

## INDIAN STATISTICAL INSTITUTE

### Nineteenth Annual Report : 1950-51

With the end of the year under review, the Institute completed the nineteenth year of its existence. Its activities this year were even more varied than in the past. In addition to its normal activities in connection with research, training, and scientific projects, new lines of activities have been opened up. A centre for training of statistical officers in the countries of the Middle-, South-, and Far East has been organized in Calcutta. The centre is jointly operated by the International Statistical Institute and the Indian Statistical Institute under the auspices of UNESCO. The Institute is engaged in conducting, on behalf of the Government of India, a multipurpose sample survey on a national scale in the rural areas of the country. The stabilization of a portion of Institute's activities, viz., research and training, is well-nigh complete and the Council looks forward to the setting up of a governing body to take charge of this section shortly.

#### 1. REORGANIZATION OF THE INDIAN STATISTICAL INSTITUTE

The annual general meeting of the Institute held on 31 May 1950 accorded its approval to the policy and line of action taken by the Council in regard to the creation of a governing body to look after the research and training school of the Institute, as mentioned in last year's annual report. The necessary regulations for this purpose were framed at a meeting of the Council held on 17 February 1951 and approved by the Department of Economic Affairs, Ministry of Finance, Government of India, on 19 March 1951. Steps are being taken to set up the governing body in accordance with these regulations.

#### 2. SCIENTIFIC ACTIVITIES

##### 2.1. RESEARCHES

2.1.1. *Theory of probability and inference:* A general theory of distance power tests analogous to those suggested by P. L. Hsu and A. Wald has been given by C. R. Rao. An important class of these tests is one which has the property that its power for any given alternative bears a constant ratio to the maximum power possible for that alternative. This procedure seems to effect a compromise between the alternative methods which favoured either the distant hypotheses or the immediate neighbourhood. Rao also considered the problem of setting up sequential tests of null hypotheses in cases where the alternatives are not specified. Wald reduced this problem to that of testing the null hypothesis against an alternative close to it. In the method suggested by Rao, a distant hypothesis, when it is true, can be discovered quicker and also the test does not make an explicit use of loss function.

D. Basu has studied the limiting properties of the power of best tests when the sample size is increased indefinitely. He has also proved in a rigorous manner that  $\bar{x}$  is a minimax estimate of the mean in the case of normal population and that for Poisson and allied distributions minimax estimates do not exist. Investigations for finding out the minimax estimates for standard deviation of a normal population are being carried out by A. C. Das.

In the course of examining the alleged difficulty about restrictions in von Mises' theory of collectives which contradicts the notion of randomness, and the definition of 'quasi-limit' by (J. Singh, *Sankhyā*, Vol. 7, pp. 257-262), D. Basu has shown that the existence of a so-called quasi-limit implies the existence of von Mises' limit.

2.1.2. *Multivariate analysis:* Some special investigations on tests of significance of the additional discrimination due to some characters used in conjunction with a fixed panel have been carried out by C. R. Rao. The non-null distribution of the statistic  $D_{1,2}^2 - D_1^2$  has been obtained and it has been proved that under some conditions this test is the most appropriate. Extending Hotelling's concept of canonical correlation, A. C. Das has obtained the form and distributions of multiple and partial canonical correlation coefficients.

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2.1.3. *Non-normal sampling distributions:* A. K. Gayen has investigated the effects of non-normality on the distribution of (i) the variance-ratio used for testing (a) the homogeneity of a set of means (one-way classification for analysis of variance) and (b) the compatibility of two variances (two independent samples), (ii) the Student's  $t$  used for testing the difference between two means. The mathematical formulae derived are based on populations expressed by Edgeworth series including terms upto  $\beta_1$ , and contain corrective terms for the parental measures of excess, and skewness. They are (a) sufficiently accurate for any size of sample from populations agreeing well with the above form of the Edgeworth series, and (b) valid asymptotically for any universe. With a *priori* or estimated values of the measures of parental deviations it is now possible to calculate the approximate true probabilities of the test functions using tables (prepared by him) for probability corrections. When exact knowledge of those parameters is not available, one may safeguard against error by considering the corrections for their plausible values. Similar work is also done on the non-normal correlation coefficient. Gayen is at present engaged in examining the change in the power of the standard tests due to parental non-normality.

2.1.4. *Sample surveys:* Various types of sampling procedures have been studied by K. C. Seal and A. Mathai. Several error formulae relating to double sampling technique have been obtained by Seal. A. C. Das continued his work on two dimensional systematic sampling extending it to higher dimensions; he also studied topographic variation for some stochastic models.

2.1.5. *Studies in time series:* Dr. Herman Wold, the visiting professor of the Institute. 1949-50, suggested a number of problems in the analysis and tests of significance of time series, most of which have been studied by a few workers. Some results on discriminant function methods of classifying time series by C. R. Rao; tests of significance by S. R. Rao, M. B. Kannan and A. Mathai; analysis of some recursive systems by A. C. Das; analysis of demand for Indian goods by V. N. Murti; the theory of indifference maps by M. V. Jambunathan, and on the use of Hollerith methods in time series problems by A. Mathai are awaiting publication.

### 2.2. VISITING PROFESSOR

Prof. Abraham Wald of Columbia University arrived in India on 20 November 1950, at the invitation of the Indian Statistical Institute. He delivered two general lectures on the theory of decision functions and sequential analysis and ten advanced seminar lectures on minimax estimation. He was preparing to launch a programme of research work allowing some time to the participants of the seminar to do some preliminary reading. In the meantime he planned to visit various Indian Universities where he was invited to deliver lectures. Prof. and Mrs. Wald left Calcutta on 12 December 1950, for Trivandrum by air and on the morning of 13 December the Wolds were killed when the aeroplane in which they were riding struck a mountain in the Nilgiri range in south India.

This tragic news came as a rude shock to the workers of the Indian Statistical Institute. Many of the research workers had started work on the complicated problem of the decision theory and they were eagerly awaiting the return of the master for solving their difficulties. Prof. Wald has left a deep impression on the workers of the Institute both as a person by his charming manners and as a teacher by his stimulating discussions in the seminar class.

The death of Abraham Wald removes an outstanding figure from the field of statistics. His brilliant researches on abstract spaces, econometric problems, sequential analysis and decision functions, opened out new lines of investigations for the present generation of research workers. Much remains to be done in his fascinating theory of statistical decision functions which he propounded shortly before his death. The statisticians while mourning his loss should resolve to complete these investigations and make the tools available to the practical workers.

### 2.3. MULTIPURPOSE NATIONAL SAMPLE SURVEY, 1950-51

Started in the current year, this is a major survey being conducted by the Indian Statistical Institute, on behalf of the Government of India. The Gokhale Institute of Politics and Economics, Poona, is also collaborating with the Indian Statistical Institute. The survey is to provide information regarding various aspects of national economy in the rural sector of the whole of India, covering a total area of 700 million acres. The immediate purpose is to collect data necessary for the computation of national income and for national planning.

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The whole of rural India has been split up into 156 strata, the formation of each stratum depending on geographical contiguity and homogeneity in topographical characters. Wherever the necessary data have been available, each stratum has been further divided into four sub-strata according to the population of the village comprising them. A total of 1833 villages have been selected for survey, and the quota of each stratum has been made proportional to its population.

