2 f^{\prime} b d\right)
$$

where $u$ is the proportionste error in $b$ and $d$ respectively
Putting in our special case $b=d$

$$
\sigma_{b}^{2}-d=2 a^{2} b^{2}\left(1-r^{\prime}\right)
$$

therefore

$$
\begin{equation*}
u^{2}=\nabla^{2} \frac{p^{2}}{b^{2}} \cdot \frac{(1-r)}{\left(1-r^{\prime}\right)}+w^{2} \frac{8^{2}}{b^{2}} \cdot \frac{\left(l^{2}+m^{2}-2 r l m\right)}{2\left(1-r^{\prime}\right)} \tag{V}
\end{equation*}
$$

This formula gives the proportionate standard error in bhe birth and death return (u) in terms of the proportionate consus standard errors (v), in the standard'error of enumeration in emigrants and immigrants (w), in the correlations in errors of the various census returns ( $r$ ) and in errors of registration of births and deaths ( $r^{\prime}$ )

In applying the result ( $v$ ) difficulties arise owing to our ignorance of the probable errors of the census, and of the values of the correlations.

We might expect the correlation of the errors in the populations at different censuses to be much smallor than those of births and deaths, the latter being based on returns made by the same men.

We may put as an example $\quad r=0.4$ and $\quad r^{\prime}=0.7$

$$
u^{2}=\nabla^{2} \frac{p^{2}}{b^{2}} \cdot \frac{3}{3}+w^{2} \frac{8^{2}}{b^{2}} \cdot \frac{l^{2}+m^{2}-\frac{8}{10} l m}{2 x_{15}^{3}}
$$

as $\mathrm{a} / \mathrm{b}$ is amall we may neglect the second term and writing $\mathrm{p} / \mathrm{b}=3^{*}$

$$
\begin{array}{lr}
u^{2}=18 v^{2} & \text { or } u=\nabla \sqrt{18} \\
\text { and if } \nabla=1 \% & u=4 \cdot 24 \%
\end{array}
$$

a gives the calculated percentage standard error of the births or deaths in the decade determined from the census figures, which latter we have assumed to have a standard parcentage error of unity.

## Lower limit of error in vital Statistics.

We get two groups of equations from the typical form

$$
b-d-(B-D)=0
$$

which may be written as

$$
b-B-(d-D)=0 .
$$

where we will take $b>B$ and $d>D$, i.e., that the error in the vital statistics is always on the side of omission.

Call $E_{B}$ the error in the number of birtha,

$$
E_{D} \quad \text { \# } \quad \text {, deaths. }
$$

then suppose wo find from the census returns and the returns of births and deathe that $\mathrm{E}_{\mathrm{B}}-\mathrm{E}_{\mathrm{b}}=0$, where $\mathrm{E}_{\mathrm{B}}$ and $\mathrm{E}_{\mathrm{D}}$ are both $>0$

[^47]then we get (i) if $\mathbf{C}>0$
(ii) if $\mathrm{C}_{\mathrm{a}}>0$
$$
\mathbf{E}_{\mathrm{D}}>0
$$

Hence if we take together all those districts for which $C>0$, we find on the average that $\mathrm{E}_{\mathrm{B}} / \mathrm{B}>0$ say ; and if we take together all the districts for which $\mathrm{C}<0$, we find on the average that $\mathrm{E}_{\mathrm{p}}^{\prime} / \mathrm{D}^{\prime}>\mathrm{C}^{\prime}$.

Now it seems to be a reasonable assumption that in those districts where we know nothing about the error in the death-rate, that it amounts to a fraction ' $\mathbf{k}$ ' of the lower limit of the error in the districts for which we have such knowledge.

> Thus

$$
\begin{aligned}
& E_{p} / D=\mathbf{k} . \mathbb{E}_{\mathrm{D}}^{\prime} / D^{\prime} \quad \cdot \quad \text { and } E_{B}=E_{D}+0 \\
& E_{B}^{\prime} / B^{\prime}=\mathrm{k} \cdot \mathrm{E}_{\mathrm{B}} / B
\end{aligned}
$$

and approximately

$$
B=D \text { and } B^{\prime}=D^{\prime}
$$

Hence,

$$
\begin{aligned}
E_{B} / B & =C / B+E_{D} / B \\
& =C / B+E_{D} / D \\
& =C / B+E_{D} / E_{D}^{\prime}
\end{aligned}
$$

Similarly

$$
\begin{aligned}
\mathrm{E}_{\mathrm{D}}^{\prime} / \mathrm{D}^{\prime} & =\mathrm{C}^{\prime} / D^{\prime}+\mathrm{k}_{2} \cdot \mathrm{E}_{\mathrm{B}} / \mathrm{B} \\
& =C^{\prime} / \mathrm{D}^{\prime}+\mathrm{k} \cdot \mathrm{C} / \mathrm{B}+\mathrm{k}, \mathrm{a}_{\mathrm{D}}^{\prime} / \mathrm{E}^{\prime} \quad \text { and } \mathrm{E}_{\mathrm{D}}^{\prime}=\mathrm{E}_{\mathrm{n}}^{\prime}+\mathrm{C}^{\prime}
\end{aligned}
$$

0

$$
\begin{align*}
& \frac{\mathrm{E}_{\mathrm{D}}^{\prime}}{\mathrm{D}^{\prime}\left(1-k^{2}\right)}=C^{\prime} / D^{\prime}+\mathrm{k} \cdot \mathrm{C} / \mathrm{B} \\
& \cdot E_{\mathrm{D}}^{\prime} / \mathrm{D}^{\prime}=\frac{C^{\prime} / D^{\prime}+k \cdot C / B}{1-k^{2}} \tag{IV}
\end{align*}
$$

If we asaume that $k=\frac{1}{k}$, this is equivalent to saying that the error in the deathrate in the districts where the birth-rate error is in excess is half the error in the deathrate in those districts in which the death-rate error is in eacess, and the birth-rate is assumed to be wholly free from error.

$$
\begin{array}{lc}
\text { Putting } C^{\prime} / D^{\prime}=7 \cdot 4 & \text { and }
\end{array} \quad \begin{gathered}
C / B=4 \cdot 0 \\
E_{D}^{\prime} / D^{\prime}=9 \cdot 4 / 8=37 \cdot 6 / 3=12 \cdot 5 \% \cdot \\
E_{B} / B=\left(1 \cdot 0+\frac{1}{2} \times 7 \cdot 4\right) / 4=10.3 \% \\
\end{gathered}
$$

thus the percentage errors in the birth-and death-rates in the districts where the birth-rate is more in error are 10.3 and 6.3 , and in the districts where the death-rate is more in the error are $5 \cdot 1$ and $12 \cdot 5$.

The average error of birth and death-rates is thus


Another alternative is to assume that where the birth-rate is more in error than the death-rate, the crror of the latter is $k$ times $(k<1)$ the former, and aice versa.

We shall then have,

$$
\begin{aligned}
& \mathrm{E}_{\mathrm{B}} / \mathrm{B}=\mathrm{C} / \mathrm{B}+\mathrm{k} \cdot \mathrm{E}_{\mathrm{B}} / \mathrm{B} \\
& E_{D}^{\prime} / D^{\prime}=C^{\prime} / D^{\prime}+\mathrm{L} . \mathrm{E}_{\mathrm{D}}^{\prime} / D^{\prime} . \\
& E_{n} / B .=C / B . \quad 1 /(1-k) \\
& E_{D}^{\prime} / D^{\prime}=C^{\prime} / D^{\prime} 1 /(1-k)
\end{aligned}
$$

Assuming that in the districts where the birth-rate is more in error than the deathrate that the latter is half the former, we get

$$
\begin{aligned}
& \mathbf{k}=\frac{1}{2} \\
& \mathbf{E}_{B} / B=2 C / B \\
& \mathbf{E}_{D}^{\prime} / D^{\prime}=2 C^{\prime} / D^{\prime},
\end{aligned}
$$

and assuming the same values of $C$ and $\mathrm{C}^{\prime}$ as before, we get
Erross in

In Districts where the error in birth-rate is greater
In Districts where error in death-rate is greatar

|  |  |
| :---: | :---: |
|  | Birth-rate |
| $\cdots$ | $8.0 \%$ |
| $\cdots$ | $14.8 \%$ |

The mean of these results is

$$
\frac{8 \cdot 0+4 \cdot 0+14 \cdot 8+7 \cdot 4}{4}=\frac{34 \cdot 2}{4}=8 \cdot 6 \%
$$

On an average tharefore 1 birth or death in 13 is not recorded.

