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VOLUME XVII

BARODA STATE

PART I

REPORT

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INTRODUCTION

1. Censuses—1872-1921—It was between the years 1867 and 1872 that the Government of India first essayed the task of a general census of this country. In that work this State was one of the few advanced Indian States that ventured to co-operate. A regular census was held throughout the State on the 21st February 1872. The preliminaries were undertaken independently by the State and the materials were afterwards tabulated partly in Bombay and partly in Baroda but no separate Census Report was written on that occasion. The second census was taken synchronously with the rest of India on the 17th February, 1881, and the whole operation from beginning to end including the writing of a Report, the first of its kind, was undertaken by the State authorities. Since that date, censuses are undertaken and organised by the State synchronously with the general Indian Census and its Reports have formed part of the all-India Series. The third census was taken on the 26th February, 1891, the fourth on the 1st of March, 1901, and the fifth on the 10th March, 1911. The present Census was held, as in the rest of India, on the night of the 18th March, 1921. The present Report is the fifth of its kind and forms Volume XVII of the Census of India Series.

2. Present Census Publications—The publications of the Census Department of this State consist, besides this Report, of two volumes of Tables in English and a Village Directory and a summary of the Report in Gujarati. The Imperial Tables Volume contains the standard statements prescribed for all India. The unit for these tables is the Administrative Division. At the end of that volume however two tables containing main statistics of population, density, variation, distribution by religion and number of literate persons for each taluka (Tahsil) are appended. The State Tables Volume contains the additional statistical matter collected specially by the State. These are either the results of special enquiries or further detailed figures per taluka regarding matters about which the Imperial Tables give information only by Divisions. This Report deals with the statistical material compiled in both these volumes but as the State Tables Volume has a more limited circulation than the other, an endeavour has been made to embody within the Report itself summary statements containing the general results of the special enquiries which the State has undertaken in this census.

3. Census Organisation and Officers—Besides the publications named above, the Census Department of the State is also responsible for another volume called the Census Administrative Report wherein a full account of the procedure adopted for the enumeration of the people and of the compilation of results has been given. It is not necessary therefore, nor is it of any interest to the general reader, to repeat in any detail the measures that were adopted. Besides, the procedure has now been so standardised that any reader who has been familiarised with Census literature does not require to be reminded of the main details of census operations. Mainly the routine followed in this census closely corresponded to that of 1911. As on the last occasion, an elaborate census agency consisting of District Census Officers, Charge Superintendents, Supervisors and Enumerators had to be appointed and trained. As soon as I was appointed to this office on the 1st of June, 1920, as the permanent Census Superintendent, the five District Subas (Collectors) were appointed District Census Officers for their respective charges and the Municipal Commissioner was given the work of organising the census of the City of Baroda as the City Census Officer. In this State as elsewhere the land-revenue and the police staff are the backbone of the census organisation. It is on them that the primary responsibility fell of preparing the ground for the census. The first work was to prepare a complete register of inhabited villages. In previous censuses there was much confusion between the Revenue and Census Lists of Villages. This confusion was mainly due to the laxity with which the term "Village" was interpreted. On this occasion it was decided to identify the village with the revenue Mauza. All hamlets formerly included within the village area and treated as part of it in village papers were merged in the parent village. After the list was prepared and passed the next duty of the Census Office was to divide the villages and towns into convenient blocks and circles. Generally it was the practice to group together 60 houses into a block normally

under an enumerator. But this rule was relaxed if the supply of enumerators was inadequate. As the village was the unit of abstraction, care was taken not to include different villages in the same block. The blocks were so arranged as to be compact. From 10 to 15 of these blocks were constituted into a circle under a supervisor. Each Mahal was under a Charge Superintendent. Towns with Municipalities were put under a Charge Superintendent usually non-official who ran the census of his town under the general supervision of the taluka officer. The Inspecting Staff were the District and *Vibhag* (sub-division) census officers. There were altogether 96 Charge Superintendents, 1,206 Supervisors and 11,099 Enumerators in this census as against 92 Charge Superintendents, 1,273 Supervisors and 10,893 Enumerators in the preceding census. Preliminary conferences were first held in the head-quarters of all districts. Instructions were then orally given to Talatis and other Enumerators at almost every taluka head-quarters town. To these were added written instructions. Manuals, standard lists of occupation, caste, language and birth place entries, lists of common errors to be avoided, explanatory circulars, inspection memos etc., were issued at all stages of the work. No stone was left unturned to obtain accuracy of record.

4. House Numbering—After the preliminary step of preparing the list of blocks and circles was over towards the end of the rains (from the 1st of October to 15th November, 1920), the first direct step towards the actual enumeration of the people was taken in the numbering of their houses, an operation which was carried out by the supervisors with the aid of their enumerators. Throughout the State with very minor exceptions, the social definition of a house was continued. In 1911, the old structural definition was given up and a new one defining a house as the residence of a commensal family was adopted. The few exceptions to this general definition were in regard to temples, *dharmashalas*, houses of Europeans and Anglo-Indians, etc., to which the structure rather than the family was the criterion applied. When the houses were finally numbered a block list (Form 8) showing per each block the census number of the house, the description of the house and the name of the head of each family was prepared.

5. Special Inquiries—Along with the work of house-numbering, it was decided to have a census of livestock per household and an inquiry into the size of house-room per standard of comfort. For this purpose, the block list was expanded with a perforated portion containing details for the classification of homesteads according as they are above comfort, in comfort or below comfort, and also columns showing kinds of livestock—agricultural and other kinds—and of ploughs, carts and carriages. In the City of Baroda under the auspices of this Census, a special Tenement Enquiry was undertaken by the Municipality.

6. The work of Training—After the houses have been numbered, an idea could be had of the exact number of census staff wanted. In this State both in 1911 and 1921, the preliminary work upto house numbering was done by the subordinate Revenue and Police establishments. It is only after this stage is reached that hands from the Educational and other departments are requisitioned and put under training for preliminary enumeration. These appointments are all made by the 1st December 1920. The preliminary enumeration did not begin till 1st February in villages and 15th February in towns. The intervening period was a very busy time with me, my Assistant and my office. The work of training the Census Staff and the distribution of forms throughout the State were our chief occupations. My Assistant and myself were travelling continuously throughout this period from August till March. Although the area of the State is small, we had to travel from Songadh to Beyt and from Patan to Billimora and thereby covered a country which is about as large as Bengal. Some idea also of the pressure on my small office of six clerks can be had from the number of forms that were printed and distributed. 4,000 copies of each leaflet, manual, instruction sheet and circular were sent out. Over 5,000 *parwanas* (permits) were issued to selected supervisors and enumerators for the special Sex Enquiry of which mention will be made presently. 12,000 copies of special explanatory circulars were also distributed. 295,000 enumeration schedules, 30,000 covers (containing instructions), 16,000 enumeration passes (of which 10,000 were bought from the Bombay Census Office), and 25,500 copies of Block lists were sent out from the Central Office. Ordinarily in other provinces this work is attended to by the Superintendent of Government Presses, or where there is decentralisation by the District Officers themselves. Here the entire work fell upon the small Central Office staff itself.

7. Preliminary Enumeration—Part of the training consisted of the filling up by the enumerator on specimen schedules of sampled cases to get his hand in the work. The preliminary enumeration began in February. In the villages, where there is less fear of changes in the final record, it is spread over a longer period than in towns, where the movement is more frequent and the revisions are likely to be more numerous. This preliminary record was checked by the Supervisors, Charge Superintendents, District Census Officers and finally by me and my Assistant. In that month, we went for a third time round the State and between the two of us we covered nearly every taluka. We tested at least 10 per cent. of the books and at some places even 60 per cent. passed through our hands. A very thorough inspection of the City books was also completed by us during the first weeks of March. It may be here added that about this time, the enumerators were also instructed to enter the number of persons normally constituting a household.