In each village a random sub-sample of the households has been studied in respect of the principal occupation, and the households comprising the sub-sample have been divided into 'agricultural' and 'non-agricultural' groups, those engaged on a primarily agricultural enterprise being treated as agricultural and the rest as non-agricultural. Further sub-sample have been drawn in both of these groups for detailed examination of general demographic and economic characteristics, production and cost data in the enterprises concerned and consumers' expenditure in the domestic field.

The field work is being conducted by the Government of India through a directorate set up for this purpose under the Department of Economic Affairs, Ministry of Finance, except in West Bengal and in twelve southern districts of Bombay, where the field work has been entrusted to the Indian Statistical Institute and the Gokhale Institute of Politics and Economics respectively.

Several schemes have been undertaken to study different problems arising in connection with the National Sample Survey in various aspects—economic, statistical planning and field technique. A brief description of two of the important investigations is given below.

(a) *Intensive village studies:* An investigation has been undertaken to study certain theoretical and applied problems related to national income computation and construction of social accounts. At present a survey is being conducted in this connection in several specially selected villages to develop suitable procedures for the collection, evaluation and estimation of data relating to production, income and consumption items which occur more frequently in rural areas and which present certain specific features not to be met with in more advanced industrial economies. The problems on which special attention is being given are (i) the evaluation and estimation of the subsistence type of production and the structure of subsistence production; (ii) the possibilities of adopting village as an economic unit for accounting purposes; (iii) the implications and physical significance of concepts like savings, investment, employment etc. in an undeveloped economy as is obtained in our rural areas.

(b) *Estimation of consumers' expenditures based on last purchases with reference to the day of survey:* Conventional family budget estimates are based on expenditures as given by the informant during a specific period, say a week or a month. This experiment attempts to arrive at the same estimates from last transactions on any item as recorded by the informant.

### 2.4. CROP SURVEY WORK IN WEST BENGAL

The Institute continued the sample survey of the area and yield under crops for the Government of West Bengal. The survey was conducted in three separate seasons: (i) *Bhadai* (July-October) for Jute and Aus paddy, (ii) *Winter* (November-January) for Aman paddy and (iii) *Rabi* (January-April) for wheat, barley, pulses, sugarcane, potato, mustard and linseed. The entire State of West Bengal except for the hill tracts was covered, involving an area of about 30,000 sq. miles.

#### 2.4.1. Design of the Area Survey:

(1) *Jute-Aus area survey:* The entire area covered by the survey was divided into several strata, each police station (administrative units) being a stratum. In the year 1949-50 square shaped grids of size 2.25 acres were located at random in the form of two interpenetrating samples in each police station, keeping some grids common to both the samples, with the exception of 8 police stations in Cooh Bihar. The number of grids chosen in that year was at the rate of 1 grid per square mile in each of the interpenetrating samples. In the year 1950-51 about 33% of these grids were chosen as a random sub-sample from each of the interpenetrating samples in each police station. The investigators were asked to survey the plots included in the grids plus an additional layer of plots surrounding the plots in grids. The average size of the total unit so constituted was about 12 acres. In the police stations from Cooh Bihar grids of size 6.25 acres were located at random in the form of two interpenetrating samples at the rate of 1 grid per sq. mile in each sample and keeping 10% of grids common.

(2) *Aman area survey:* The design was similar to that of Jute-Aus survey.

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(3) **Rabi crop area survey:** The method of selecting the sample was similar to that of Jute-Aus survey. But instead of surveying one layer of plots surrounding the plots in grids a cluster of plots according to the following procedure were surveyed. The plots in villages bearing survey numbers serially from 1 onwards were grouped into clusters of serial plot numbers like 1-50, 51-100, 101-150, etc. If the first plot from a list of plots included in the grid, which generally corresponds to the N.W. corner of the grids, is say 138, all the plots in the cluster of plots to which this belongs (i.e., plot numbers from 101 to 150) were surveyed. Total number of sample units surveyed in the three seasons were 16,143; 10,031 and 22,749 respectively.

### 2.4.2. Design of the yield survey:

(1) **Jute-Aus crop:** Each police station was divided into four quadrants of approximately equal area. One random point within each quadrant was located on the map. A number of villages round this was located on the map. A number of villages round this point, covering an area of about 3 to 4 sq. miles were listed. 5 grids were chosen from among the grids within these villages included for area survey. Crop was harvested in 3 out of these 5 grids. In one grid two plots with Jute crops were chosen for harvesting. In a second grid two plots with Aus paddy were chosen for harvesting. In a third grid one plot with Jute and another plot with Aus were chosen for harvesting. In addition to this, two plots with Jute and two plots with Aus crop were chosen for harvesting from a random village. In each plot three concentric circular cuts of radii 2', 4' and 5' 7½" were taken, the centre of cuts being located at random within the plots. The estimates of yield rates were based on the yields from circular cuts of radius 5' 7½".

(2) **Anon crop:** The design was similar to that of Jute-Aus survey. But harvest survey was not carried out in a random village.

(3) **Rabi crop:** The design was similar to that of Jute-Aus survey. But square shaped cuts of size 15' x 15' were used for potato, sugarcane and Arhar in the Rabi season. For the other crops a set of concentric circular cuts of size 2', 4' and 5' 7½" was used in each plot.

Total number of sample cuts harvested in the three seasons were 3,396, 6,392 and 4,219 respectively.

As in the previous year a survey for the estimation of requirements of seed potato in West Bengal for the year 1951-52 has been undertaken. The survey is still in progress.

2.4.3. **Field organization:** The region under survey was divided into 228 to 236 area units in different seasons each unit being approximately equal to the average area of police station and one such unit the average area of police station and one such unit was allotted to each investigator. Usually four investigators worked under one inspector; but in certain areas due to shortage of inspecting staff five investigators had to be placed under the supervision of one inspector. Four inspectors worked under one chief inspector who generally held charge of a district. Three to four districts were placed under the supervision of an assistant superintendent.

### 2.4.4. Analysis of data:

As in the previous years progressive estimates were submitted regularly to the Government.

## 2.5. POPULATION STUDIES

### 2.5.1. All-India Population Statistics (Y-sample):

The work of transferring the information in the Y-sample (2% sample of the 1941 census slips) to Hollerith cards was completed by April 1950. The total number of cards punched in connection with this project amounted to 53.41 lakhs.

As regards the preparation of age-tables, tabulation for Madhya Pradesh, the Punjab (I) and Bombay was completed and the age-tables for these states were submitted to the Government. Total card-passages through the tabulators in connection with this project during this year was 17.24 lakhs and the card-passages for the complete project amounted to 137.91 lakhs.

Tabulation for the preparation of occupational tables based on the Y-sample, in which preliminary work had been started towards the end of the last year was nearly completed. Occupational tables for West Bengal, Assam, Orissa, Bihar and Madras have been submitted to the Government and the work for the other states is almost complete.

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Studies on caste and fertility based on the Y-sample were also taken up during the year under review, but the progress made so far is relatively small as higher priority was given to the preparation of occupational tables. Now that work on occupational tables is drawing to a close it is expected that it would be possible to devote more attention to these studies.