The figures given below are the percentage errors on the recorded births. The actual births will number 108.6 to 100 recorded.

The percentage errors on the actual births will be

$$
8 \cdot 5 / 108 \cdot 5=7 \cdot 8 \%
$$

that is about 1 in 13.
Thus we reach the conclusion that the vital statistics of the Ponjab are likely to be about 7 or 8 per cent. in error, and that, provisionally, errors of about 11 per cent. in the birth-rate and of say 5 per cent. in the death-rates may be adopted as probable. Finally it is clear that the census figures of 1911 and 1921 do not establish the accuracy of the vital statistica to a greater degree of accuracy than 7 or 8 per cent. of error.

Since making the above deductions elight arithmetical errors were discovered in Mr. Middleton's table on page 54, and the following revised table must be adopted instead:-

Calculation of the percentage srrors of the birth anl death returns on the assumptions that in any one district one at least of the returns is absolutely correch.


If we adopt the corrected values of the excess errors in the birth and death-ratea instead of Middleton's values, then excluding Simla, the percentage excess error is

$$
\begin{aligned}
& 10 \cdot 14 \% \text { for the birth-rate } \\
& 7.00 \% \text { for the death-rate. }
\end{aligned}
$$

Let us take these as $10 \%$ and $7 \%$ respectively,

$$
\text { i. e., } C / B=10 \text { and } C^{\prime} / D^{\prime}=7
$$

(i) Then on the assumption that the error in the death-rate in the districte where the birth-rato orror is in excess is half the average error in the diatricts where the minimum can be fixed.*

We get

$$
\begin{aligned}
& E_{B} / B=0 / B+\frac{1}{2} E^{\prime} / D^{\prime} \\
& E_{D}^{\prime} / D=C^{\prime} / D^{\prime}+\frac{1}{2} \cdot E / B
\end{aligned}
$$

$E E_{B} / B=18, \quad E_{D} / D=6$,
Average $=\frac{18+12+6+9}{4}=11 \cdot 25 \%$.
(ii) On the ussumption that the error in the birth-rate; where the death-rate error is in excess, is $\frac{1}{2}$ the error in the death-rate, and vice versa.

$$
\begin{aligned}
& E_{\prime}^{\prime} / D^{\prime}=C^{\prime} / D^{\prime}+\frac{1}{2} E_{D}^{\prime} / D^{\prime} \\
& E_{B} / B=C / B+\frac{1}{2} . \quad E_{B} / B
\end{aligned}
$$

We get

Taking the mean of the two results we may say that the average error of the birth and death-rates, assuming the censuses are correct, is $12 \%$.

If we treat this as the standaxd error and adopt an estimate of $1 \%$ for the standard orror of a census, the standard error of the birth- and death-rates is given by

$$
\begin{aligned}
E_{v}{ }^{2} & =(12)^{2}+(4.24)^{2} \\
& =144+18=162 \\
E_{v} & =12.7 \%
\end{aligned}
$$

This is the percentage error on the recorded births and deaths. Assuming the errore are alwaye in defect the percentage error on the actual births and deaths is

$$
\frac{12.7 \times 100}{112.7}=11.3 \%
$$

This result is still more unfavourable to the accuracy of the vital atatistics, and it may exaggerate their incorrectnesam

However it is clear that whatever the standard error in the vital statistics is, whether 5, 8, or 11 per cent., we are fery far from being justified in assuming these statistics to be really close to the trath.

- Alote that dashes indicate that! we are dealing with diatricta in which the death-rato orror is in exoen.


## APPENDIX 2.

## The relationship between density of rural population per square mile with the District percentage of cultivated area.

Briefly, there is, as Mr. Middleton states a clear association between density of rural population and percentage of cultivated area in each District, but the conclusion that density of population increases faster than the percentage of the cultivated area, can hardly be said to be established withont a laborious analysis. Speaking statistically the law of density could only be accepted, if it were shown-
(a) that the regression of density of population on percentage of cultivated area is not linear.
(b) that the regression curve is concave upwards.

Now, the testing of these points, making allowance for the errors due to the smallness of the sample, is a considerable task; but we can get an approximate result by fitting the data with second and third ordor parabole. If this is done we find (calling " $D$ " the rural density per square mile, and " $k$ " the percentage of cultivated area)

$$
\begin{aligned}
& D=-23 \cdot 260+6 \cdot 989 k-026 k^{2} \\
& D=23 \cdot 741+4 \cdot 005 k+.023 k^{2}-0002 k^{3}
\end{aligned}
$$

These equations show that-
(a) the relation of density to cultivated area is expressed very nearly by a straight line, both the square and cubic terms being small up to a percentage of 80 for the cultivated area; which is above the limit found in this data;
(b) as judged by the quadratic the curvature is convex upwards, which is exactly tho opposite conclusion to that reached in paragraph 18;
(c) as judged by the cubic, there is an almost negligible concavity upwards for values of $k$ less than 38 per cent., but that for higher values of $k$ the curve is once more convex upwards.
It is by no means certain, without a much fuller analysis, whether the curvature would be positive or negative, if the errors of random sampling could be eliminated, and it is not intended to set up any law in opposition to that of Mr. Middleton. Unless, however, he has used other and wider material than that discussed here, judgment as to the nature of the divergence from linearity of the association of density of population and cultivated area must be suspended. In fact one might in slang phrase say that the data give a very good imitation of linear relationship.*

The data and the quadratic and cubic parabolm are shown in the diagram below-

-This dooe not mean, of courso, that there is alone one correapondenco betweon donsity and percentage of uuldivatod aroa. Eran if the corrolation is akow, it in cortainly not porfoct-a point no doubt which Mr. Middheton implied, though bo did not atoto it.

## APPENDIX 3.

## Mean Scalar Distaste.

 -It us find the mean scalar distance of a triangle ABO from the Apex $A$.


The value is given by

$$
\overline{\mathbf{B}}=\frac{\iint \mathrm{r}^{2} \mathrm{~d} \theta \mathrm{dr}}{\iint \mathrm{r} \theta \theta \mathrm{dr}}, \text { integrated over the area of the triangle }{ }_{0} ;
$$

The limits of $r$ are 0 and $p$ sec. $\theta$, for $0<\theta<\beta$
The limits of I are 0 and $p$ sec. $\theta$, for $0<0<\alpha$
whore a and $\beta$ are the angles which the perpendicular $p$ makes with the sides $A O$ and $\Delta B$ respectively.