8. The Actual Census—Finally the great night came, for which we had been making such strenuous preparations. In the vast majority of cases, the final census was only the process of going over the entries, striking out the departures and deaths and adding the names and other details of new arrivals. In towns where there are *dharmashalas*, hotels, hospitals and the like, the final census in many cases necessitated new work. Throughout the State except in certain forest and hilly areas, the census time was synchronous from 7 p.m. in the evening of the 18th March till midnight. But even in these non-synchronous areas, the final revision was commenced a few hours earlier. That was the only difference. Special arrangements were also made for railway stations, train enumerations, boats and floating population, *dharmashalas*, dak bungalows, etc. Throughout the night my Assistant, my staff and myself were at work in the City, inspecting and in helping the Ward Superintendents whenever required to prepare the provisional totals for the different wards of the City. Everywhere throughout the State there was feverish activity throughout the night to add up the various circle totals. The traditional rivalry of the Charge Superintendents about sending in their charge totals was in evidence in this census also. Various and elaborate were the devices resorted to by them in the attempt to be the first in the transmission of the great news. The first to send in his totals was the Range Forest Officer of Umarpada. The Padra Mahal Vahivatdar sent a messenger by road, who reached me at 4-30 on the morning of the 19th. The Vaghodia Vahivatdar used the telephone at Ajwa Water Works to transmit the news. The Bhadran Mahalkari arranged to send in his totals by wire and then followed it up with a messenger on camel-back. I am not quite sure whether the latter was not the swifter medium. One by one almost all the Charge Superintendents including the Mahalkari from far off Beyt sent in their totals in the course of the day. The few who remained sent their figures by the afternoon of the 20th and at 6 o'clock in the evening of that day exactly 36 hours after the census the provisional totals for the State were wired to the Census Commissioner for India. The Baroda City totals had been transmitted as early as 6 o'clock in the morning of the 19th. The accuracy with which these totals were rapidly compiled may be shewn by the fact that the difference between the provisional totals and the final figure arrived at after elaborate analysis in the Abstraction Office was only 4,647 or 0·2 per cent. Three district totals out of five differed from the final by only 19, or ·004 per cent. In the Baroda *Prant*, the difference of 1,340 or 0·2 per cent. was almost entirely owing to a mistake in posting in one taluka. In the Kadi *Prant*, the mistakes were more serious but were practically confined to three talukas out of the twelve. The difference there amounted to 3,356 or nearly 0·4 per cent.

9. Abstraction and Tabulation—Within a week of the Census, all the enumeration books were sent to the Central Office, and an Abstraction Branch was opened under the direct supervision of my Assistant to turn this "raw material" into the "manufactured product" of the Census Tables. This process is of a three-fold nature: slip copying, sorting and compilation of results. The experience of the last two censuses has demonstrated the superiority under Indian conditions of the slip system over any other conceivable alternative. The Slip system is simply the process of abstracting from the enumeration books all the information entered regarding each individual person (except his or her name) on a convenient sized slip. Slips of different colours were used for each religion returned (red for Hindu, yellow for Jain, blue for Animist, green for Musalman, white for Parsi, brown for Christian and *badami* for other religions). Symbols to distinguish civil condition for each sex were printed on the slips. Thus for

writing the other entries it was necessary for the slip copyists to select the right coloured slip with right symbol printed on it. As to the other entries, a standard list of abbreviations was prescribed. After the entries in each block were thus abstracted, the slips were counted and sorted by religion, and the details were entered in an important register called Register A. This work began on the 25th March, lasting, allowing for holidays and half working days, altogether 34 days. We were able to report the final totals, the first of all States and Provinces, to the Census Commissioner for India on the 10th May. The next process was that of sorting which was started soon after and lasted till the 10th September 1921. Sorting was only a process of preliminary compilation. There was a sorter's ticket to each final table. Each sorter was responsible for a certain number of slips which were handled separately by religion and sex. Further the slips for the towns were kept distinct throughout from those of the villages. After he had counted the slips in his charge, he sorted his slips according to the requirements of each table and posted the results per religion and sex on the sorter's tickets. Along with the standard statements prescribed for all India we undertook to do special sorting in certain matters concerning literacy, birthplace, infirmities, occupations and civil condition. Besides these, the results of the special enquiries referred to above had to be collated and reduced to tabular form.

The last stage, *i.e.*, that of compilation, began early in June, as soon as the sorters had prepared a sufficient amount of material for compiling the tables. The first six tables were readily compiled from Register A. Compilation really began with Table VII and consisted in reducing the mass of details in the sorters' tickets into Compilation Registers by talukas which were further reduced into Imperial and State Tables. Some tables, *e.g.*, regarding Age, Birthplace and Occupations gave the most trouble, but all difficulties were at length countered. The compilation for Imperial Tables was over by the 15th December 1921.

10. New Enquiries—Altogether 22 Imperial Tables and 38 State Tables

Subject matter	Number of Table	
	State	Subsidiary
1. The Census of Live-stock ..	XXVI- XXVII	
2. The Size of the Normal Family.	XXVIII	
3. Classification of Homesteads by Standards of Comfort in talukas and towns.	XVII- XVIII	
4. The Tenement Census Enquiry in the City of Baroda.	XIX- XXIII	
5. Additional data regarding Occupation:		
(a) occupation of English literates.	XIII	
(b) the occupation of the urban population and	XXIV	
(c) occupation of immigrants to the City.	XXV	
6. Additional information regarding Literacy :		
(a) literacy in towns	X	
(b) literacy by scripts	XI	
(c) statistics regarding those who though not literate are able to read only.	XII	
7. Additional and detailed information regarding Age, Sex and Civil Condition in towns and talukas	VI- VII	
8. Additional information regarding Age-distribution of migrants.	XV- XVI	
9. Additional information regarding Civil Condition of the Infirm.	XIV	
10. Enquiry regarding Size and Sex Constitution of families.		I-VIII (Chapter VI Part II)
11. Statistics regarding Cottage and Rural industries.	XXIX	

were compiled in this census. Of the State Tables, eight are incorporated in this Report (Chap. VI, Part II), 29 are contained in the State Tables Volume and one—Distribution of caste by talukas—is ready only in manuscript. Of these State Tables, those which are wholly new to this Census number 28. The nature of new enquiries undertaken along with the general census has been already described. No less than twenty new tables were based on these. One other enquiry remains to be mentioned. It was decided at my instance to compile for this Census, statistics of Marriage and Fertility in the State. A special enquiry was conducted in this respect—but on an optional basis—by a selected staff of men and women workers. Eight tables containing its results are incorporated in the Report. The subject matter of these twenty-eight new tables is detailed in the margin.

11. The Report—Early in the sorting stage, I lost the valuable aid of my Assistant whose hard work in connection with the preliminaries to the Census brought on a serious illness. From May till the end of the compilation of tables, I had to attend to the scrutiny and supervision of the Tabulation Office. This

entailed a very serious strain upon me and although the collection of other statistical materials and notes for the Report was going on apace, the actual writing of it could not be taken in hand till the first week of November. In view of the greater statistical interest of this Census, compared to other years, a mass of miscellaneous information of economic interest had to be collected and analysed. Besides the 51 tables published in the two Tables Volumes, this Report contains 101. Subsidiary Tables and innumerable marginal statements which help the reader to understand the figures better. Every effort has been made to ensure accuracy and enable this Report to become—as its ambition is to be—a reliable work of reference.

I make no apology for its bulk. As Mr. (now Sir Edward) Gait pointed out in the Bengal Census Report of 1901,—“Completeness is more important than brevity, especially in India, where there is no body of professional statisticians ready and eager to pounce on the raw material provided for them at the Census and to make the required deductions; and, unless the Census Superintendent himself analyses the figures and points to the conclusions to be drawn from them, they are in danger of being left unnoticed altogether.” I have always thought that the Census was an excellent agency, with whose aid any amount of valuable and important information could be collected, provided no undue strain was put on its intelligence. I have therefore endeavoured to place before the reader a volume of statistical material, the extent of which has not been equalled by any other Census in this State. I present the results to the reader's judgment. Finally I have pleasure in stating that the value of this Report has been much enhanced by the excellent actuarial analysis (Part II of Chapter V) which Prof. Vaidyanathan has contributed on the Age figures. A Life Table for this State was long felt to be a great want. I am hoping that Prof. Vaidyanathan's work will be found very useful. He has also written one of the appendices *viz* :—the centre point of population.