2.5.2. *Studies on sampling methods in population census based on the 1941 Census enumeration slips of Hazaribagh district in Bihar:* Experimental studies on the methods of sampling in population census as mentioned in the last year's report were continued during the whole of the year. The object of the study is to determine the most efficient scheme of

- (i) sample tabulation of the 1951 census materials.
- (ii) collecting concurrently with the complete enumeration certain informations and constructing tables therefrom.
- (iii) population sampling independent of the complete census.

So far the investigation has been confined to the first aspect only.

Taking the slips of several charges and treating these as the population, both systematic and random sampling methods were adopted with individual, household and cluster of individuals as sampling units. Interesting results are likely to emerge when the analysis is completed.

### 2.6. RANGOON SURVEY

The Institute continued its technical advice to the Government of Burma in connection with the survey. A representative of the Institute was invited to Rangoon for consultation in the preparation of the report which has since been published.

The report deals with the types of buildings and their use, population by race, citizenship, and literacy, employment, status and other labour force characteristics.

### 2.7. AGRICULTURAL LABOUR ENQUIRY

The final report of the enquiry has been submitted to the Government of West Bengal. It deals with various aspects of the economic conditions of agricultural labourers such as wages and employment, income and expenditure, assets and liabilities, etc.

It is found that agricultural labourers constitute about 4% of the population of West Bengal, - 1.6% having agricultural labour as the only occupation and 2.4% taking to it as supplementary to other occupations. They are employed for about 68% of the days in the year in both agricultural and non-agricultural pursuits.

### 2.8. CINCHONA SURVEY

At the request of the Ministry of Health, Government of India, a survey was undertaken to estimate the yields of bark and quinine in certain parts of the Madras Cinchona Plantations. As the yield of bark depends on the age of the plant, the plants were stratified on the basis of their age. A total of 663 plants were selected from the different strata and the following observations were noted for each of them: (i) yield of bark, (ii) height and girth (at 3 levels). In addition to this height and girth (at 3 levels) measurements were taken for 1989 other plants which were not uprooted for harvesting.

Statistical analysis is under way. Besides the preparation of a direct estimate of the yield of cinchona bark, it is also intended to study the relationship between the yield of bark and the physical characteristics (viz., height, girth) of the living plants with a view to exploring the possibility of obtaining a forecasting formula for estimation of the yield of bark from the measurements of the characters of the living plant.

### 2.9. MISCELLANEOUS ENQUIRIES

2.9.1. *Spotcheck of Patuuri records:* Towards the end of 1949 the Government of India decided to carry out a spotcheck of the records of *patuuri* (village *chankilare*) and at the request of the Government the Institute deputed 20 senior officers to help in conducting the enquiry. The investigation was confined to some parts of Uttar Pradesh, Vindhya Pradesh, the Punjab (India) and PEPSU. A report on the results of this survey was submitted to the Government on 10 September 1950.

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2.9.2. Study on standard 'scales' for personality and interest tests: Data relating to some tests of personality and interest administered sometime ago to the Institute workers are now being analysed. As the 'scales' devised by R. G. Hornreuter and other American workers for their subjects over there, are not obviously acceptable for the subjects here, possibilities of new satisfactory 'scales' for the purpose are being explored.

### 3. EXAMINATIONS

The Statistician's Diploma Examinations Part I and Part II were held in July 1950 simultaneously at Calcutta, Poona and Delhi. Fifty-seven candidates registered themselves for examinations in different papers, of whom thirty-seven appeared. Three candidates qualified for the Diploma Part I, while none qualified for the Diploma Part II. The names of the successful candidates are given in Appendix 3.

The Computer's Certificate Examination Part I was held in August 1950 and out of 161 candidates who registered themselves for different sections of the examination, 136 appeared. The names of successful candidates are given in Appendix 4.

With effect from 1951 the Statistician's Diploma Part I and Part II examinations will be combined into a single examination consisting of 8 papers and a revised syllabus for this purpose has been framed. Corresponding changes in the regulations for the examination have been made.

### 4. TRAINING SECTION

#### 4.1. TRAINEES

It was reported last year that seven students were promoted from the first year to the second year class; all of them passed the qualifying examination held at the end of their second year session.

Ten students appeared at the qualifying examination held at the end of their first year session of whom nine were promoted to the second year class. Sixteen students were admitted to the first year class this year, of whom five discontinued their studies. The second year students besides attending the regular theoretical and practical classes also took part in some of the projects conducted by the Institute.

#### 4.2. OFFICERS ON DEPUTATION

There were three officers on deputation from different States. One of them joined as a regular student of the training section. As to the other two, special courses were arranged to suit individual requirements.

### 5. INTERNATIONAL STATISTICAL EDUCATION CENTRE

As mentioned in the last year's report the Institute accepted a proposal for collaborating with the International Statistical Institute in organizing an international educational centre for statistics in Calcutta under the Auspices of the U.N.E.S.C.O. The centre which has been formally opened on 13 October 1950 is administered by a joint board of directors representing the International Statistical Institute and the Indian Statistical Institute.

The object of the centre is to provide statistical training to persons in the countries of Middle-, South-, and Far East who will have practical statistical responsibilities in government, in financial, commercial or individual establishments, or in scientific research institutions. A total of 18 trainees from 5 different countries participated in the first semester work (October 1950 to April 1951). The second term will last 6 months and classes will commence in July 1951.

The major bulk of the teaching work was undertaken by the members of the staff of the Indian Statistical Institute, who formed the nucleus of the teaching body. Services of a number of teachers from outside India were also made available to the centre through the help of the International Statistical Institute and the courtesy of the National Income Committee, Government of India. During the first term the teaching provided for the students of the centre amounted to 741 hours of instruction of which about 76% was contributed by the staff of the Indian Statistical Institute, 8% by Prof. K. B. Madhava who served as the honorary administrator of the centre during the first half of the term and 16% by teachers from outside India.

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The visiting teachers were Dr. Titus Podes (Index Number Institute, U.S.A.), Dr. J. B. D. Derksen (U.S. Statistical Office), Prof. J. R. N. Stone (University of Cambridge), Prof. Simon Kuznets (University of Pennsylvania), Mr. J. Edward Fly (U.S. Bureau of the Census), Mr. W. F. Gardner (International Monetary Fund), Mr. D. G. Bulger (International Monetary Fund), Mr. R. L. Sammons (U.S. Bureau of the Census), Mr. S. H. Diebert (SCAP, Japan), Dr. William Hurwitz (U.S. Bureau of the Census), Mr. Abraham Aidenoff (U.S. Statistical Office), and Dr. C. P. G. I. Smit (FAO).

### 6. LIBRARY

#### 6.1. RESEARCH LIBRARY

The Central Library of the Institute was located at Calcutta with branches at Giridih and Baranagar.

During the year under review addition to the library was 555 new books of which 85 were received as gifts from scientists and learned societies of various countries. The library now contains 24,219 volumes excluding offprints and monographs. A total of 710 periodicals and annuals were received; of these 147 were subscribed for, 323 were received on exchange basis and 240 were gifts from scientific societies, government departments and research departments of commercial firms.

The total number of library members increased from 245 to 321. The total number of books and journals borrowed was 22,825 of which 3,862 were issued from the lending section and 18,963 from the reference section.