Call the area of the triangle $A_{2}$ then

$$
\begin{aligned}
A \bar{S} & =\int_{0}^{\beta} \int_{0}^{p \sec \theta} r^{2} d r d \theta+\int_{0}^{a} \int_{0}^{p \sec \theta} r^{2} d e d \theta \\
& =\int_{0}^{\alpha} \frac{p^{3} \sec ^{3} \theta}{3} d \theta+\int_{0}^{\beta} \frac{p^{3} \sec ^{3} \theta}{3} d \theta \\
& =\frac{p^{3}}{3}\left[\int_{0}^{a} \sec ^{3} \theta d \theta+\int_{0}^{\beta} \sec ^{3} \theta d \theta\right.
\end{aligned}
$$

Now $\int \sec .^{3} \theta \mathrm{~d} \theta=\int \sec \theta \mathrm{d} \tan \theta$

$$
\begin{aligned}
& =\sec \theta \tan \theta-\int \tan \theta \sin \theta \sec =\theta d \theta \\
& =\sec \theta \tan \theta-\int \sin ^{2} \theta \sec { }^{3} \theta d \theta \\
& =\sec \theta \tan \theta-\int d \theta \sec { }^{3} \theta+\int \sec \theta d \theta \\
\therefore 2 \int \sec ^{3} \theta & =\sec \theta \tan \theta+\log \tan \left(\frac{\pi}{4}+\frac{\theta}{2}\right)
\end{aligned}
$$

Thus /

$$
\begin{aligned}
& A \bar{S} \\
& \cdot A \bar{S}
\end{aligned}=\frac{\mathbf{p}^{3}}{6}\left[\sec ^{\circ} a \tan a+\sec . \beta \tan \beta+\log \tan \left(\frac{\pi}{4}+\frac{a}{2}\right)\right.
$$

$\left.+\log \tan \left(\frac{\pi}{4}+{ }^{\prime}{ }^{\beta}\right)\right]$.

$$
=\frac{-p^{3}}{6}\left[\sec . a \tan a+\sec . \beta \tan \quad \beta+\log \tan \left(\frac{\pi}{4}+\frac{a}{2}\right) \tan \left(\frac{\pi}{4}+\frac{\beta}{2}\right)\right]
$$

If the triangle is isosceles $a=\beta$, and the mean scalar distance is then ':

$$
\dot{\bar{S}}=\frac{\mathrm{p}^{3}}{3 \Lambda}\left[\sec . a \tan a+\log \tan \left(\frac{\pi}{4}+\frac{a}{2}\right)\right]
$$

Now we have for the triangles formed by joining the terminals of a side to the centre the following values of a.


Now call $Q$ the whole area of the figure,
i. e., $Q=6 \mathrm{~A}$ for the hexagon
$=4 \mathrm{~A}$ for the square
$=3 A$ for the triangle (equilateral) $/$
For a circle from the centre $\overline{\mathrm{S}} / \sqrt{Q}=376126$
Returning to the general formula, a graphic method of determining the mean'scalar distance, applicable to an irregular boundary, will be developed.

We have

$$
\overline{\mathbb{S}}=\frac{\iint \mathrm{r}^{2} \mathrm{~d} \theta \mathrm{dr}}{\iint \mathrm{r} \mathrm{~d} \theta \mathrm{dr}} \text {, integrated over the whole area of the figure. }
$$

Let 0 be the point from which the mean scalar distance is to be determined.


$$
0 \mathrm{P}^{\mathrm{s}}=1,0 \mathrm{Q}^{2}
$$

then if $\mathbf{O Q}=\mathrm{R}$, we get $\quad 3 \mathrm{r}^{2} 8 \mathrm{r}=2$ I. R 8 B
and

$$
\overline{\mathrm{S}}=\frac{\iint \frac{\mathrm{i}}{} l \mathrm{Rd} \mathrm{\theta} \mathrm{dR} .}{\iint \mathrm{r} \mathrm{~d} \theta \mathrm{dr}}
$$

where the integrals extend over the outer and the inner curves respectively.
Calling $\Delta$ the area of the original curve
$\Delta^{\prime}$ the ares of the constructed curve

$$
\overline{\mathrm{s}}=\frac{\Delta^{\prime}}{\Delta} l
$$

and the mean scalar distance can at once be obtained planimetrically.
Let $l$ be the unit of length on which 0 P is measured

$$
l=\frac{0 \mathrm{P}^{3}}{0 \mathrm{Q}^{2}}
$$

and where $0 P=0 Q$ we get,

$$
l=0 \quad \mathrm{P}=0 \mathrm{Q} .
$$

In order to calculate graphically the mean scalar distance for any contour from any point, it will suffice to measure the ares of the two curves in the same unit, and multiply two-thirds of their quotient by the distance adopted as unity, for which the two radir veotors are equal.

The contours of 4 villages together, with the semi-cubical curve for the calculations.

of the mean scalar distance are shown in the sttached diagram. I'he relative data for these,

1 and 2 other villages are given in the
-statement below, and the figures in col. 7 of this statement show that the shape of the village boundary and the position of the abadi, is far from being as favourable to agricultural- operations as they
might be.

| 容 | Villago. | District. | Tahail. |  |  |  |  | Reysare. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 2 | 3 | 4 | 6 | 6 | 7 | 8 | 8 |
| 1 | Juglan ... | Hibsar ... | Hibsar ... | $8 \cdot 7324$ | 1-114817 | 1-408937 | 24.8 |  |
| 2 | Rambah ... | Karnal ... | Karnal $\quad . \therefore$ | 8.0986 | -981677 | 1.037780 | 89.8 |  |
| 3 | Sundah ... | Ambala | Ambala ... | 1.6478 | -483949 | .579858 | 83.5 |  |
| 4 | Maina ... | Rohtak ... | Robtak | $3 \cdot 1480$ | -057839 | -718351 | 910 |  |
| 5 | Sunet | Ludhiana | Ludhiana | 2.8618 | -037840 | 888601 | 02.4 |  |
| 6 | Ladbewali .. | Jullundhar | Jollundhar ... | 1-1872 | $\checkmark 402092$ | - 4.45822 | $20 \cdot 3$ |  |

## APPENDIX 4.

## MORTALITY FROM VARIOUS DISEASES.

(A). Tho anntal death-rate from 1867 to 1921 (inclugive) from (1) cholera, (2) small-pox, (3) bowel complaints, (4) plague, (5) fevern, (6) all "other "causes, and (7) all caases (B)-The eeasonal variation of the douthe from the above causes for the 2 feriods 1867 -1896 (30 years) and 1897-1921 ( 25 years). (C).-A comparison of the urban and raral death-rates from the causes enomerated in (A) abuve.

The object of this Appendix is merely to summarise in convenient form the broad stabistical features of the deaths as classified in the Public Health returns since 1867.

The three sections into which the Appendix is divided will be taken seriatim.
(4). -The annual death-rate from 1867 to 1921 (inclusive) from (1) cholera, (2) smallpox, (3) bowel complaints, (4) plague, (5) fevers, (6) all "other" causes, (7) all causes.

The death-rates have all been calculated afresh from the original data of mortality from each disease for the Punjab (British Territory) as constituted from time to time, the NorthWest Frontier Province being excluded from 1900 and onwards. The actual census returns for $1868,1881,1891,1901,1911$ and 1921 have been used for the years named; but for the inter-censal periods the population has been found by intercalating geometric series, whose end terms coincide with the actual census populations. The whole set of enumerated and calculated populations is shown in the table in statement l. For the sake of comparison of the growth of the population before and after the separation of the North-West Frontier Province the figures for the territory comprised in this Province have been added to the Punjab figures since 1900 (inclusive). The figures suffer from the defect (so far as comparison goes) of the exclusion since 1911, of the part of the Delhi population which lies to the west of the Jumna for which separate figures are not available in the tables.

The interpolated population will differ from the actual population, sometimes by large amounts, and it would have been better to use the vital statistics of births and deaths to determine the population at one census from that of the preceding census, and then apply a geometric progression to the residual differences between the calculated and observed populations at the later census.

The diagrams may now be consulted.


NUMBER DF DEATHS in the punjab per mille of the population CHOLERA.



number of deaths in the punjab per mille of the population
PLAGUE.



ALL OTHER CAUSES
THIS INCLUDES DEATHS FROM INJURIES \& RESPIRATORY DISEASES ALSO.