12. Cost of the Census—A few details of the cost of the census may not be uninteresting. The final accounts are not yet made up, so that some of the items herein included are estimates. When the bills for the printing of the Report are paid an expenditure of nearly Rs. 1,12,500 will have been incurred, or a little less than double of the figure of the last census. The very great increase in the cost of printing and paper, the rise in the scale of wages and the increased volume of statistical work that we undertook to do in this census at once suggest themselves as causes of this circumstance. Where my predecessor could get slip copyists and sorters for Rs. 12 and Rs. 15 I had to offer Rs. 25 and Rs. 35. The cost of printing and paper now is more than double. Compared to 1901, however, when the cost of the census was Rs. 1,25,000, our expenditure is less. The Census of 1921 has cost Rs. 53 per 1,000 of the population, as against Rs. 28-8 as. in 1911 and Rs. 64 in 1901.

Items of expenditure	Expenditure in Rupees	
	1911	1921
Establishment and Allowances	41,702	72,500
Contingent and Printing Charges	15,425	37,960
Deadstock	2,646	4,587
Total	59,773	115,047
Less Recoveries	1,773	2,662
Net Expenditure	58,000	112,385

13. Acknowledgments—The essential requisites of a successful census are finance, guidance and co-operation. In presenting this Report I must therefore express my cordial indebtedness to His Highness's Government, for lending a ready ear to all my requisitions. Altogether since April, 1920, sums amounting to Rs. 1,52,000 were set apart in the budget for Census work, and in this respect, I appreciate very much the complete confidence which the Government of the State thought fit to repose in me. To Mr. J. T. Marten, the Census Commissioner, I have to express my especial obligations. He has done this State the compliment of visiting it twice, which, if I remember rightly, no other Census Commissioner had done. His talks with me on a variety of subjects and in particular in regard to the Statistics of Marriage in which I happen to be specially interested, have formed the basis of many a paragraph in this Report. To his notes and circulars and also his own Report on the Central Provinces Census of 1911, I am thankful for many helpful suggestions in statistical analysis. To the Dewan of the State, Sir Manubhai Mehta, Kt., C.S.I., I owe more than I can acknowledge in the way of helpful advice. The forms of the eight Sex Tables were submitted to him and their present shape is almost entirely due to his suggestions.

He has looked through the Chapter on Language which bears the seal of his approval. In Chapters on Literacy and Civil Condition I frequently sought his advice. Of the others, the foremost are my distinguished predecessors, Khan Bahadur Dalal, to whom every writer on the Baroda Census must look back as to a master, and Rao Bahadur Govindbhai, whose remarkable neatness and lucidity of treatment of figures I took as my model. Their Reports have been my constant companions in the last two years, and my indebtedness to them for much valuable knowledge has lain rather heavily on my conscience. Of the other officers, Mr. A. B. Clarke, Educational Commissioner, Dr. C. V. Sane, Director of Agriculture and Mr. Manilal B. Nanavati, Director of Commerce, co-operated with me very cordially, and made available to me and my staff all the materials at their disposal. To the India Reports of 1901 and 1911, Mr. Blunt's Report on the United Provinces, Pandit Harikishan Kaul's on the Punjab, Mr. O'Malley's on Bengal and Mr. Morgan Webb's on Burma, my gratitude is due for valuable suggestions and new ways of statistical analysis. A writer on the Census—particularly in this year of grace—cannot hope to produce an original Report, and I am not sure whether the reader is not thankful for this circumstance. This Report has sought its inspiration from a variety of sources. I have tried however to acknowledge my borrowings always in the body of the Report. But I should like here to add the names of the following authorities : Dr. Radhakamal Mookerjee's *Foundations of Indian Economics* ; Dr. Farquhar's *Modern Religious Movements in India* ; Mr. R. N. Gilchrist's *Indian Nationality* ; Prof. Ramaprasad Chanda's *Indo-Aryan Races* ; the Baroda Economic Development Report and lastly my friend Mr. Piyare Kishan Wattal's *Population Problem in India* which was recommended to me by the Census Commissioner as one of the best statistical studies on the Census that he had read. Mr. N. D. Mehta, B. A., LL. B., Chief Officer of Ahmedabad Municipality, kindly acceded to my request for a note on an interesting Baroda religious movement, which I have published as an Appendix to this Report. Prof. A. G. Widgery, M. A. (Cantab.) and Mr. D. L. Purohit, M. A., LL. B. were very helpful with their suggestions.

Turning nearer home, I have to acknowledge my obligations to the office. No one could wish for a more devoted staff. Mr. Maganlal N. Thakkar, B. A., LL. B., who was Head Clerk and Personal Assistant in the last Census, worked in this as Assistant Census Superintendent. His intimate local knowledge and experience of the *minutiae* of census were invaluable assets to me when I took over charge. His constant travel and heavy work told upon his not very strong constitution ; and from May 1921 till November 7 of the same year, when he left me, he was ill practically for the whole period. But still even in his illness he never denied me such assistance he could ; after he left me he has kindly read for me some of my chapters before finally passing them for the Press. Mr. Anant N. Dikshit, B.A. (Honours), worked as my Head Supervisor and then acted for Mr. Maganlal during his periods of absence on leave. He had to bear the brunt of the very heavy work of supervision and even of organisation. Later from November till end of March he worked as my Personal Assistant. In these capacities I have pleasure in bearing testimony to his signal devotion to work. Mr. Natwarlal M. Parikh, B.A., deserves special commendation for the painstaking accuracy with which he prepared the Subsidiary Tables. Mr. Jhaverbhai T. Patel, B.A., my Head Clerk, has a good command of English, which made him a useful literary *amanuensis*. Mr. Dahyabhai Harjiwandas Shab was my Shirestedar, and one of the most efficient clerical hands that I have ever come across. He had charge of the entire spade work of the preliminaries of the Census. Without any previous experience of this kind of work, he yet attained a singular mastery of its detail. Mr. Chunibhai Jamdar, the Map Drawer, has an excellent hand, and managed to complete his work in spite of a very severe illness. Finally the Typist, Mr. Ashabhai S. Patel, must not be forgotten—one of the best workers in his line. His gifts of rapid work were sometimes embarrassing to me, for his speed was faster than my thoughts.

Lastly, but no less sincerely, my gratitude is for the *Times of India* Press. I do not know which to be grateful for the most—the excellence of the work they turned out or the astonishing patience with which they bore with my many unreasonable requests. The Laxmi Electric Press was responsible for the State Tables Volume, the style and get up of which are a credit to local printing enterprise.

SATYA V. MUKERJEA,
Census Superintendent, Baroda State.

APPENDIX I
CENTRE OF POPULATION

(By Prof. L. S. VAIDYANATHAN, M.A., A.I.A.)

1. **Limitations of the enquiry.**—Important and interesting inferences as to movement of population can be drawn from an investigation of what is called the "Centre of Population," which is the same as the statistical centre of mass of the population occupying the area in question.

The utility of such an investigation consists in enabling us to find a centre or centres to which the population of a given area tends to gravitate through economic or other causes. But such an investigation can only be truly helpful if the area dealt with is fairly large, and compact in character. Otherwise a decrease in a particular area would give no clue to where the deficiency has migrated; nor an increase conversely in another area would serve to show from where the immigrants have come in. In regard to this State however, such a comprehensive enquiry for the whole area is extremely difficult because its administrative divisions are widely scattered from one another. The only two divisions of the Baroda State that can lay claim to any pretension of being fairly compact are Baroda and Kadi and by way of sampling, the investigation has been made in these two areas taken separately. The positions of the centre of population in these two divisions have been found with the Census returns of 1911 and 1921, so as to give an idea as to how far and in what direction the centre has shifted during the decennium.