Two new units have been set up in the library—Documentation Unit, Records Unit. A Documentation Unit has been organized for the preservation of papers containing important technical information. So far, about 25 files containing more than 200 papers have been arranged with systematic classification and proper indexing.

The function of the Records Unit is to systematically arrange and preserve the large volume of maps and documentary material collected in course of the statistical surveys conducted by the Institute. The unit has so far collected 1,58,392 schedules of 24 surveys. Systematic classification and indexing of the material is expected to be taken up shortly. Some progress has also been made with regard to the systematic arrangement of maps.

#### 6.2. WORKERS' CIRCULATING LIBRARY

58 English and 284 Bengali books were added to the Library thus bringing up the total stock to 4011 volumes. The number of books issued from Calcutta, Baranagar and Giridih were 1513, 4992 and 1952 respectively.

### 7. SANKHYĀ: THE INDIAN JOURNAL OF STATISTICS

During the year under review Part 3 and Part 4 of Volume 10 and Part 1 of Volume 11 were issued. Part 2 of Volume 11 is also expected to be published at an early date.

### 8. PHOTOGRAPHIC SECTION

The photographic section made 13,700 microfilm copies from books, journals, charts and tables. 240 maps and 84 other large size items were photographed. Bromide enlargements of 834 maps and 630 notes, tables and graphs etc., were also made. Number of ferro prints processed by the section was 164, and 341 zinc plates were prepared.

### 9. ACTIVITIES IN THE LOCAL BRANCHES

#### 9.1. BOMBAY BRANCH

9.1.1. *Council:* The following office-bearers were elected at the Council meeting held on 7 October 1950: President: Shri V. L. Melta; Vice-Presidents: Prof. C. N. Vakil, Dr. V. R. Khanolkar, Mr. L. S. Vaidyanathan, Mr. R. O. Saraiya; Treasurer: Mr. K. M. Promchund; Joint Secretaries: Dr. N. S. R. Sastry, Mr. V. V. Divatia. Members of the Council: Mr. G. M. Sankpal, Mr. Y. S. Pandit, Prof. M. C. Chakravarti, Mr. K. C. Cheriyan, Dr. R. L. N. Iyengar, Mr. K. Sambasiva Rao.

During the year 3 meetings of the Council were held.

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9.1.2. *Visitors from abroad:* Prof. Simon Kuznets, Mr. J. R. N. Stone, and Dr. J. R. D. Derksen foreign advisers to the National Income Committee of the Government of India, joined a discussion meeting on the estimation of National Income under the auspices of the Branch in the first week of January 1951.

9.1.3. *Sample Survey work:* The survey of the economic conditions of middle class families started in the previous year was continued during this year also. The field work was completed by the end of June and the data were analysed using Powers Samas equipment. The report on the survey is almost complete and the work is expected to be completed shortly. A pilot enquiry into the prices of controlled commodities was also undertaken in Bombay City at the instance of the Ministry of Finance, Government of India.

9.1.4. *Training in Economic Statistics:* As in the previous year, the training course in Economic Statistics was popular and in all 64 candidates were admitted to the course, the fee for the whole course being Rs. 10/-.

9.1.5. *Training in Quality Control:* The Bombay Branch of the Indian Statistical Institute in co-operation with the Textile Association (India) organized a course of lectures on Quality Control during the year 1950-51 also. Altogether twenty-three students were admitted to the course which commenced from 8 January 1951. A special feature of the course for this year is that in addition to the existing staff of lecturers, persons engaged in the practical application of quality control were invited to give lectures.

9.1.6. *Experimental work in mills:* The Bombay Millowners' Association informed the Board of Management for Quality Control that experimental work on quality control may be undertaken in the Khatau Makunji Spinning and Weaving Co. Ltd., the Shree Ram Mills Ltd. and Finlay Mills Ltd. During the period under review experimental work on using control chart was started in the Blow-room of Khatau Mills, Spinning Section. This work is progressing satisfactorily and it is expected to extend the work to other departments of the same mills and also to other mills. This scheme is financed by the Council of Scientific and Industrial Research, Government of India.

### 9.2. POONA BRANCH

9.2.1. *Membership:* The membership of the branch continued to be 6 life members during the year under report. Rao Bahadur D. L. Sahasrabudho was the President and Mr. N. V. Sovani, the Local Secretary.

9.2.2. *Activities:* As during the last two years the Statistician's Diploma Examinations were held in Poona under the auspices of the branch. Nearly 40 students appeared in the examinations, the largest number of all the examination centres in India. The percentage of successful candidates was also the highest in India.

## 10. MISCELLANEOUS

10.1. *Visit of Prof. Simon Kuznets, Mr. J. R. N. Stone, and Dr. J. B. D. Derksen:* Prof. Simon Kuznets, Mr. J. R. N. Stone and Dr. J. B. D. Derksen who came to India as foreign advisers to the National Income Committee, Government of India, stayed in Calcutta for some time in December 1950. During this period Mr. Stone delivered a lecture on national income and social accounting on 27 December 1950 and Prof. Kuznets delivered a lecture on sources of material for computation of national income on 28 December 1950. Dr. Derksen during a second visit to Calcutta from 29 January to 2 February 1951, delivered 15 seminar lectures on national income and social accounting to the trainees of the International Statistical Education Centre.

10.2. *Visit of Dr. William Hurwitz:* Dr. William Hurwitz, of U. S. Bureau of the Census was invited by the Government of India to give advice on the method of sampling to be followed in the Multipurpose National Sample Survey. He reached India on 8 February 1951 and stayed here for about a month. During this period he met the Institute workers and the Government of India representatives in a number of discussion meetings. He also delivered a lecture on 24 February on Sampling establishments in Calcutta. His visit was of great help as it enabled the Institute workers to discuss sampling problems of importance with a research worker of his standing and experience.

10.3. *Indian Science Congress:* The thirty-eighth session of the Indian Science Congress was held at Bangalore in January, 1951. C. R. Rao, A. K. Ghose, K. C. Seal and D. Basu attended the session as delegates from the Indian Statistical Institute.



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## 11. GENERAL ARRANGEMENTS

*Distributions of workers at the four centres as compared to last year*

	Calcutta		Baranagar		Giridih		Delhi		Total	
	31	31	31	31	31	31	31	31	31	31
	March	March	March	March	March	March	March	March	March	March
	1950	1951	1950	1951	1950	1951	1950	1951	1950	1951
Monthly	64	28	108	159	18	23	5	2	196	212
Piece-rate	—	—	4	62	—	32	—	—	4	94
Total	64	28	113	221	18	55	5	2	200	306

*Staff:* Sri S. B. Sen returned to the Institute on 8 February 1951 after serving in the United Nations Statistical Office in New York for three years. Sri Nimai Charan Ghose, one of the old workers of Institute, who joined the Dept. of Central Excise, Calcutta, in June 1944, came back to the Institute on 8 July 1950. Dr. Anil Kumar Gayen rejoined the Institute on 18 August 1950 after two years at Cambridge where he obtained his Ph.D. Sri Narosh Chandra Dutta, who took up an appointment in the Defence Department, Government of India, last year, rejoined the Institute on 22 May 1950. Sri Samarendra Nath Mitra, M.Sc., who studied computing machines in U.S.A. & U.K. joined the Institute on 1 September 1950 as a research worker. Sri J. Saha, Librarian of the Institute, left for U.S.A. on 10 February 1951 on a Fulbright Scholarship. Sri Prafulla Mukherjee, a young member of the technical staff, left for Cambridge in September 1950 with a Scholarship from the British Council. Dr. S. K. Banerjee, lately Director General of Observatories, assisted the Institute for a time in the capacity of Hon. Joint Director.