## (B)-The seasonal variation of deaths.

The seasonal mortality has been studied by Newsholme's method, in which the average daily death-rate is datermined in two ways (1) by dividing the total mortality of the month by the number of days in the month, and (2) by dividing the total mortality of the year by the numbar of days in the year. The ratio of the quotient in (1) to the quotient in (2), expressed as a prrcentage gives a masure of the relative intensity of the disease month by month, as compared to the avarazo intensity throughout the year. The percentages for each month, year by year. having been determined, the mean monthly intensity and the standard deviation are readily determined for any particular group of years. In the present case the statistics for 1861-1921 have been divided into two groups, namely, 1867-1896 (30 years) and 1897-1921 ( 25 years), the objects aimed at being (1) to obtain eventually a comparative series of groups each of 30 years' duration as the figures for future years become available; (2) to distinguish the pre-colony era from the colony era that was inaugurated by the starting in 1897 of the Lower Chenab Canal, and (3) to discriminate the seasonal variations which arise from ohance from those which are basic, and may, therefore, be expected to be common to both groups of years.

The diagrams bslow give the means and co-sficients of variation of the mortality rates calculated in the manner described for each month for the two groups of years separately.

## (C) Comparison of the urban and rural death-rates from carious diseases.

The full statements of the deaths year by year from each discase in rural and orban areas are too lengthy to be reproduced. From the tables only the following results are noted :-

| Diseaso. |  |  | AFERARE OF THE ATNTAL DEATH-RATES per mille. |  |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  | Rural areat. | Towns, |
| Cholera (1877-1921, exeluding 1885-1888) .. | * | . | 0.30 | 0.56 |
| 8mall-pox (1877-1021, excluding 1885-1368) | - | . | $0 . \mathrm{Cl}$ | $0 \cdot 84$ |
| Plagre (1901-1921) -. | -• | . | 6.53 | $4 \cdot 73$ |
| Hovers (1877-1921, cxcluding 1886-1888) .. | - | - | 22.88 | 20.69 |
| Bowol complainta (1877-1821, exoluding 1886-1888) | - | .. | $0 \cdot 66$ | 2.81 |
| Rorpiratory diseases (1002-1921) $\quad .$. | - |  | $2 \cdot 32$ | 6.77 |
| Injurics (1877-1921, excluding 1885-1888) | $\cdots$ | - | 0.35 | $0 \cdot 40$ |
| All "uther " oauses (1877-1921, excluding 1895-1888) | - | .. | 6.80 | 11.20 |
| All caures (1877-1021, excluding 1885-1888) | - | . | 36.04- | $41 \cdot 59$ |

We may summarise the statistical conclusions indicated by the 3 classes of figures in respect of each disease. The medical expert must interprot them in the light of his own technical kuonledge.

## CHOLERA

General trend.-The mcrtality from cholera shows no signs of general diminution in the: 55 years 1867-1921.

Seusonal variation.-Cholera is most evident during tle summer months; though there is a very marked difference between the seasonal rariation in the let and 2nd group of years. During 1867-1896 the cholera mortality curve had a double homp; but is ondy singly humped in the later years 1897-1921. Light is thrown on this phenomenon by considering separately years of high, medium, and low cholera mortality, as it is found that the years of medium and low mortality exhibit a double hump, the first in May or June, the second in September; while years of high mortality have only a single maximum in August.

The variability of desths from cholera (shown by the dotted lines on the diagrams) is very high, as might have been anticipated from its epidemic character.

Urban and rural areas.-Cholera produces a much greater mortality in towns than in villages. Out of 39 years the rural areas had a greater cholera mortality in only 7 years.
SMALL-POX.

General trend.-The seasonal variation curves for 1867-1896 and 1897-1921 agree very closely : so do their variabilities. Maximum mortality is to be exfected in May. December is the month in which thero is the greatest uncertainty as to an outbreak.

Urban and rural areas.-Small-pox causis $1 \frac{1}{2}$ times the proportionate number of deaths in towns than it does in villages. In only 8 years out of 39 was there a greater rural than urban mortality.

## BOWEL COMPLAINTS.

General trend.-There appears to be a very steady tendency for deaths from bowel complaints to diminish, and since 1900 the death-rate has not exceeded 1 per mille.

Seasonal variation.-The incidence of bowel complaints is greatest at two parts of the year, May and October. Tho rariability is low, in no case exceeding 25 per cent., the causes which produce bowol complaints being apparently more or less similar in character and intensity from yoar to year:

Urban and rural areas.-Town dwellers are essentially more subject to bowel complaints than residents in rural areas. Out of 41 jears 1877-1884 and 1889-1921, in no single year was the mortality in urban less thau in rural areas from this cause.

## PLAGUE.

General trend.-So far as any general tendency is exhibited by a disease which appears first in recent Punjab history in 1901, it might be supposed that plague is diseppeacing.

Seasonal variation. -The data are too limited for a secure determinaticn.
Urban and rural areas.-Rural areas suffered more than urban axeas in 12 out of 21 years ending 1921.

## FEVERS.

General trend.-Since 1885 the general tendency appears to be for a constancy of the death-rate from fevers : the high mortality in 1918 is due to the Influenza epidemic.

Seasonal variation.-Two maxima appear in the seasonal chart. One in May-June is due to relapsing fever-the other in October-November to malaria. The variability is low, for the most part being below 30 per cent., consonant with the endemic character of these diseases.

> ALL " OTHER" CAUSES.

General trend.-This appears to have been upwards from 1867. to 1908, with a alight tendency to diminish since.

Seasonal variation.-As might have been expected there is very little variation from month to month in the deaths from "other" causes, which includes deaths from all sources except cholera, small-pox, bowel complaints, plague and fevers. Agreeably with this the co-efficients of variation are very small; in February, July and August they are below 10 per cent. in both groups of years.

Urban and rural areas.-Deaths from "other" causes in towns always outnumber proportionately the numbers of deaths in rural areas.

> ALL CAUSES.

General trend.-The general death-rate whether due to physiological causes or to a better reporting agency, rose, on the whole, from 1867-1890; since then it appears to be on the average fairly stationary, though there was great mortality in 1908 and 1918.

Seasonal variation.-Deaths from fevers constitute about 75 per cent. of all deaths in the Punjab, and the seasonal variation accordingly follows the fever chart fairly closely.

Urban and rural areas.-The general urban death-rate is greater than that in the rural areas in 37 out of 41 years.

STATEMENT 1.
Statement showing the population of Punjab from 1867 to 1921 (calculated).