2. **The Method employed.**—The method employed for finding the centre of population follows the general lines laid down in the United States Census. For this purpose, a convenient point is chosen as the centre for each *prant*—Baroda City for Baroda Division and Mehsana Town for Kadi Division. The East to West line through this centre represents the X axis and the North to South line the Y axis. The whole area of each division is then cut up into squares, each 144 square miles in area by drawing parallels to the axis of X and Y respectively at uniform distances of 12 miles, till the whole area is accommodated in one square or other. The population in each square is then totalled village by village and the sum is put at the centre. If in any square, there occurs a big town or city, or if it be intersected by a large sheet of water or by foreign territory, the population in that square is supposed to be concentrated, away from the centre of the square, at that point, which would very nearly represent the centre of gravity of the population of that square. Then moments are taken considering all individuals to be of uniform weight for these concentrated populations and the values of X and Y, the co-ordinates of the centre of population, computed by the ordinary method of moments.

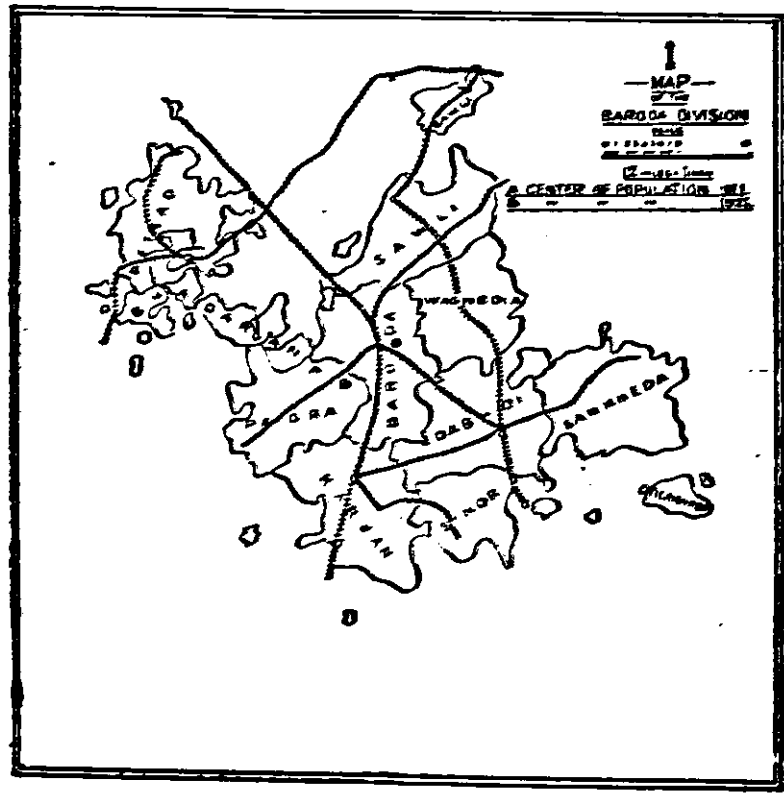
3. **Results: Baroda Division:—**

	1911		1921
x	.. .. . — 8-363	x	.. .. . — 7-621
y	.. .. . — 2-881	y	.. .. . — 4-521

showing that the centre in 1911 was at a point which is 8-363 miles due West of Baroda City and then 2-881 miles due South; whereas in 1921 the respective distances are 7-621 and 4-521 in the same directions.

The distance as the crow flies from Baroda was in 1911, 8-8453 miles and in 1921 is 8-8533 miles; so the centre has almost moved on an arc of the circle having Baroda City as centre and radius equal to 8.85 miles nearly. The net distance moved through by the centre being

$$\sqrt{(751)^2 + (164)^2} = 1.80 \text{ miles.}$$



The centre has moved more than double the distance due South than it has done due East.

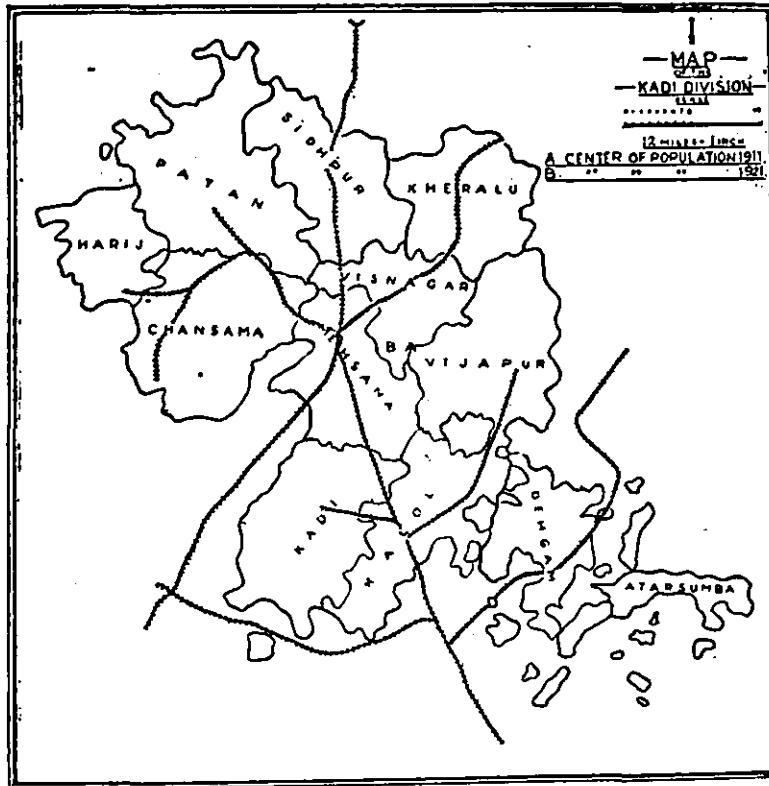
The shifting of the position of the centre can be accounted for by an increase of population in the South Eastern talukas (Waghodia, Dabhoi and Sankheda) and the Southern talukas (Karjan and Sinore) or by a decrease in the North Western area, or to all these causes co-existing. As a matter of fact, except in Karjan and Sinore, the South Eastern Talukas have shewn large increases, while Petlad and Bhadran have both decreased.

4. Kadi Division:—

	1911			1921
\bar{x}	.. ..	=	+ 7.572	\bar{x} = + 6.582
\bar{y}	.. ..	=	- 1.714	\bar{y} = - 1.629

showing that the centre in 1911 was at that point which is 7.572 miles due East of Mehsana and then 1.714 miles due South, while in 1921 the respective distances are 6.582 and 1.629 in the same directions. The direct distance from Mehsana was in 1911, 7.764 miles and in 1921 is 6.781 miles. The net distance moved through by the centre being—

$$\sqrt{(.99)^2 + (.085)^2} = .9936 \text{ miles.}$$



The centre has moved more than 11 times the distance due West than it has done due North. The shifting of the position of the centre can be accounted for by an appreciable increase in the Western talukas (Chanasma and Harij) and a slight increase in the Northern talukas (Pattan, Sidhpur and Kheralu) or by a large decrease in the Eastern Talukas and a slight decrease in the Southern Talukas or to both causes existing simultaneously. As a matter of fact, the census shows a large increase in Eastern and North-Eastern Talukas. Although the population has increased everywhere in this division, the increase has been greater in the West than in the East.

APPENDIX II

A METHOD TO TEST THE ACCURACY OF BIRTH REGISTRATION.