*Calcutta Office:* The library, the photographic section and the training and research section continued to function in Calcutta throughout the year. The Central Office was transferred to Baranagar in September 1950.

*Baranagar Office:* The main computing section, with the major projects, the Hollerith and the Cost Accounts section were located here during the year.

*Giridih Office:* The staff at Giridih Office was strengthened considerably in the early part of the year to cope with the increased volume of work arising from the National Sample Survey project.

*Hollerith Section:* The number of machines remained unchanged. The section worked under high pressure throughout the year. The card passages and the hours spent on different machines were as follows: Sorter 70.4m. cards, 6525 hours; Tabulator 7.4m. cards, 5244 hours; Reproducer 2.0m. cards, 3523 hours; Multiplier 0.8m. cards, 1434 hours; Collator 10.2m. cards, 1225 hours and punches and verifiers 3.3m. cards, 3300 hours. Altogether as many as 63 different types of jobs were undertaken during the year under review. The total number of cards consumed under the broad heading of different projects was as follows: Population 0.58m.; Crop Survey 0.86m.; National Sample Survey 0.74m.; and Miscellaneous 0.52m.

*Cost Accounts Section:* This section, as in previous years, has been primarily engaged in (a) the assessment of the computer-months spent on different projects and jobs, and (b) the valuation of work done by the workers of the computing section. Past records of output and time are being continually examined to arrive at objective standard rates for use in the valuation of output in monetary units.

*New Building:* The construction of a new building on the Institute land at Baranagar was started during the year and, when completed, is expected to relieve the acute congestion from which we suffer so badly at present. As the scattered nature of even the available accommodation was beginning to affect the efficiency of work, a start had to be made for constructing a building of our own even though we had to depend entirely on loans for finance.

## 12. ACCOUNTS

In the following pages are given the statement of General Revenue Account for the year 1950-51, and allocations thereof under different projects and schemes. It should be noticed that the contingent expenditure which has been classified under a number of heads in the General Revenue Account has been lumped together under one or two heads in the Allocated Accounts. It may be noted that an amount of rupees one thousand three hundred forty-nine and annas fourteen, being expenditure on contingent monials, has been shown under salaries in the General Account but under contingencies in the Allocated Accounts.





INDIAN STATISTICAL INSTITUTE

Indian Statistical Institute : Revenue Accounts for the year ending 31 March, 1951

Dr.		Cr.	
<i>West Bengal Crop Survey, 1946-50</i>			
(Government of West Bengal)			
To Opening balance .. .. .	Rs. 1,07,391 5 6	By Salary and dearness allowance .. .. .	Rs. 1,16,194 3 0
" Suspense a/c (Field Branch) .. .. .	41,829 4 9	" Travelling allowance .. .. .	10,858 3 0
" Liabilities .. .. .	25 1 0	" House rent, stationery, stores, postage, printing and other contingencies etc. .. .. .	19,270 13 9
		" Hollerith maintenance etc. .. .. .	2,922 8 0
	Rs. 1,49,245 11 0		Rs. 1,49,245 11 0
<i>Work on Population Census Data, 1941</i>			
Transfer of y-slips and Preparation of Age tables (Government of India, Ministry of Home Affairs)			
To Block grant .. .. .	Rs. 1,23,300 0 0	By Employment of staff .. .. .	49,151 13 3
		" Salary and dearness allowance .. .. .	37,332 2 0
		" Travelling allowance .. .. .	1,278 6 0
		" House rent, stores, postage, printing, stationery and other contingencies .. .. .	13,872 12 0
		" Hollerith maintenance, cost of cards etc. .. .. .	18,781 1 0
		" Closing balance .. .. .	2,976 3 9
	Rs. 1,23,300 0 0		Rs. 1,23,300 0 0
<i>Preparation of Occupational Tables and Special Studies on Bihar Slips 1941 Census</i>			
(Government of India, Ministry of Home Affairs)			
To Block grant .. .. .	Rs. 1,05,000 0 0	By Salary and dearness allowance .. .. .	44,430 1 0
		" Travelling allowance .. .. .	1,864 5 6
		" House rent, stationery, stores, postage, printing and other contingencies .. .. .	20,081 15 0
		" Hollerith maintenance, cost of cards etc. .. .. .	42,453 14 6
		" Closing balance .. .. .	86,169 12 0
	Rs. 1,05,000 0 0		Rs. 1,05,000 0 0

Examined and found correct  
P. C. NASTI & Co.  
Chartered Accountants.

6, HARTING STREET, CALCUTTA.  
The 30th April, 1951.

ANNUAL REPORT FOR 1950-51

Indian Statistical Institute : Revenue Accounts for the year ending 31 March, 1951

Dr.		Cr.	
<i>Research and Training</i>			
(Government of India, Ministry of Finance)			
To Opening balance	Rs. A.	P.	Rs. A. P.
Receipts against total grant of Rs. 4,30,000 from the Government of India	22,216	11 0 0	3,42,332
By Balance	3,75,000	0 0 0	8,294
By Membership fees	4,953	0 0 0	14,172
By Training fees	4,020	0 0 0	9,600
By Examination fees	10,715	0 0 0	36,048
By Other receipts	1,457	15 9 0	28,987
To Liabilities	67,668	15 0 0	6,500
	8,824	0 0 0	9,399
	1,000	0 0 0	6,500
	4,116	9 0 0	4,116
	4,83,933	10 3 0	4,83,933
<i>National Sample Survey : Spot Check of Patrons' Records</i>			
(Government of India, Ministry of Finance)			
To Receipts on account	Rs.	A.	P.
Liabilities	30,000	0 0 0	23,975
	19,481	4 9 0	16,374
	10,481	4 0 0	4,115
	40,481	4 0 0	5,016
<i>National Sample Survey, Planning of the Scheme</i>			
(Government of India, Ministry of Finance)			
To Grant	Rs.	A.	P.
Liabilities	20,000	0 0 0	13,583
	314	5 0 0	5,988
	20,314	5 0 0	742
	20,314	5 0 0	20,314

Examined and Found Correct  
P. V. SANKH & Co.  
Chartered Accountants

6, HASTINGS STREET, CALCUTTA.  
The 30th April, 1951.