| No. | Year. . | Population of the British Punjab. | No. | Year. | Population of the Br.tish Yunjab. | Population of Punjab an comprised prior to 1900. |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 1867 | 17,611,498 | 28 | 1895 | 24,488,470 |  |
| 2 | 1868 | 17,611,498 | 30 | 1896 | 21,646,766 |  |
| 3 | 1869 | 17,703,839 | 31 | 1897 | 21,806,210 |  |
| 4 | 1870 | 17,796,685 | 32 | 1898 .. | 21,966,822 |  |
| 5 | 1871 | 17,889,971 | 33 | 1809 .. | 22,128,624 |  |
| 6 | 1872 .. | 17,983,770 | 34 | 1900 .. | 20,330,330 | 22,201,014 |
| 7 | 1873 | 18,078,079 | 35 | 1901 | 20,330,339 | 22,455,819 |
| 8 | 1874 | 18,172,864 | 36 | 1002 | 20,294,517 | 22,886,175 |
| 9 | 1875 | 18,268,143 | 37 | 1803 . . | 20,258,756 | 22,717,205 |
| 10 | 1876 | 18,363,932 | 38 | 1004 .. | 20,223,056 | 22,849,155 |
| 11 | 1877 | 18,460,214 | 39 | 1905 . 0 | 20,187,437 | 22,981,802 |
| 12 | 1878 .. | 18,557,006 | 40 | 1906 .. | 20,151,859 | 23,115,212 |
| 13 | 1879 | 18,654,310 | 41 | 1907 .. | 20,116,362 | 23,249,408 |
| 14 | 1880 | 18,752,107 | 42 | 1908 .. | 20,080,926 | 23,384,367 |
| 15 | 1881 . 1 | 18,850,437 | 43 | 1909 .. | 20,045,531 | 23,520,113 |
| 16 | 1882 | 19,042,975 | 44 | 1910 .. | 20,010,217 | 23,656,644 |
| 17 | 1883 | 18,237,403 | 45 | 1911 .. | 19,974,956 | 23,793,983 |
| 18 | 1884 .. | 19,434,000 | 46 | 1912 .. | 20,044,848 | 23,983,764 |
| 19 | 1885 .. | 10,032,514 | 47 | 1913 .. | 20,115,000 | 24,175,091 |
| 20 | 1886 .. | 10,883,045 | 48 | 1914 .. | 20,185,372 | 24,367,01S |
| 21 | 1887 . . | 20,035,631 | 49 | 1915 .. | 20,256,004 | 24,562,291 |
| 22 | 1888 .. | 20,240,271 | 50 | 1916 .. | 20,326,895 | 24,758,210 |
| 23 | 1889 .. | 20,447,022 | 51 | 1917 .. | 20,398,028 | 94,055,677 |
| 24 | 1890 .. | 20,655,868 | 52 | 1918 .. | 20,469,356 | 25,154,737 |
| 24 |  | 20,806,847 | 53 | 1919 .. | 20,541,026 | 25,355,392 |
| 25 | -1891 .. | 20,886,847 |  |  |  |  |
| 26 | 1892 | 21,020,652 | 54 | 1020 - | 20,612,896 |  |
| 27 | 1893 . . . | 21,175,384 | 55 | 1921 . .. | 20,685,024 | 25,761,500 |
| 28 | 1894 .. | 21,331,364 |  |  |  |  |



DEATHS IN THE PUNJAB FROM BOWEL COMPLAINTS THEIR SEASONAL VARIATION \& STEADINESS OF RECURRENCE FIRST GROUP OF 29 YEARS 1868-1896.

## mean percentages <br> COEfficients of variation - - - - -



SECOND GROUP OF 25 YEARS 1897-1921.


DEATHS IN THE PUNJAB FROM FEVERS
THEIR SEASONAL VARIATION \& STEADINESS OF RECURRENCE FIRST GROUP OF 30 YEARS 1867-1896.
mean percentages
COEFFICIENTS OF VARIATION - - - - -


SECOND GROUP OF 25 YEARS 1897-1921.


## DEATHS IN THE PUNJAB FROM ALL OTHER CAUSES

 THEIR SEASONAL VARIATION \& STEADINESS OF RECURRENCE FIRST GROUP OF 30 YEARS 1867-1896.
## mean percentages

coefficients of variation _-m- -


SECOND GROUP OF 25 YEARS 1897-1921.



No. 6343-1

DEATH8 IN THE PUNJAB FROM SMALLPOX
THEIR SEASONAL VARIATION \& STEADINESS OF RECURRENCE FJRS' GROUP OF 30 YEARS 1867-1896.

## mean percentages

COEFFICIENTS OF VARIATION - - - -

$14.1 \ldots$

8ECOND GROUP OF 25 YEARS 1897-1921.


IAN. FEB. MAR. APR MAY. JUN. JUL AUG EEP. OCT. NOV. DEC. MAN.

## APPENDIX 5.

Ceance of burvivat for chimdren born li various frars of married mite.

Take a single parental pair who have been married $x$ years. Let the chance; that a child born in the pth year of marriage survive till the beginning of $(p+1)$ th year, be $R_{p}$ [Properly $R_{p}$ will vary with the ordinal No. of the child, children born after the first having - better survival rate than the first-born.]

Let the chance, that a child born in the pth year of marriage lives from the beginning of the gth up to the end of the qth year of its age, be $R_{p a}$

Then the children born in the first year of married life alive at the end of the first year are-

$$
f_{1} R_{1,1}
$$

The children alive at the end of the 2nd year are -

$$
\begin{aligned}
f_{1} R_{11} R_{1,2} & \text { (aged 1 to 2) } \\
+f_{2} R_{21} & \text { (aged } 0 \text { to 1) }
\end{aligned}
$$

The children alive at the end of the 3rd year are -

$$
\begin{aligned}
f_{1} R_{1,1} R_{1,2} R_{119} & \text { (aged 2 to 3) } \\
+f_{2} R_{2,1} R_{2,2} & \text { (aged 1 to 2) } \\
+f_{3} R_{3,1} & \text { (aged 0 to 1) }
\end{aligned}
$$

The children alive at the end of the xth year are -

$$
\begin{aligned}
& f_{1} R_{1,1} R_{112} \quad . . \quad . . \quad . . R_{1 ; ~} \quad \text { (aged } x-1 \text { to } x \text { ) } \\
& +f_{2} R_{21} R_{2,2} \ldots \quad . . \quad . . R_{2, x-1} \text { (aged x-2-tox-1) }
\end{aligned}
$$

$$
\begin{align*}
& \text {.. .. .. .. .. .. .. .. .. .. .. .. .. } \\
& \text {.. .- .. .. .. .. .. .. .. .. .. .. .. } \\
& +f_{\mathbf{x}} \mathbf{R}_{x, 1} \quad{ }^{1} \text { (aged } 0 \text { to 1) } \tag{1}
\end{align*}
$$

There are in the summation $\frac{x(x+1)}{2}$ different R's. That is for a marriage of 30 years duration the number of R's will be 465. By putting all the R's equal to each other we are therefore making a pretty liberal assumption. It seems, however, necessary to do so, in order to get practical conclusions.
Pat

$$
\begin{aligned}
& \mathbf{R}_{\mathrm{y}_{1}}=\mathbf{R}_{112}=\text {.. .. .. .. } \mathbf{R}_{1, x} \\
& =\mathbf{R}_{p: 1} \quad . . \quad . . \quad . . \quad . . \mathbf{R}_{p x-1} \\
& R_{x, 2}=R
\end{aligned}
$$

Then the number of children alive at the end of the xth year is (from 1 pair of parents)

$$
\begin{aligned}
& 4=f_{1} R^{x} \quad \text { (aged } x-1 \text { to } x \text { ) } \\
& +f_{2} \mathrm{R}^{\mathrm{x}} \mathrm{I} \quad \text { (aged } x-2 \text { to } \mathrm{x}-1 \text { ) } \\
& \text { + .. .. .. } \\
& +f_{x} R \\
& \text { (aged } 0 \text { to 1) }
\end{aligned}
$$

begotten by parents who have completed $x$ years of married life.
Now we are given the number of marriages in their rth year, and the number of children alive of marriagea in their rth year.