1. The following method is suggested for estimating the number of births in any given year from the corrected census return for the age period 0-1. The method assumes in the first place that there is a constant ratio between the census return at that age and the number of births in the twelve months preceding; and this relation enables us to compute to a high degree of accuracy the number of births in any one normal year and so to estimate the births for the decade: so long as the registration of vital occurrences continues to be defective, some such method is very necessary. The census return in the age period 0-1 if accurate, and if the census year happens to be normal one without any epidemics or famines, should represent the survivors of children born in the preceding twelve months, but the Census return is not always very accurate. There is always a depression in the age curve in regard to 1-2 as compared to 0-1 and 2-3; and this has been explained in the Bengal Census Report of 1901 as being due mainly to the inclusion in the first age period of unweaned infants over 1. But if we compare the age returns for such intelligent communities as Parsis, Jains, Anglo-Indians, etc., this depression is just as much a feature of theirs as in the General Age Table. So it cannot be merely owing to inaccuracy of returns that the depression is due. I presume the specific rate of mortality for age period 1-2 is very high if not so high as at the earlier age and as a result, the children of that age being at risk for a longer period and subjected to almost equal intensity of mortality have suffered at the census date a much larger number of deaths than those at 0-1. Whatever may be the case it is necessary to smooth the age returns for the first three years. The ordinary method of "Bloxaming" does not help us as it leaves the first age period entirely unaffected. For this reason, the Columnar method as used and explained in the Actuarial Report (paras 209-11 of this Report) is recommended. After this adjustment is made for quinary groups, the returns for the individual years should be deduced graphically according to the method described in Newsholme's *Vital Statistics* (p. 266, third edition). The method is explained also by Mr. Hardy in his Age Report for 1901 (p. 5, para 16).

2. Having got our corrected figure for age 0-1 we should now construct a table showing the number of deaths per each 100 births per month from March 19, 1920 to the census date. With a view to do this, it is necessary to assume that infant mortality proceeds more or less on the basis of a law. It is a universal experience that it decreases in force as the infant grows and this decrease is perceptible from month to month and even from week to week. It is the first weeks and the first three months that constitute the most critical period in the infant's life. The more accurate vital experiences of European Statisticians may serve us as a guide. From the general experience of mortuary returns for 1881-90 of England, and also from the infant death figures for three rural counties, five manufacturing counties and three selected towns (*Vide Newsholme Vital Statistics* p. 122) it has been observed that the proportion of mortality in the three months after birth varied from 41 per cent. to 49 per cent. of total infant deaths during the year. Notter and Firth (*Vide their Practical Hygiene*) observe as their experience that out of a total of 128.1 infants dying within the year no less than 66.6 die within the first three months and a further 24.7 die within the next three months. The Life Table Report of the General Census of England and Wales states that 73 per cent. of infant deaths happen within six months after birth.

Taking these results we may assume for this State and India generally, 60 per cent. to be the proportion of infant deaths occurring within the first quarter, 20 per cent. in the second quarter, 12 per cent. in the third quarter and 8 per cent. in the last quarter of the year. These assumptions are necessary because at the census date, the infant population would be existing at varying "risks" the largest amount of average risk being $11\frac{1}{2}$ months for those born between March 19 and April 18 of 1920, and the smallest average risk being $\frac{1}{2}$ month for those born in February-March 1921. Between these two batches of births, the mortality varies in intensity inversely to the lapse of months. Children born in March-April 1920 and living on the census day will have escaped the full intensity of infant mortality of the first six months and survived into the healthier portions of their first year life. Children born in the later months will be progressively subjected to higher rates of mortality, as they will come under observation more and more during the risky months of their first year lives, than those born earlier. Therefore starting with the normal rate of mortality we have progressively to weight it according as the intensity grows stronger. The normal rate of mortality we assume to be 30 per cent. of those living at age 0 (i.e. of births). This is based on Mr. Ackland's Life Table for Bombay for the decade 1901-11, and may be taken to be the normal rate of mortality for infants living at age 0 for the present.

3. The question now remains how this normal rate is to be weighted month by month. The March-April born are subject to $11\frac{1}{2}$ months' risk on an average, therefore they yield $30 \times \frac{11.5}{12}$ or 28.75 deaths per 100 births.

The June-July born will have $8\frac{1}{2}$ months' risk and should have according to our assumption 92 per cent. of 28.75 or 26.45 deaths. Those born in September-October 1920 will be subject to $5\frac{1}{2}$ months' risk and should yield therefore according to our assumption 80 per cent. of 28.75 or 23.00 deaths. Those born in December-January will have $2\frac{1}{2}$ months' risk and should therefore suffer 60 per cent. of 28.75 or 17.25 deaths. Of these 17.25 deaths, the first month after birth should absorb the largest number, as it is in that period that the infant is liable to the greatest risk.

4. From these data we have now to work up the rates for the intervening months; for this purpose we should take as our guide the Hamburg City Vitality experience for 1911 and 1912 (quoted in Whipple *Vital Statistics* p. 342) perhaps the completest record of births and infant deaths. We find the specific mortality rate for infants for that city from that table to be 15 per cent. for each of those years. As we have taken 30 per cent. to be our rate, the Hamburg Record may well be taken as our basis. From that table, the monthly records of deaths among births may be averaged, so also the monthly record of births; and from the proportion between them our deaths may be distributed month by month and the monthly mortality rates deduced thereupon. Thus we get the following Tables (corrected to three decimals).

TABLE I

Year Number	Births	Died before Census Day	Survived on Census Day
March—April 1920	100	$\frac{30}{12} \times 11.5$ or 28.75	$100 - 28.75 = 71.250$
April—May	100	$\frac{32.31}{12} \times 10.5$ or 28.268	$100 - 28.268 = 71.732$
May—June	100	$\frac{34.63}{12} \times 9.5$ or 27.413	$100 - 27.413 = 72.587$
June—July	100	$\frac{37.34}{12} \times 8.5$ or 26.450	$100 - 26.450 = 73.550$
July—August	100	$\frac{40.79}{12} \times 7.5$ or 25.492	$100 - 25.492 = 74.508$
August—September	100	$\frac{45.02}{12} \times 6.5$ or 24.388	$100 - 24.388 = 75.612$
September—October	100	$\frac{50.18}{12} \times 5.5$ or 23.000	$100 - 23.000 = 77.000$
October—November	100	$\frac{57.6}{12} \times 4.5$ or 21.600	$100 - 21.600 = 78.400$
November—December	100	$\frac{67.28}{12} \times 3.5$ or 19.623	$100 - 19.623 = 80.377$
December 1920—January 1921 ..	100	$\frac{82.8}{12} \times 2.5$ or 17.250	$100 - 17.250 = 82.750$
January—February	100	$\frac{111.47}{12} \times 1.5$ or 13.934	$100 - 13.934 = 86.066$
February—March	100	$\frac{218.71}{12} \times .5$ or 9.113	$100 - 9.113 = 90.887$
Sum	1200	255.281	944.719

TABLE II

Year and month	Births	Died from March 19, 1920 to March 18, 1921, before reaching the age of one year.												
		March April	April May	May June	June July	July Aug	Aug Sept	Sept Oct	Oct Nov	Nov Dec	Dec Jan	Jan Feb	Feb March	
March 19, to April 18 ..	100	9-113	4-821	3-316	2-373	1-977	1-400	1-388	1-104	-958	-963	-855	-482	28-750
April—May ..	100	..	9-113	4-821	3-316	2-373	1-977	1-400	1-388	1-104	-958	-963	-855	28-268
May—June ..	100	..	..	9-113	4-821	3-316	2-373	1-977	1-400	1-388	1-104	-958	-963	27-413
June—July ..	100	..	..	..	9-113	4-821	3-316	2-373	1-977	1-400	1-388	1-104	-958	26-450
July—Aug ..	100	..	..	..	..	9-113	4-821	3-316	2-373	1-977	1-400	1-388	1-104	25-492
Aug—Sept ..	100	..	..	..	..	..	9-113	4-821	3-316	2-373	1-977	1-400	1-388	24-388
Sept—Oct ..	100	..	..	..	..	..	..	9-113	4-821	3-316	2-373	1-977	1-400	23-000
Oct—Nov ..	100	..	..	..	..	..	..	..	9-113	4-821	3-316	2-373	1-977	21-600
Nov.—Dec. ..	100	..	..	..	..	..	..	..	..	9-113	4-821	3-316	2-373	19-623
Dec.—Jan. ..	100	..	..	..	..	..	..	..	..	..	9-113	4-821	3-316	17-250
Jan.—Feb. ..	100	..	..	..	..	..	..	..	..	..	..	9-113	4-821	13-934
Feb.—March ..	100	..	..	..	..	..	..	..	..	..	..	..	9-113	9-113
Sum ..	1,200	9-113	13-934	17-250	19-623	21-600	23-000	24-388	25-492	26-450	27-413	28-268	28-750	944-719

5. Thus an enumeration of 944,719 infants on the census day accounts for 1,200,000 births that have taken place within twelve months before that date. Or in other words $\frac{944,719}{1,200}$ or 78.727 per cent. of the children born in the course of just one year preceding the Census are enumerated on the census date, and this ratio worked out on the mid-decade population of 0-1 (calculated on the principle of geometric variation from the corrected data of two censuses) will give the average annual number of births or the total of the decade.