# INDIAN STATISTICAL INSTITUTE

## Indian Statistical Institute : Revenue Accounts for the year ending 31 March, 1951

	Dr.	Cr.	
<b>National Sample Survey : Statistical Work etc. on Main Enquiry</b> (Government of India, Ministry of Finance)			
To Grant	Rs. A. P.		Rs. A. P.
Liabilities	2,40,000 0 0	By Salary and dearness allowance	1,21,363 13 0
	18 5 3	" Travelling expenses	6,379 5 6
		" House rent, stationery, stores, postage, printing and other contingencies	82,032 5 0
		" Health maintenance, cost of cards etc.	49,932 13 0
	Rs. 2,40,018 5 3		Rs. 2,40,018 5 3
<b>National Sample Survey : Exploratory Survey, Village Studies and Training etc.</b> (Government of India, Ministry of Finance)			
To Grant	2,40,000 0 0	By Salary and dearness allowance	1,52,011 1 0
		" Travelling expenses	32,425 8 3
		" House rent, stationery, stores, postage, printing and other contingencies etc.	55,991 15 0
		" Closing balance	288 7 0
	Rs. 2,40,000 0 0		Rs. 2,40,000 0 0
<b>National Sample Survey : West Bengal Combined Operations</b> (Government of India, Ministry of Finance)			
To Receipts out of the total grant of Rs. 8,90,000 from the Government of India, Ministry of Finance	7,68,000. 0 0	By Salary and dearness allowance	5,51,442 1 0
		" Travelling expenses	54,786 13 3
		" House rent, stationery, postage, printing and other contingencies etc.	1,36,485 3 0
		" Health maintenance, cost of cards etc.	10,492 0 0
		" Closing balance	10,813 14 0
	Rs. 7,58,000 0 0		Rs. 7,58,000 0 0

6, HARTING STREET, CALCUTTA,  
The 30th April 1951.

Examined and Found Correct  
and Accurate  
Chartered Accountants.

ANNUAL REPORT FOR 1960-51

Indian Statistical Institute : Revenue Accounts for the year ending 31 March, 1951

	Dr.		Cr.	
	<i>National Sample Survey: In West Bengal and Andaman</i>			
	(Government of India, Ministry of Finance)			
To Liabilities	Rs.	A.	P.	Rs.
.. .. .	25,757	7	0	.. .. .
	By Salary and dearness allowance	..	..	.. .. .
	.. Travelling expenses	..	..	.. .. .
	.. Stationery, stores, printing, postage and other contingencies etc.	..	..	.. .. .
	Rs.	25,757	7 0	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .
To Grant	<i>National Sample Survey: Technical Director</i>			
.. .. .	(Government of India, Ministry of Finance)			
.. .. .	.. .. .	1,00,000	0 0	.. .. .
	By Salary and dearness allowance	..	..	.. .. .
	.. Travelling expenses	..	..	.. .. .
	.. House rent, stationery, printing, postage and other contingencies	..	..	.. .. .
	Closing balance	..	..	.. .. .
	Rs.	1,00,000	0 0	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .
	<i>National Sample Survey: Work on behalf of the Central Directorate</i>			
	(Government of India, Ministry of Finance)			
To Liabilities	.. .. .	61,427	11 0	.. .. .
	(1) Printing and despatching N.S.S. schedules including cost of paper	..	..	.. .. .
	.. By Travelling expenses	..	..	.. .. .
	.. Stationery, paper & other contingencies	..	..	.. .. .
	Rs.	17,806	10 0	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .
	(2) Supplying Crop-cutting Equipment	..	..	.. .. .
	.. By Salary & allowance	..	..	.. .. .
	.. Crop-cutting equipment and other contingencies	..	..	.. .. .
	Rs.	8,884	5 0	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .
	(3) Map Collection	..	..	.. .. .
	.. By Salary & allowance	..	..	.. .. .
	.. Travelling expenses	..	..	.. .. .
	.. Stationery & other Contingencies etc.	..	..	.. .. .
	Rs.	6,685	11 9	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .
	Rs.	61,427	11 0	Rs.
	.. .. .	.. .. .	.. .. .	.. .. .

B. EASTINGS SECRETARY, CALCUTTA.  
7th 30th April, 1951.

Examined and Found Correct  
At Calcutta  
Chartered Accountants

**INDIAN STATISTICAL INSTITUTE**

**Indian Statistical Institute : Receipts and Payments Account for the Year ending 31 March, 1951**  
Statistical Workers' Provident Fund

RECEIPTS		PAYMENTS	
	Rs. A. P.		Rs. A. P.
To Opening balance	.. .. .	By Withdrawal of worker's own contribution ..	4,227 9 0
Cash at Imperial Bank	.. .. .	" Payment of interest to workers to be credited to their accounts	3,268 7 0
" Worker's own contribution to the Fund	.. .. .	" Payment of interest to worker's withdrawing their account	222 4 0
" Institute's contribution: Laboratory	.. .. .	" Loans outstanding with workers (net amount)	0,775 0 0
Field Branch	.. .. .	" Closing balance:	
	35,013 13 0	Government papers at cost ..	94,472 13 4
	2,036 4 0	Cash at Bank .. .. .	1,43,099 2 8
" Interest on Investment: Bank	.. .. .		
Institute	.. .. .		
	4,928 10 0		
" Interest received against loans given to workers	.. .. .		
	588 7 0		
	8,103 14 9		
	Rs. 2,42,005 4 0		2,42,005 4 0
		<i>Supervision Fee Fund</i>	
To Opening balance	.. .. .	By Amount spent towards reconstruction of Institute Buildings	42,000 0 0
	.. .. .		42,000 0 0

6, HASTING STREET, CALCUTTA.  
The 30th April 1951.  
Examined and Found Correct  
P. C. NATHAN,  
Chartered Accountants



## ANNUAL REPORT FOR 1950-51

### APPENDIX 1. LIST OF PAPERS PUBLISHED IN 1950-51

1. BARD, D. (1951): On the behaviour of the power of the best critical region for increasing sample size (Abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.
2. DAS, A. C. (1950): On some topographic models. *Science & Culture*, Vol. 16.
3. DAS, A. C. (1951): On certain minimax admissible estimates (Abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.
4. DAS, A. C. (1950): On the estimation of parameters in a recursive system (Abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.
5. GAYEN, A. K. (1950): The distribution of the variance-ratio in random samples of any size drawn from non-normal universes. *Biometrika*, Vol. 37, Parts 3 & 4.
6. GAYEN, A. K. (1950): Significance of difference between the means of two non-normal samples. *Biometrika*, Vol. 37, Parts 3 & 4.
7. GAYEN, A. K. (1951): On the theoretical distribution of the product-moment correlation in non-normal samples (Abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.
8. GROSS, A. (1950): A note on the marginal and the optimum size of holding in Bengal. *Sankhyā*, Vol. 10, Part 4.
9. MAHALANOBIS, P. C. (1950): Why Statistics? *Sankhyā*, Vol. 10, Part 3 (General President's address to the thirty-seventh session of the Ind. Sci. Cong. Poona, 1950).
10. MATHAI, A. (1951): On fitting correlograms to autoregressive and moving average series (Abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.
11. MUKHERJEE, P. (1950): Some suggestions regarding the Indian census questionnaire. *Sankhyā*, Vol. 10, Part 3.
12. MUKHERJEE, R. (1950): Family and economic structure in Brittany. *Rural Sociology*, Vol. 15.
13. MUKHERJEE, R. (1950): Communal tension in Uganda. *Man In India*, Vol. 30.
14. MUKHERJEE, R. (1951): A study on differences in physical development by socio-economic strata. *Sankhyā*, Vol. 11, Part 1.
15. RAO, C. R. (1950): A note on the distribution of  $D_{p-q}^2 - D_p^2$  and some computational aspects of  $D^2$ -statistic and discriminant function. *Sankhyā*, Vol. 10, Part 2.
16. RAO, C. R. (1950): Statistical inference applied to classificatory problems. *Sankhyā*, Vol. 10, Part 3.
17. RAO, C. R. (1950): A note on unbiased minimum variance estimates. *Bull. Cal. Stat. Assoc.*, No. 9.
18. RAO, C. R. (1950): On a class of arrangements. *Edin. Math. Proc.*, Vol. 8.
19. RAO, C. R. (1950): Methods of scoring linkage data giving the simultaneous segregation of three factors. *Heredity*, Vol. 4.
20. RAO, C. R. (1950): Sequential tests of null hypotheses. *Sankhyā*, Vol. 10, Part 4.
21. SEAL, K. C. (1951): On some extensions of the method of double sampling (abstract). *Proc. Thirty-eighth Ind. Sci. Cong.*, Part III.