Let $l_{x}=$ number of children alive from parents in their $x$ th year of marriage.
$m_{n}=$ number of parents in their $x t h$ year of marriage.
Then $l_{x}=m_{x} \times l_{1}$

$$
\begin{equation*}
\therefore \frac{l_{x}}{m_{x}}=f_{1} R^{x}+f_{z} R^{x-1}+\ldots \ldots+f_{x} B \tag{A}
\end{equation*}
$$

Take the values of $L_{\mathrm{y}}$ and $\mathrm{m}_{\mathrm{z}}$ from the tables.
For the Oth recorded year of marriage $x=1$

- lat recorded year of marriage $x=3$ and so on.

$$
\begin{aligned}
& \text { If } b=\begin{array}{c}
\text { total number of children born to parents now in their } \\
\text { marriage. }
\end{array} \\
& \begin{array}{llll}
b_{x}=m_{x}\left(f_{1}+f_{2}+\right. & . & . . & \left.. . f_{x}\right) \\
\frac{b_{x}}{m_{x}}=f_{1}+f_{2}+f_{s}+ & . . & . . & . . \\
f_{x}
\end{array} \\
& \text { If we go back to the general expression (1) we have succesesively, by puting } \\
& \frac{l_{1}}{m_{2}}=f_{1} R_{1,2} \\
& \frac{l_{1}}{m_{g}}=f_{2} R_{1,1} R_{2,2}+f_{2} R_{\nu_{1}} \\
& \frac{l_{0}}{m_{s}}=f_{1} R_{1,1} R_{1,2} R_{1,2}+f_{1} R_{2,1} R_{2,2}+f_{3} R_{2,1} \\
& \frac{i_{x}}{u_{x}}=f_{1} R_{1,1} R_{1,2} \ldots R_{1, x}+f_{2} R_{2,1} R_{2,1} R_{2,2} \ldots \ldots R_{v x-1}+\ldots \ldots \ldots \\
& +\mathrm{f}_{\mathrm{x}} \mathrm{R}_{\mathrm{x}, 1}
\end{aligned}
$$

This gives us $x$ equations to solve $\frac{x(x+1)}{2}$ unknowne

The ' $f$ 's' are given by equations ( B ).
Now it seems reasonable to assume that the survival rate of children in their $\boldsymbol{n t h}$ year of age born in the $m$ th year of marriage of their parents, is equal to the general survival rate for the $n$th year of age multiplied by a factor depending only on the duration of marriage at the time of birth.

We then have

$$
\mathrm{R}_{\mathrm{m}, \mathrm{n}}=\mathrm{K}_{\mathrm{m}} \mathrm{R}_{\mathrm{n}}
$$

Thus we get

We may now put in (C) the actual survival rates for the general population $\mathbf{R}_{\mathbf{1}}, \mathbf{R}_{\boldsymbol{v}}$ $\ldots . . R_{x}$ and the values of the $\mathrm{P}^{\prime} \mathrm{s}$ determined from ( $B$ !, and we have x equations to determine the $\mathbf{x}$ unknowns $K_{1}, K_{2}, K_{3} \ldots \ldots \ldots . K_{x}$. which give the influence of duration of marriage at birth on the survival of the children at all ages.

If we call $\mathrm{Lx}_{x}$ the number living at age $\mathbf{x}$ according to table $\mathbf{P}$ of the actuarial Report for the Census of 1911 ( $p$ 187) in our notation

$$
\mathrm{R}_{\mathrm{I}}=\frac{\mathrm{L}_{\mathbf{x}}}{\mathrm{L}_{\mathrm{x}-1}}
$$

So the values of $R_{1}, R_{2} \ldots \ldots . R_{10}$, should be found from this table and then substituted in equations of type (C).

To start with take all groups together. From Table P, Life Táble Punjab, males page 187, Census of India Report 1911, vol. I, part I, the survival rates R are given by subtracting the percentages in col. 4 from $1 C 0$ and expressing as a decimal, i.e.,


The $f^{\prime} \mathrm{s}$ are determined from equations ( $B$ ) and taking the fertility for the first ten years only, equations (C) then give 10 equations for the 10 unkncuns $K_{y}, K_{\nu} \ldots \ldots K_{20}$

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| Telugu .. |  | Widow remartinge ${ }^{\text {- }}$ - .. | 248 \& 4.4 |
| Telegraph aystem .. .. |  | Wig makers $\quad . \quad . \cdot$ | 304 |
| Telegrsph, wireless- $\quad \because$ |  | Wircless telegraph station ... ... | 18 |
| Tolophonio вystem .: ... .. . . |  |  |  |
| Teli $\quad \cdots \quad \cdots \quad . \quad$. |  |  |  |
| Thalooheri $\quad \because \quad . \quad . \quad$. |  |  |  |
| Thoological school at Qadion ${ }^{\text {a }}$ - . ${ }^{\text {a }}$ |  | Yogi | 185 |
| Tibetun . . . . . |  |  |  |
| Town, defnition of -and oity ... .. | 102 \& 103 | I |  |
| Town, number of inhabitants per room inTombe iumber of persons per building | 117 \& 118 |  | 110 |
| Towns, number of persons per building - in solooted-and cities .. .. .i | 110 \& 117 | Zakat | 113 |


[^0]:    - In anoiont deys the revenue domanded averaged about 30 per conto of the gross produce and rose to conviderably more provided it could be talken without ennibilating the producer; it is eutimated that the present revenue amonnts to about 6 per cent, of the groes produce.

[^1]:    Nola-I desire to rendor my acknowledgomonts to Mr . Calvert from whose "Wealth and Welfare of the Punjab" I bave freely drawn in paragraphe 10 and 11 .

[^2]:    * The railway mileage of 1868 is shown as 293 in the Censue Report of 1891 and ar 468 in that of 18 si ; dopartmental reports show that 410 miles were open in 1872.

[^3]:    - Note.-In Punjeb British Territory the number of actual workers whose main employment is agrioulturo to $3,860,000$ and the corresponding figare for Masalmans is 2,092,074.

[^4]:    Columine 8 to 6.-Pataudi, Patiala, Nahan
    Column 4,-Dujana, Kspurthala
    Columns 9 to 12.-Nahan, Mandi, Chamba
    Column 8.-Dujans, Jind, Nabha, Bilaspur.

[^5]:    - Fida Appondix I tor an analysis of the errons arising from incorrect consus figures in judging of the aconracs
    of vital atatiotion.

[^6]:    * It might be argued, of oourse, that there might have been a long influx of vory young ohildren during $1911-$ 1015 (who would be between $0-9$ in 1921) or an emax of very young ohildren daning $1910-1921$, or, that largo numbors of children betwoon 5-9 had come int
    + In viow of the inecouray of the vital statistics one cannot be confident that the births did really fall of in the last half of the docade, when administrativo routine was leat rigid owing to the war and to internal disturbancos.
    $\ddagger$ Other cases in which the flgares are open to suspicion will be referred to later on. In the present chapter such an instance in dealt with in paragraph 51.

[^7]:    -The actual values of the constants found for this distribution Fere, after applying the full correction for abruptness at the beginning of the range and Sheppard's corrections.

    $$
    \begin{aligned}
    & \mu_{g}=-4533 \\
    & \mu_{8}=3.2821 \\
    & \mu_{4}=31-9162
    \end{aligned}
    $$

    Whidt give $\beta_{1}=115.58, \beta_{2}=155.31$.
    This makes the criterion $\kappa<0$ and a type $I$ curve is indicated.

[^8]:    "Whan dry the true 'bara ' boil approachos the hardneess of talc.

[^9]:    
    fore some A is not neocsearily C.'

[^10]:    Hut in this conneotion it must be bomo in mind that among the poorer classes, the number of persons per iuhabled room is practically the same as tho number of persons per inhabited building, so many of their persons per riuting only ol a singlo living room. That 5 or moro persons should be able to sleep for 7 or 8 hours in a olosed for health is usually put at 3,000 oubic feet reania as well) of perhaps only 2,000 cubic feet, whereas the allowance physiologist,

[^11]:    The following references will help those who wish to pursue at leisure particular lines of enquiry :-

    Imperial Table I shows the population by sexes in urban and rural areas separately. It also shows the number of occupied houses in towns and villages for all the Punjab districts and states and for the Delhi Province. It is interesting to note that this table shows that the congestion of persons in houses in rural areas is greater than it is in the towns, as the average for the whole of the Punjab is 4.58 persons per house in the rural areas as against only 4.40 persons per house in Punjab towns. The data only refer to occupied houses.