This ratio for a normal year gives further results. Calculated on the mean total of child-bearing females aged 15-45 it is found that 22,093 children are born to every 10,000 such females in a decade. This proportion is useful to work with as the return of child-bearing females is correcter than that of infants aged 0-1. If we take the reproductive limits to be 15-40, the number of normal births per 10,000 such females works out at 24,707. This normal rate may be fairly assumed to be constant, as the rate of fertility from decade to decade does not vary largely in India.

In Prof. Vaidyanathan's Life Table, the children alive between ages 0 and 1 are shown: 76,795 males and 78,832 females, per 100,000 births of each sex.

Thus the above ratio of 78,727 children alive for 100,000 births, worked out on the basis of these assumptions may be accepted as generally holding good. That the assumptions themselves are broadly true is also shewn thereby.

APPENDIX III,

A NOTE ON

SHREYAS SADHAKA ADHIKARIVARGA

BY NARMADASHANKAR D. MEHTA, B.A., LL.B.

(Chief Officer, Ahmedabad Municipality)

1. **Introductory**—When the Pauranic Hinduism degenerated itself into idle idolatry and the Western India even under University education could get no inspiration either from the orthodox Sâivism of Smarta or Pâshupata school or from the Sâkta cult of the Tantric school or from the Vaishnavism of Ramanuja or Vallabhacharya or Swâminarayan or from the religious reform movements of Arya Samaj or Prarthana Samaj, the province of Gujarat produced both a saint and a genius in the person of Shriman Nrisinhacharya, who brought about a wonderful revival of Vedic religion in its three forms of ritual, worship and knowledge.

2. **Story of Founder's life**—He was born in Kadod, a village in the Bardoli Talukà of the Surat district on 29th November 1853 (Kartik Vad 14th, Samvat 1910). He was a Vjshnagra Nagar by caste. His early education was in the Surat District. As a pupil in the primary and secondary schools, he was mystic in temperament and he paid very little attention to the modern method of education, but pleased himself to take walks on the Tapti river and became engrossed in his thinking though always securing a high rank at the annual examinations of the schools. He developed a wonderful intuitive perception and established a small school. Later on with moderate educational equipment, he joined the service in the P. W. D. in the Baroda Cantonment. His superiors were struck by the independence and integrity of his character. During the period of his active service as well as during his Semi-Sanyasi peregrinations after the death of his young wife, he moved about with eyes and ears open among bands of Sadhus of various denominations. For a few days about this time he came in touch with Mohan Swami dwelling in his *Math* at Surat, quite a man of common type having very little claim over intellectual or mystic attainments. Soon after this he began to disclose his innate spirituality by leaps and bounds. He left off his service and devoted all his time in contemplation of the Divine. He began to reveal a special spiritual insight whereby he was able to attract a large number of pupils and devotees, followers and admirers from various walks of life. He was able to probe deep into the hearts of all—from cultivators, mechanics, merchants to teachers, lawyers, professors and administrators—by his spiritual influence which he exercised more by exemplary life as an ideal householder than by mere lectures and sermons. In him all his pupils found not only a unique religious teacher but a loving parent, an intimate friend and an infallible guide in all matters earthly, divine and spiritual. In the year 1882 (Samvat 1938) his disciples formed themselves into a society called Shreyas Sadhak Adhikarivarga under the spiritual guidance of their Guru in Baroda. This Society has never been a sect. It was from the very beginning a school or an academy of able persons studying at the feet of Shriman Nrisinhacharya. The founder of the Society passed off quietly on 3rd August 1897 (Shrâvan Sud 5th Samvat 1953) leaving the mantle of his responsibility on his then minor son Shrimad Upendra Bhagwan who was trained up by Mr. Chhotalal, the premier disciple of the late Guru. The Society at present contains not less than two thousand members. No periodical fee is levied and the management of the *Ashrama* is carried on from the gifts and private earnings of the Guru.

3. **Activities of the Shreyas Sadhak Adhikarivarga**—The Society formed under the spiritual guidance of Sri Nrisinhacharya laid down the objects of their activities to be spiritual bliss (*Shreyas*) in preference to material or mundane pleasure (*Preyas*). But the revelation of spiritual bliss was to be achieved not by absolutely discarding the mundane activities and leading a life of asceticism but by leading a pious life of a house-holder who should turn the material means of pleasure into means of moral and spiritual uplift. The mundane pleasures have no value of their own unless they lead to ethical, æsthetic and spiritual evolution of man. The *Preyas* or mundane pleasure should, therefore, be subordinated to *Shreyas* or spiritual bliss.

4. The fundamental doctrine of the Guru of the Society was that although spiritual bliss is open to all irrespective of the birth of the individual and accidental circumstances, it requires *special* mental and moral qualifications as a working basis. These qualifications varied with individuals according to the plane of their evolution and the initiation

of the Guru was based upon the innate aptitude of the individual disciple. His teaching was therefore both *general* and individual or *special*. The general teaching was on the common platform of Vedic religion while the individual or special teaching was in the form of special worship, etc., for every individual. The first kind of teaching was open to all and was imparted through works of poetry, dramas, novels, etc.; while the latter in its highest stage was imparted to the select few who were initiated in the mysteries of religion and philosophy. The open teaching of the Guru is embodied in the voluminous literature of the Society noted in the margin. The series of Bhāminibhusana has been very popular and it has passed through seven editions.

- | | |
|--------------------------------------------------------------------------|-----------------|
| 1. Vānīvās in three Vols. (Poems.) | |
| 2. Bhāminī Bhūsana in five Vols. (Stories.) | |
| 3. Sīhānt Sindhu in two Vols. (Doctrinal book.) | |
| 4. Panchavarad Vritānta (Spiritual Novel full of esoteric teachings.) | |
| 5. Tribhuvan Vijayikhadga. (Novel full of spiritual and secular ideals.) | |
| 6. Sureshcharitra (Spiritual Drama). | |
| 7. Sati Suvarnā (Novel.) | |
| 8. The Mahākāl in nine Vols. (Moral, religious & Philosophic essays.) | |
| 9. Sanmitranu Mitra Prati Patra. | } Letters, etc. |
| 10. Sadbodh Parijātakā. | |

5. **Occult Teaching**—The occult teaching imparted to select few was in four forms of Yoga: (1) Hatha Yoga, (2) Laya Yoga, (3) Mantra Yoga and (4) Raja Yoga. The disciples of each school were given practical lessons in chambers and their progress was watched at periodical visits and when they were found well-grounded in one practice, a higher platform for exercise was given. Oft-times one class of disciples co-ordinated their experiences and then after they got the approval of the Guru they reduced them to writing and circulated among the occult members of the same group. There were senior typical disciples of each class who were ideals for the juniors. It can be stated without contradiction that Shreyas Sadhak Adhikarivarga contained adepts in all the four forms of Yoga and the late Reverend Chhotalal Jivanlal—who was commonly called Mastersaheb being an ideal teacher in the Baroda High School and was the premier disciple of the Guru, had the keys of all the fourfold Yoga in his hands and was the referee of all the juniors in matters of occult practice. His chief works in Gujarati are:—

1. Yogini Kumāri.
2. Dhanavan thavāni amogh kalā.
3. Adhyātma bal poshak granth mālā—prathama aksha.
4. Vidyarthino sācho mitra.
5. Mangal prenita sandesa.
6. Sudhā srotaswini (in two parts).
7. Balakone kevi rite kelavavā.
8. Brahma charya.
9. Rog tālvāna upāyo.
10. Is'war Bhakti manushyōye s'a mātē karvi.
11. Sreyas sadhak adhikari varga e sun chhe ?
12. Murti pujānon rahasya.
13. Vijnanni rasik vāto.
14. Plaguethi bachvāno upāya.
15. Dugdhōpchāra.