### APPENDIX 2: LIST OF REPORTS SUBMITTED

1. *Crop Survey West Bengal, 1949-50.*
  - (a) Second progressive estimate of area under Rabi crops, 7 April 1950.
  - (b) Third " " " " area and yield of Rabi crops, 9 May 1950
  - (c) Detailed Tables showing the area and outturn of Rabi crops during 1949-50, 27 November 1950.
2. *Crop Survey, West Bengal, 1950-51.*
  - (a) First progressive estimate of area under Jute and Aus Parley by districts, 31 August 1950.
  - (b) Second progressive estimate of area under Jute and Aus, 4 October 1950.
  - (c) Table showing the estimated outturn of dry Jute fibre and Aus (lean rice), 14 November 1950.
  - (d) Third progressive estimate of area and outturn of Jute and Aus Crop based on entire data collected, 9 December 1950.
  - (e) First progressive estimate of area under Aman rice, 9 December 1950.
  - (f) Second progressive estimate of area sown and the outturn of Aman (lean rice) in the year 1950-51, 1 February 1951.
  - (g) Third progressive estimate of area sown and outturn of Aman (lean rice) in the year 1950-51, 7 February 1951.

## INDIAN STATISTICAL INSTITUTE

- (h) First progressive estimate of area under Rabi crops, 19 February 1951.
  - (i) Second progressive estimate of area under Barley and Gram crops, 10 March 1951.
  - (j) Second progressive estimate of area under other Rabi crops, 20 March 1951.
3. *Estimate of potato seed requirements.*
- (a) Table showing the quantity of potato seeds used in 1949-50 and the quantity of potato seeds required for the year 1950-51, 17 November 1950.
4. *Population Project (Y-slips).*
- (a) Means of Livelihood and Industries tables of independent and partly dependent person based on Y-sample for the state of West Bengal, 10 November 1950.
  - (b) Do. for the state of Assam, 23 November 1950.
  - (c) Do. for the state of Orissa, 13 December 1950.
  - (d) Do. for the states of Madras and Bihar, 27 March 1951.
  - (e) Standard sets of age-tables based on Y-sample of Madhya Pradesh, 25 April 1950.
  - (f) Do. of the Punjab (I), 16 June 1950.
  - (g) Do. of Bombay, 10 July 1950.
5. *Multipurpose National Sample Survey.*
- (a) A brief report on National Sample Survey was submitted to the Government of India, Ministry of Finance, 12 March 1951.
6. *Survey of Rural Indebtedness.*
- (a) Final Report on Rural Indebtedness Enquiry (1946-47) of West Bengal, 25 April 1950.
7. *Survey of Economic Condition of Agricultural Labour (1946-47).*
- (a) Final Report submitted, December 1950.

### APPENDIX 3. STATISTICIAN'S DIPLOMA EXAMINATION (Parts I & 2), 1950

#### Part I : Paper I

Forty-five candidates registered themselves of whom twenty-five appeared. The following seven candidates have been declared to have passed.

- |                       |                            |
|-----------------------|----------------------------|
| 1. MURTHI, H. RAMA    | 5. RAMACHANDRAN, C. S.     |
| 2. NARASINHAN, R. G.  | 6. VAMAN, GADAKARI HEMLATA |
| 3. PATIL, V. T.       | 7. VISWANATH, S.           |
| 4. PUNTAMBEKAR, V. J. |                            |

#### Part I : Paper II

Forty-two candidates registered themselves of whom twenty-five appeared. The following eleven candidates have been declared to have passed.

- |                        |                             |
|------------------------|-----------------------------|
| 1. DHAVLE, SHALINI     | 7. PHAIKE, D. N.            |
| 2. GOPALKRISHNA, C. G. | 8. RAMACHANDRAN, C. S.      |
| 3. MURTHI, H. RAMA     | 9. SONTAKKE, D. W.          |
| 4. NARASINHAN, R. G.   | 10. VAMAN, GADAKARI HEMLATA |
| 5. PATRAK, R. B.       | 11. VISWANATH, S.           |
| 6. PATIL, V. T.        |                             |

#### Part I : Papers III & IV

Thirty-two candidates registered themselves of whom twenty-eight appeared. The following eight candidates have been declared to have passed.

- |                        |                        |
|------------------------|------------------------|
| 1. DHAVLE, SHALINI     | 5. NARASINHAN, R. G.   |
| 2. GOPALKRISHNA, C. G. | 6. PRADHAN, K. RAMARAO |
| 3. HONWAD, V. S.       | 7. PUNTAMBEKAR, V. J.  |
| 4. MURTHI, H. RAMA     | 8. RAMACHANDRAN, C. S. |

## ANNUAL REPORT FOR 1960-61

### Part 2 : Paper I

Two candidates registered themselves and both of them appeared. None passed.

### Part 2 : Paper II

Two candidates registered themselves of whom only one candidate appeared but could not pass.

### Part 3 : Paper III

Two candidates registered themselves of whom the following candidate appeared and has been declared to have passed.

1. CHELLASWAMY, T.

## APPENDIX 4. COMPUTER'S CERTIFICATE EXAMINATION, 1960.

### Part 1A : Section 1

Eighty-three candidates registered themselves of whom seventy-eight appeared. The following thirty candidates have been declared to have passed.

- |                              |                              |
|------------------------------|------------------------------|
| 1. *BANERJEE, SUDHIR KUMAR   | 16. GUPTA, SUBIMAL           |
| 2. BANIK, SITANATH           | 17. KAPADIA, AMBALAL BAPULAL |
| 3. BASU, SUNIL RANJAN        | 18. KHANRAH, ADHIR CHANDRA   |
| 4. BHATTACHARYYA, NANIGOPAL  | 19. MITRA, SAMARENDRA NATH   |
| 5. BHATTACHARYYA, PHANIGOPAL | 20. NANDY, RASIKLAL          |
| 6. *BHATTACHARYYA, SITANBU   | 21. ROY, DULAL CHANDRA       |
| 7. *CHAKRAVARTI, ARUN KUMAR  | 22. ROY, MRINAL KANTI        |
| 8. CHAKRAVARTI, SABITA       | 23. SARKAR, AJAY KUMAR       |
| 9. *CHATTERJEE, RANJIT KUMAR | 24. SEN, KAMALA              |
| 10. CHOUDHURI, NIRMAL KUMAR  | 25. SENGUPTA, GAURANGA       |
| 11. CHOUDHURI, PRATUL        | 26. SENGUPTA, NIHAR RANJAN   |
| 12. DASGUPTA, BIRENDRA KUMAR | 27. SIL, JARODA NANDAN       |
| 13. DUTTA, GOUR BENODE       | 28. *SIL, MODHU MANGAL       |
| 14. DE, NITAI CHAND          | 29. SINHA, ARUN KUMAR        |
| 15. GUHA, AJAY KUMAR         | 30. BISWAS, ARUN KUMAR       |

\*denotes distinction

### Part 1A : Section II

Eighty-six candidates registered themselves of whom eighty appeared. The following ten candidates have been declared to have passed.