    Imperial Table III gives the towns and villages classified by population: The unit of grouping in this table is not uniform and this makes them difficult. to manipulate from a statistical view-point. "A classification with an equal base unit of 500 persons up to a range of 20,000 has already been given in para. 55 above. Imperial Table III will enable the classification to be continued above the range of 20,000 inhabitants per town or village.

    Imperial Table IV gives the towns classified by population with variation since 1881; and may be referred to in connection with subsidiary tables 7 and 8 which have already been discussed in paragraph 52.

    Imperial Table $V$ shows the towns arranged territorially with population by religion, further analysis of which will be made in Chapter IV in considering the relative tendency of certain religious groups to congregate in towns.

    Imperial Table VII, part (c), gives the details of age, sex and civil condition for cities and selected towns, a list of these being

    Lahors City,
    Amritanr City
    Multan City Multan City Anpalpind To
    Ambala Town.

    Jullundur Town. Sialkot Town. Ferozopore Town. Dolhicity.
    given in the margin.
    Imperial Table VIII (C) gives details of literacy by religions and age for the same cities and selected towns as those mentioned above.

    Imperial Table XI (B) gives the details of birth-place by districts for cities and selected towns.

    Imperial Table XVII gives the details of occupation by districts, states and cities, as to which the reader may be referred to Chapter XII for further information.

[^12]:     and Oudh (Tablo. O) the parcontago of tomakea who reach 16 in $45: 8$, so the above figure is probably approximately
    corrook.

[^13]:    It is neoossary continually to remind the reader that these fignres refer only to those emigranta ana immigrants who affect the census returns, and that actually the number of persons going to and from the districts named is far in excoess of the marginally noted figures.
    † But the possibility of a large corroction for "criroulation" discussed in paragraph 67, hat to be borno in mind.

[^14]:    Whathor the offoot of periodio migration is refioctod in the Consus figures, of course depends on whether the Conacs tables plece while tho partioular sessonal pilgrimage in in awing or noth

[^15]:    man indebted to thin oourtery of the officinis of the North-Western Railway for supplying me with a greas
     mils of the Railway, nambar of trains ran, and co forth, of which time forbids armmination, boyond that given in the
    

[^16]:    - Betwoen 7 p.m. on the 18th March 1921 and 6 amm . on the 19 th. The arrangements for train and atation onumeration were very thorough, a supervisor and enumerators (one of whom was a female) being responsible for oach train, the supervisor and malo onumerstors accorpany actually in transit at $6 \mathrm{am} . \mathrm{m}$. on the night of the 18 th achomo of enumeration was that it gave tho num after that time was onumerated at the station iteolf, except for a March 1021. Any person arriving at a station alter that onumeration van. Unfortunately there are some rather cortain number who were acrommodated in a special running trains. Thus the only train enemerated in the sorious errors in the compilation of the returns for running thans. 1,000 passengers, and actually oontained Amritsar Distriot was 5 UP, which oould not contain more than
     III for Ampitgar include 1,059 persons, who wero connted in the platiorm enameration, and do not belong to a running train at all.
    +Conversely one might have deduced the mean speed (given the lead) or the mean lead (given the speed) of journeys by rail from the Census figures of numbers of
    calculation of the menn time spent on journeys by rond,
    $\ddagger$ Half the total number of journoys wimately, given tho mode, from the well-known formula, mean-modo:=3 (moan-median).

    It mightseem that these journeys should be classified under the heading of "casual" migration in Mr. Gait's sehome: but his restriction of the term to movoments between "adjoining villages precluces the; and wion
    forced to believo that a great proportion of the movements which affect the census figuree have been ignored.

[^17]:    -The oxeluition in unavoidable, as no statirtice of rond-trafio aro available.

[^18]:    *It would not be tru : of tho motionless vegetable kingdom, where the percentage of natives will always be cont. per cont.
    $\dagger \mathrm{Im}$ ke no apology for borrowing an occasional phrase from the technique of that rescrvoir of accurato asion to wit mathatics, though I am well eware that there is a tendency for the olessical man to rogard any oxpression, to wit masinsantan, idea $\ddagger$ This correlation co-efficient, as woll as the regression oquation whin
    $\ddagger$ This correlah Lallpor, Montgomery, Shahpur and Sheikhupura.
    Colony districts of Lyall par, olucidsted so far. G. H. Knibbs in a most detailod and illuminating treatise on "The Mathematical Theory of Population" printed as Appendix A, Volume 1 of tho Consue of the Commonwoalth of Australia, 1917, does not deal with the matter in his ohaptor on migration.

[^19]:    If time parmita (an unlikoly contingency) I hope to oxamine in an Appendix what correction should be appliod to tho orude fgures of foreign-born for a given ares and population and rate of movement.
    $\dagger$ Thus, il, in rospoct of thie problom of migration, a motsphor may be permittod, it is as though one inntantanoously observod myriady of lying-fish omorging from and disappearing into a sunlit sea, and attempted to detormino by intaition alono the movements made below the surface.

[^20]:    Mir. Middloton hed further propowed two other functions which be calls "the woefficient of migration" "tho offoot of migration." The oroofficiont of migrati $n$ ho defines at oqual to immigranthminus emigrants divided dividod by total population. Hed. Mr offect of migration " be defines as-the number of immi rante minus emigrants dividod by cotal population, Had. Mr. Middlotion romained to develop the idean of which themo functions wors andion, no doubi tho reatite would havo been of considorable Intereat.

[^21]:    - muoh groator sathority than I could, and I have loftiontirely to him the oxposition of the Iolamio pojid, speabs with

[^22]:    Wu have to remamber that the percentage of Musalmans has fallen from 50 ' to juts per cont, during
    tho decade, and that this differenco is leas then the 1 per cent. of orror which may be attribated to tho cengup

[^23]:    Acoording to Rai Behadur Pandit Hari Kishen Kaul (Chaptor IV, pare. 132 (a) of the Censud Report of 1911) the solnowlodgment of the aupremsoy of Brahmans, whose claims to superiority are bwed on bitth alone, is made by lower Hindu castet only.

[^24]:    - Roforred to an page 406 of the Indian Year Book for 1918.

[^25]:    *No doubt as life insurance operations extend, it will be possible to get a olearer view of the age-dietribution, but this can hardly help matters for many years to come. In the meantime the annual vital statistics might well oontain the recorded deaths by each ycar of age, as this, with the recorded number of births, after correcting oontain the recordcd deaths by each of the effer of migration, would allow of independent calculation of the age-distribution.
    $\dagger$ Mr. Acland in commenting on the preference for certain digits in the unit place to express ages, puts the order of preference as $0,5,2,8,6,4,3,7,1,9$.

    In the Panjab the order would agree with this for the younger ages, but in the higher ages 9 is preferred in the unit place to cither 7 or 1 . The reluctance of an old man to enter a new decade might account for this phevomonon, if it is not the remult bf random sampling.

[^26]:    - "In this oonneotipn it is notoworthy that acoording to Knibbs (page 112 of Appendix A to the Consus of the Commonwenlth of Australia 1911$)^{\text {" }}$ inacouracy of alatement is more marked amongst the males than amongsi fomales." Tho argument is based on the ratio of tho recorded to the adjusted aumber of persons for each age unit.
     pointa of infloxion, and there is no reason so far as I ant aware, if the force of mortality at different ages varie onough, why there abould nnt bo several such pointa aven in a "stationary" population. If there are more than 9 pointa of infiexion, Makoham's law will be, pro tanto, unsatisfactory.

[^27]:    *The effect of the amoothing produced by a double application of Bloxam's method is so great that, applying the process to the data of the 1881 and 1891 censusey, and adopting the smoothed reaulta reached by the samo mothod in 1001, there is no appreciable difference between the age-curves of any of the last 4 censuses. Ono only has to look at the varying number of births from yoar to year, to which has to be added the effect of a differential mortality, to realiso how unlikely such correspondences would be.