He was the Editor and Chief Contributor of the Mahākala for 15 years. During his period of literary and religious activities the Mahākala rose to and occupied a pre-eminent position among Gujarati periodicals. He organised the institution of Sadhan Samarambha a weekly session of the Society commencing from Holi Holidays—for the purpose of establishing a habit of concentration of mind with religious devotion in a secluded spot.

6. **Special features of the Society**—Occult teaching requires two fundamental principles: (1) The initiation by an adept or Guru. (2) Faith and devotion in the teaching and practice. With these pre-requisites, the moral and spiritual evolution is as certain as day follows night. The doctrines of the Guru are non-sectarian in character, i. e., they do not require that the disciple should believe in a particular form of God or worship. The theistic view of the Guru is more allied to Saguna Brahma Vāda of Sankar's School of Vedanta and tolerates all forms of worship but the object to be achieved is spiritual realisation of identity of the ego with the Supreme Being which involves the cultivation of the thinking powers over and above that of devotion and action. The Guru required devotion and action on the part of his disciple but as subsequent to thought. Leading followers of the Guru are, therefore, not blind worshippers of idols or symbols of the ordinary Shaiva or Vaishnava cult, nor are they mere speculators of the modern Vedantic type but are practical religious men with the spiritual insight of a Yogi or adept, religious fervour of a saint, and dignified peace of a philosopher.

7. Later Activities—Since the death of the late Mr. Chhotalal Jivanlal, who carried on the responsibility of educating the eldest son of the Guru, the activities of the Society have suffered materially in consequence of want of full time devotees at the Central Ashrama in Baroda. But the Society has developed a special feature of usefulness in Gujarat in as much as the members thereof meet at least four times in a year to perpetuate the memory of their Guru and senior disciple, Mr. Chhotalalbhai, by practical sermons. Shrimad Upendra Bhagwan who occupies the responsible status of Guru has shown conspicuous ability in religious organisation and has led in the cultivation of æsthetics as hand-maid in religious and philosophic education. His poems reveal the working of a high spiritual mind and the rhythm and imagery of some of his lyrics are unsurpassingly admirable. The following books contribute to the literature of the Society under the guidance of Shrimad Upendra Bhagwan :—

1. Upendra Girāmrita (Poems).
3. Divya Murti (Novel).
2. Sudāmā Charita (Poem.)

Apart from the æsthetic development of the Society the present Guru takes special interest in social reform movement. Through the instrumentality of his cultured wife he has trained up a large number of women and children in fine arts; and a casual visitor to the periodical sessions of the Society will carry with him very happy reminiscences of what art can achieve in the domain of religion.

8. Conclusion—The institution of the Shreyas Sadhak Adhikarivarga though religious, is not trammelled by rigid rules of succession as in the case of Acharyas of the Shaiva or the Vaishnava cult. Nor is there any compulsory monetary obligation on the part of disciples or followers. Each disciple, follower or member is at liberty to apply for initiation at the hands of the Guru and his subsequent relations with the head of the institution are dependent upon the moral aspect rather than on the ritualistic aspect. The success of the institution upto now is more due to the self-sacrificing spirit of the Guru than to anything else.

APPENDIX IV
CENSUS OF LIVESTOCK*

(SOME INFERENCES)

Statistical Data

Subject	STATE TABLE
Census of Live Stock by Talukas	XXVI
Variation in Live Stock by Divisions and Censuses	XXVII

1. **Introductory.**—This is the first time that a regular cattle census was undertaken in the State. Several causes such as the succession of bad years, scarcity of milk and *ghee* and the consequent effect on people, the rumours about the exportation of cattle and the growth of creameries had produced a great and anxious stir amongst the public in regard to them. Many people honestly desired that it was time the Government should interfere. Under the circumstances it was far from easy to come to any definite conclusion as to the actual state of things without undertaking a regular census of livestock. It is true that an estimate of livestock is prepared every year by the Agricultural Department through the agency of the Revenue Department but the figures are found to be not very complete and satisfactory. In order, therefore, to lay hold of the true situation and to satisfy the public, the Government of His Highness ordered at my instance a regular census of livestock and agricultural implements along with the general one. The necessary forms were then got printed and attached to the house list; and in October 1920, the first regular cattle census was undertaken along with the work of house-numbering which was then going on. Along with each numbered household, the name of its Head, the number of its cattle, its ploughs and carts were also recorded. It was the completest and the most comprehensive Cattle Census the State has ever undertaken and the results are assuredly satisfactory.

2. **Reference to Statistics.**—The figures of cattle—milk and agricultural—as well as those of ploughs and carts are contained in State Table XXVI. These are further compared with those of the revenue estimates of July 1920, 1919, 1918, 1917 in State Table XXVII. The result recorded in this census when compared with the figures of the July estimate undertaken by the Agricultural Department testifies to the accuracy and completeness of the census enumeration. In regard to certain items of the record such as bullocks and calves, no proper comparison is possible with the revenue figures of July 1920, as they were not separately recorded; the departmental census only counted under “cows,” “bulls,” “bullocks” and “buffaloes” such of the young of these animals as were available for agriculture, leaving the rest unenumerated. But wherever a proper comparison is possible there is observable an increase in numbers. Thus the numbers of sheep and goats increased from 301,278 to 379,324; the number of ploughs increased from 137,715 to 199,640; and of carts from 76,669 to 86,541. These increases within three months could not have been actual and their only cause is improved and more accurate enumeration. From the above reasons it is to be regretted that no conclusions can be formed as to whether the export of cattle has been going on to any large extent. The total number of cows is shown to be 194,541 in October 1920. In the July record of the same year, the number under cows is shewn to be 248,374; but this number must include a large proportion of the young calves which were separately enumerated in October or else the earlier estimate is entirely erroneous. It could not be that within three months such a large decrease of over 50,000 cows should happen.

3. **Distribution of cattle per inhabited house.**—The number of inhabited houses in the State is 512,845; so that for every 100 houses or families, there were in October 1920, 35 cows; 83 bulls and bullocks, 65 buffaloes and 73 sheep and goats, 39 ploughs and 17 carts.*

4. **Famine's toll of cattle.**—Cattle are censused at the end of every five years in the Bombay Presidency. In this State, the record is annual but as above pointed out, is defective. Assuming however that the margin of error is about equal in each year, we append in the margin comparative figures for the last five yearly estimates. Figures for 1910 are given to show that there has been a progressive increase up to 1918. The famine of that year accounted for the decrease of 4 per cent. in 1919. Next year there was a slight increase indicating a tendency towards the normal. The increase in the latest census is of course as pointed out above, due to completer enumeration.

Year	Number of cattle milk and agricultural	Variation per cent
July 1910 ..	844,227	.....
" 1917 ..	959,736	+14.9
" 1918 ..	1,001,844	+ 3.3
" 1919 ..	961,674	- 4.0
" 1920 ..	973,550	+ 1.2
Oct. 1920 ..	1,245,692	+23.2

* This Appendix has been prepared by my Head Clerk, Mr. J. Y. Patel, B.A., mainly from the materials contained in a Gujarati article on the results of the Cattle Census written by Dr. C. V. Sane, M.D., Director of Agriculture, Baroda State, and published in the *Khadet Panchang*.