- |                              |                           |
|------------------------------|---------------------------|
| 1. ACHARYA, BANADA           | 6. GUHA, AJAY KUMAR       |
| 2. BHATTACHARYYA, NANIGOPAL  | 7. GUPTA, SUBIMAL         |
| 3. BHATTACHARYYA, PHANIGOPAL | 8. KHANRAH, ADHIR CHANDRA |
| 4. DEY, INDU BHUSAN          | 9. SIL, JARODA NANDAN     |
| 5. DUTTA, MAHENDRA NATH      | 10. SINHA, NIRMAL KUMAR   |

### Part 1B : Section I

Fifty-four candidates registered themselves of whom forty-six appeared. The following five candidates have been declared to have passed.

- |                             |                       |
|-----------------------------|-----------------------|
| 1. BANERJEE, ABHUTOSH       | 4. ROY, DULAL CHANDRA |
| 2. GHOSE, PROMODE RANJAN    | 5. ROY, RADHA RAMAN   |
| 3. DASGUPTA, BIRENDRA KUMAR |                       |

### Part 1B : Section II

Fifty-seven candidates registered themselves of whom fifty-one appeared. The following six candidates have been declared to have passed.

- |                           |                           |
|---------------------------|---------------------------|
| 1. CHAKRAVARTI, SABITA    | 4. MAJUMDAR, CRITTARANJAN |
| 2. GUHA, AJAY KUMAR       | 5. NANDY, BIRENDRA KUMAR  |
| 3. KHANRAH, ADHIR CHANDRA | 6. ROY, DULAL CHANDRA     |

# INDIAN STATISTICAL INSTITUTE

## Part IC: Section I

Thirty-eight candidates registered themselves of whom twenty eight appeared. The following three candidates have been declared to have passed.

- |                           |                           |
|---------------------------|---------------------------|
| 1. BHATTACHARYYA, GOPAL   | 3. MAJUMDAR, CHITTARANJAN |
| 2. CHAKRAVARTI, SABIKANTA |                           |

## Part IC: Section II

Thirty-six candidates registered themselves of whom twenty-six appeared. The following fourteen candidates have been declared to have passed.

- |                           |                              |
|---------------------------|------------------------------|
| 1. BASU, SANTOSH KUMAR    | 8. MUMKERJEE, DURGAPADA      |
| 2. BHATTACHARYYA, GOPAL   | 9. PALIT, SUDHAR KUMAR       |
| 3. BANERJEE, KALIPADA     | 10. PAUL, BHOLANATH          |
| 4. DAS, AMARENDRA NATH    | 11. RAY, NARESH CHANDRA      |
| 5. DAS, PRANABENDRU       | 12. SENGUPTA, ABANI KUMAR    |
| 6. GHOSE, PROMODE RANJAN  | 13. SENGUPTA, AMITAVA        |
| 7. MAJUMDAR, CHITTARANJAN | 14. SENGUPTA, PRABIR CHANDRA |

## APPENDIX 5. LIST OF OFFICERS-ON-DEPUTATION, 1960-51

1. DAS, S. C. (*Directorate of Public Instruction, Orissa*).
2. DUTT, S. (*State Statistical Bureau, Orissa*).
3. SASTRY, A. S. R. (*Economic Research Department, Hyderabad, Deccan*).

## APPENDIX 6. LIST OF TRAINEES WHO COMPLETED THE TWO YEARS' TRAINING COURSE IN MAY 1950

1. BRADURI, S. N. (*C.P.*), 2. JAMBUNATHAN, M. V. (*Mysore*), 3. KANAN, M. R. (*Madras*), 4. KRISHNAMACHARI, V. R. (*Madras*), 5. MATHUR, G. P. (*U.P.*), 6. RAJAGOPALAN, R. (*Madras*), 7. VENKATARAMAN, R. (*Madras*).

## APPENDIX 7. LIST OF TRAINEES, 1950-51

*First year class:* 1. BASU, E. (*West Bengal*), 2. CHACKO, K. GEORGE. (*Travancore-Cochin*), 3. CHATTERJEE, A. (*West Bengal*), 4. CHATURVEDI, G. N. (*U.P.*)\*, 5. DUTTA ROY, D. K. (*West Bengal*), 6. HABIBAHAN, K. (*Madras*), 7. JAI KRISHNA (*Delhi*)\*, 8. KRISHNAMURTY, D. V. R. (*Madras*), 9. KRISHNA CHANDRA (*U.P.*), 10. LAL, RAMA SHANKAR. (*U.P.*), 11. RAJHAVENDRA, V. K. (*Travancore*)\*, 12. RAJESWATHI MAJI, (*Bihar*)\*, 13. RAMASWAMY, G. (*Madras*), 14. ROY, D. (*West Bengal*), 15. SENGAR, G. S. (*Rajasthan*)\*, 16. VENKATARAMAN, M. V. (*Mysore State*).

*Second year class:* 1. DAB, S. N. (*Kashmir*), 2. DAS, S. C. (*Orissa*) 3. PANESAR, B. R. (*East Punjab*) 4. SARMA, D. V. N. (*Madras*), 5. SHARMA, G. I. (*Rajasthan*), 6. SINGH, M. (*East Punjab*), 7. SINGH, S. N. (*U.P.*), 8. SUBRAMANIAN, N. (*Madhya Pradesh*), 9. VERMA, S. K. (*Madhya Pradesh*).

\*discontinued

## APPENDIX 8. LIST OF TRAINEES IN THE INTERNATIONAL STATISTICAL EDUCATION CENTRE

1. U. HLA ETAW (*Burma*), 2. U. TIN SAW (*Burma*), 3. U. KYAW SEIK (*Burma*), 4. L. AH HEK (*Burma*), 5. NGUYEN CONG PHU (*Viet-nam*), 6. LK VAN PHUC (*Viet-Nam*), 7. Y. KITAGAWA (*Japan*), 8. M. A. SINDQUI (*Pakistan*), 9. Z. H. CHOUDHURY (*Pakistan*), 10. M. A. AYRIDI (*Pakistan*), 11. B. C. PRADHAN (*India*), 12. HABIBUR RAHAMAN (*Pakistan*), 13. ABDUL KARIM (*Pakistan*), 14. MD. MIHAT ALI (*Pakistan*), 15. A. FARUK (*Pakistan*), 16. T. AHMED (*Pakistan*), 17. G. SATYANARAYANA (*India*), 18. D. VIDYASAGAR RAO (*India*).