[^28]:    The valuee siven are thoso found by interpolation in the life-tables, using first difforences only.
    t'iven on page 107 of "Mortality Laws and Statistios". R. Henderson, New York, John Wiley and Sons, Lamdin, Chapmanand Halli 1015 . It should be noted that the death returns used sre thoso of the years 1908 . 1012 inolurive.
    the ternus "holented" and "unsoleoted" are used here in the sonse that impaired livea are excluded or inoluded as the case might be. The actuarial reports on the Provincial Consus figurea are based on the ages of noleutions of 100,000 or 200,000 persons out of each provinco, but this selection has no reference at all to the stato of heath of the persona selocted. It is a puro oompilation selection.

    In the case of the present 1021 census, the compiation was made for 100,000 of esch sexfor each of the 3 main whigions, Musaman, lindu and Sikh, the seleotions being made, though not conaistently, from the aohedulea nf thowe tintriote ill which the particular religious group predominated. Thus Findus, of both sexes, were selected from thu Lautem and Wontern Punjab, Musalmans, of both sexes, were taken from the Western and Eastern Panjab, and Sikhs, of buth woxes, from the Contral Punjab. Actually, the solection was even more striotly local than even thia explanation ahowy, as, for example, Western Musalmans were all derived from the Attork district, whilo beatera Hindua wore all ohosen from the Kangra distriot.

[^29]:    Up till quito recontly the chowkidar's remuneration was round about Rs. 3-Rs. 4 a month, equivalent to sbout $£ 3$ a year. For this sum he had to have every birth and death in his village entered up by the cirele patwan, and than tramp with his registors once a week to tho nearest police station, if mighences would somotimea produce the ier ho нomotimes neg.

[^30]:    * This is the factor to whioh Col. Forater, I.M.S., Director of Public Health, attaohee great veight.

[^31]:    I do not wish it to bo inforrod from thin that I haro any ovidence that fomaso infanticide doee not still oriat In the Contral Punjab, but only that I have beon out of tonoh with the bocal conditions aince 1916, and ame, therefore,
    

    Sintiaticalty thero is rery atrong ovidenco for the provalence of femalo infanticide in 1981 from the hink in
    

[^32]:    - There is . Punjabi saying that kattz awr bitic ek, raxgur aur gujis do, which being interpseted pute

[^33]:    - Hore a marriago dasesd as of duration 3 yoars, say, will have lastod loss than 4 yoars and not loese than$\dagger$ The otatomons in tho cort iation is ane chath has lasted least than 1 year.
    y for marriages of 7 geans' duration.

[^34]:    §Hardly less atriking that the immaturity of the wife at the time of arrival at her husband's home, is the dromaturity of the husband himself. Among certain tribes of the Central Punjab this immatund's home, is the cho girl-wife roaching puborty bofore the boy-husband, saroumstance of which this immaturity may result in advantase. A Puajabi soying pithily sums ap the oonsequances by concluding the boy's father is apt to take ohild of bia grandfathor and not of his father." The gensequances by concluding that "the firstborn child is the tho oharactors of tho putativo father and son will fall bolow the valuo of practice will be that the correlation of oorrolation for true patornal inheritanco. The point will be disoussed further in oremalf which is the anticipated data oollootod by tho writor from the Contral Puajab, a task which is doferrod to Chatar XI
    ""Age at marriago" must be interpretod in the sense explained, did to Chator XI.
    live ín hor husband'e home."
    $\dagger$ Tho gounalal arreemont botween the figume tor the Family Consus roalte aro not ontiroly vitiatsd by the arions casto groups ia, perhape, partial ovidence that the mein consus.

[^35]:    *l havo not accoss to the lituraturc of the aubject at the present time, but if my recoliection sorves me Profossor Pearson found that tho firstborn son was more unstabla than the later, 187, Consue of Indis al oharaoteristics.
    $\dagger$ Tho general survival rator have boon takon from Table P, Life Table, Males, page 187, Consa of India Report 1911, Volume I, Part L, drawn up by Mr. Aclaud.

[^36]:    The ahisence of cousin marriago among Jats and its rarity among meos aro not surprisia
    faot that both oastes are converted from Hinduism. Pathanis in Delbi are loss inclinod to marry cousias (inst of pel conts in Attook and 29 por conto is Sayads in Dolhi marry 30 por oent. of cousion as againet per contm in attook and 29 por conto. Muzafiargarh.

[^37]:    - No malor in thooe age-pertods.

[^38]:    Extont of
    144. Out of a total population of $25,101,060$ persons in the Punjab, 967,943 tie sac. persons, comprising $882,537 \mathrm{males}$ and 85,406 females, were returned as literate in the present census. In the Delhi Province, out of a total of 488,188 persons, 62;458 persons, comprising 45,389 males and 7,069 fomales, were returned as

[^39]:    - Assuming that tho probable error of the retums for the percentage of literates is 1 per cent. for either consus, the probeble error of the difference of two figures of 9.5 per cent. is $\sqrt{\bar{z}} \times 0.095=0.135$. The assumption of a probsble error of 1 percent. does not seo

[^40]:    ${ }^{*}$ This is the number of studenta in the 4th Primary class acoording to General Teblo $X$, LII of the Roport on the Progreat of Education in the Panjab for 1920-21. Mr. Anderson, the Direotor of Educetion doonde.
    frie preecat annualineroment of popalation is abont 0.65 per cent.

[^41]:    *The numerical dopendenco of the amount of literacy on the number of achrians is exhibited by a correlation
     the number of hiterato males per mille of males for each lunjab district.
    The co-efficients of varistion from district to dintrict of the ratio of achorn 28.3 and 27 rer cert. ter juchulls.
    

[^42]:    Lyallpur toz 2881 and 1891 aso not arallable.

[^43]:    "The only illustrated paper published at present in the Punjab is "The Nation," which is written in Eaglish and has a Sundsy eupplement.

[^44]:    -Arconling to the Rev. Amold Hill Payne (cide article Deat and Damb, Facjelopaedia Britianica, Vol FII Ithedition), dumbness in the true senve of the word does notexist, and be would attribute all cases of deaf-mutiam Kidward M. Gallaudet, of deaf-mutes into the speatincor from attempting to apenk. The elassification of Doctor Mdward M. Gallaudet, of deaf-mutes into the speating-deaf, the semi-speating-deaf, the mute-desf, the speakingthe Rev, bill Payme in right, no hearing molet exist.

[^45]:    There ary two sources of error which militate agninst exact concluaions.? Firstly, the 4 districts in which There are two sources of error which militate agniost exact con the 30 districts in the two Provinces. Secondly, with 1,000 casce there is atill an apprecisble error due to random sampling oven esend cawe gives rise to represontative. If wo assume that the true percentage of first cousin-marriage is as random sampling affects the
    
    result the percontage of first-cotwin marriage among Nusalmana oan hardly be less than 2 or grawrecinted faot that
    the error of random sampling" is nothing moro than an oxact marg onef. If yuu leard Jones moke 2 amall numbers do not afforl ay good material for gencralisation as largo as if you heard him make 100 faleo false statements out of 2 , you would not be so suro ho was a habitual fiar, aste, from religion to religion ; of the statements out of 100 . In reality all differences of the figures from casto to casto, dnta of ono locality with thoes of anotber, and of the figures of one census with those, it becomes imperative vien with the "error of random anmpling." Whilo thg empansinn is- always dese. with the error with the mall numbers involved in the Tables relating to imfirmities.

[^46]:    "Sce nlao Nupenio's Lalorntory Pablications, Memoir Series IV, "On the measure of the resemblanco of Aimt-counins "by Ethel M. Bdorton and Karl learson, and Lecture Sorics IV "On the marriage of first-cousins"
    ty Ethel M, Elderton.

[^47]:    - Rougtily $P=85,000,000$ and $b=8,500,000$.