5. **Necessity of a complete quinquennial census of Livestock.**—Public estimates of the volume of agricultural wealth are notoriously wide of the mark. To enable them to form proper inference, a census of livestock is the best means. Such censuses should be held twice in every decade, each at the end of a five years' period. Thus will be brought home to them the real state of things which will stop them from indulging in wild conjectures. It is hoped the Government will give its assent to such quinquennial censuses of livestock.

6. **Agricultural cattle.**—Non-agricultural cattle too have been censused this year; in the general review given above we have indicated the proportional figures regarding them. We shall now confine ourselves more particularly to a discussion of agricultural and milch cattle. As it is not possible to give statistics of cattle per Mahal, only useful classes of cattle will be referred to here. Agricultural cattle as ascertained at the present census are shewn per division in the following table :—

Kind	Central Gujarat	South Gujarat	North Gujarat	Kathiawad	Total
Cows	27,454	53,976	83,103	29,948	194,541
Bullocks	111,250	78,846	177,423	37,101	404,620
Bulls	1,207	4,016	11,246	5,169	21,638
Calves	34,641	57,588	49,749	20,781	162,759
Female Buffaloes	79,238	30,113	190,800	17,402	317,553
Male Buffaloes	4,184	2,982	8,683	826	16,675
Young stock	68,153	20,498	128,675	10,580	227,906
Total..	326,129	248,019	649,739	121,807	1,345,692

The total number of agricultural cattle is thus 1,345,692. These if divided into classes

Division	Agricultural	Milk-giving	Young stock
Central Gujarat ..	116,641	106,092	102,794
South Gujarat ..	85,844	84,089	78,096
North Gujarat ..	197,352	273,963	178,424
Kathiawad	43,096	47,350	31,361
Total..	442,933	512,094	390,665

like agricultural, milk-giving and young stock will be by divisions as shown in the margin. This analysis shows us that 33 per cent. of the total number of cattle belong to the agricultural class; 38 per cent. belong to the milk-giving class and the remaining 29 per cent. cover the young stock. Looking from an another point of view, we find on the whole, that the milch cattle exceed in number the agricultural ones; but in the Central and to some extent in Southern divisions agricultural cattle outnumber the milch ones while the reverse is the case in regard to North Gujarat and to some extent Kathiawad. The conclusion is that the Central division requires more cattle for purposes of cultivation or that it cannot maintain more milch cattle. The statistics of young stock also clearly point out that the Central and to some extent Southern divisions have proportionately a greater number of the young stock than the other two divisions. This increase may possibly be ascribed to the custom of breeding bullocks out of calves prevalent in these two divisions. This kind of animals being largely exported from North Gujarat there is a proportionately great variation in the number

Division	Cows	Calves	Increase	Decrease
Central Gujarat ..	27,454	34,641	7,187	....
South Gujarat ..	53,976	57,588	3,612	....
North Gujarat ..	83,103	49,749	....	33,414
Kathiawad	29,943	20,781	....	9,167

tion to the first two.

7. **Decrease in the number of agricultural cattle.**—It is commonly believed that agricultural cattle have been decreasing in number day by day. How far do statistics support the belief? On what does the scarcity of bullocks depend? Neither the cultivated land alone nor the number of cattle alone can lead us to any conclusion. Both these factors should be considered together before we arrive at any comparison. For purposes of such a comparison, the following table giving the area of cultivated land and the number of agricultural cattle recorded at the past three quinquennial censuses will be useful.

Natural Division	Agricultural Cattle and Cultivated land (in Bighas)	Census of the Year			
		1906	1911	1916	1921
Central Gujarat	Cultivated land	1,204,996	1,210,617	1,384,292	1,420,916
	Agricultural Cattle	83,899	88,657	100,905	116,641
South Gujarat	Cultivated land	672,806	668,069	714,871	774,716
	Agricultural Cattle	64,626	69,392	75,852	85,544
North Gujarat	Cultivated land	1,806,070	1,568,639	1,258,402	2,269,137
	Agricultural Cattle	139,634	143,758	153,096	197,352
Kathiawad	Cultivated land	727,424	562,637	649,872	680,507
	Agricultural Cattle	27,544	32,994	37,506	43,096
Total	Cultivated Area	4,413,236	4,009,953	4,007,497	5,155,276
	Agricultural Cattle	315,431	334,801	367,482	442,933

It is apparent from the above table that there has been a continuously steady increase both in the area cultivated and the number of agricultural cattle. Any inference based on these statistics alone will not help to explain this variation. But if we find out the proportion of average land cultivated in those years, per every pair of bullocks, the *bona fide* situation in respect of these agricultural cattle will be understood. The marginal table shows that

Kathiawad has the largest area cultivated per every pair of agricultural cattle while the pair in South Gujarat has the least to till. On the whole since 1916 the present condition of all other divisions except North Gujarat appears to be satisfactory. The higher average of cultivated area in the North Gujarat in this census is accounted for by the fact that there has been a considerable increase in the cultivated area, unaccompanied by, of course, a corresponding increase in the number of its cattle.

Year.	Central Gujarat	South Gujarat	North Gujarat	Kathiawad	Baroda State
1906.. ..	28-7	20-8	25-9	52-8	27-9
1911.. ..	27-3	19-2	21-8	34-1	23-9
1916.. ..	27-4	18-8	16-4	34-5	21-8
1921.. ..	24-3	18-0	23-0	31-6	23-2

This means that North Gujarat requires more agricultural cattle (besides bullocks, the agricultural cattle include bulls and he-buffaloes also for comparison with figures of past censuses). Taking only the bullocks as recorded in the present census into consideration, the average land cultivated per Mahal per pair is as given below :—

Name of Mahal	Area cultivated per pair of bullocks	Name of Mahal	Area cultivated per pair of bullocks
GENERAL GUJARAT		NORTH GUJARAT	
Yiakwada	18-2	Vipar	13-2
Baroda	20-5	Atasumba	16-8
Savi	21-2	Kheralu	20-8
Sankheda	23-1	Vasagar	22-1
Padra	23-6	Mehsana	22-2
Dabhoi	23-9	Kadi	22-8
Bhachran	25-7	Patan	23-7
Petlad	26-0	Sidhpur	24-5
Vaghodia	26-3	Kalol	25-1
Siron	31-8	Chansama	27-0
Karjan	31-9	Harij	28-6
		Dehgam	27-4
SOUTH GUJARAT		KATHIAWAD	
Gandevi	6-8	Beyt	16-8
Vraha	14-7	Kodinar	17-3
Mahuva	15-0	Ratanpur	31-7
Sranghad	18-1	Okhanasdal	32-2
Narvori	18-5	Dhari	35-1
Mansrol	21-2	Khambha	38-6
Palwan	24-4	Bhambkatta	38-9
Kamrej	25-5	Amreli	43-2
		Dunmagar	45-4

seers of milk per day per each head of cattle, one person in the different divisions gets per day milk as shown below :—

Division	Population	Daily supply of milk in the State	Average seers of milk per individual
Central Gujarat ..	707,512	387,459	0.54
South Gujarat ..	340,372	256,954	0.75
North Gujarat ..	900,578	858,600	0.95
Kathiawad ..	178,630	189,400	1.06

The only object in presenting these statistics is for purposes of comparison with different divisions. If these figures reveal any sufficiency of nourishment, it ought to be gauged from the healthiness of the agriculturists of those divisions. These statistics show that the inhabitants of the Central, Southern, Northern and Kathiawad divisions are in an ascending order of healthiness. Thus the population of Central Gujarat is the weakest. On the other hand, the scarcity of milk must be in a reverse order. How far do these statistics confirm the exact state of things is left to the reader to think for himself. If he finds the situation deplorable, he should strive to improve it.

13. **Conclusion.**—This being the first regular cattle census, its statistics are neither of much use for purposes of comparison nor of help for gauging the real condition of agricultural cattle in the State. The Census will be invaluable both to the Government and the subjects as an index of the real condition of cattle if the principle of a quinquennial census is accepted as recommended above.