

INDIAN STATISTICAL INSTITUTE

ANNUAL REPORT

April 1955—March 1956

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TWENTYFOURTH ANNUAL REPORT : April 1955 — March 1956

PART 1 : CONSTITUTION AND ACTIVITIES OF THE INSTITUTE

1. The Indian Statistical Institute completed the twentyfourth year of its existence during the year under review (1 April 1955—31 March 1956). As we reach the quarter century mark of our institutional life we cannot help looking back at our modest beginnings. On 17 December 1931 the Institute was brought into being by a resolution of a public meeting held under the Chairmanship of the late Sir R. N. Mookerjee who became our first President (1932-1936). It was duly registered in April 1932 as a 'non-profit learned society' under Act XXI of 1860. The First Annual Report of the Institute revealed a paid staff of a single part-time worker and a total current expenditure of Rs. 238 only. Since then its activities have become more and more diverse and extensive.

2. Broadly speaking three successive stages may be distinguished in its development. During the first few years of its existence the Institute functioned more or less as a laboratory for analytic studies including the design of experiments, and also took up small scale enquiries on behalf of Government departments and private concerns. During the second stage the Institute carried out, on an increasing scale, crop estimation surveys on behalf of the Governments of Bengal and Bihar and developed the technique of large scale sample surveys for this purpose. Since 1950 the Institute has taken a leading part in organizing the National Sample Survey at the desire of the Government of India, and since 1954 is actively helping in the work of planning for national development. Two new units were established during the year under review, one called *Kalyanashree*, a production centre at head-quarters in Calcutta for the study of the economics of household handicrafts and industries under experimental conditions, and the other, the Industrial Management Research Unit for Planning (IMRUP) at Bangalore.

3. *Constitution and Administration*: The Institute consists of Ordinary, Life and Honorary Members; Associate Fellows, Fellows and Honorary Fellows. The supreme control including the power of making rules is vested in the members in General Meeting assembled. The President and Office-bearers are elected annually. The management is vested in the Council, the Governing Body of the Research and Training School, and other Committees elected from time to time. Work assigned by the Government of India is done in accordance with conditions settled by mutual agreement and in consultation with Government.

ACTIVITIES

4. The activities of the Institute cover a wide range and may be grouped under the following heads:

1) *Research and Training School (RTS)*: For research in theoretical and applied statistics with sections for a 3-year course of professional training at postgraduate level for candidates who have already taken their master's degree and other technical courses at various levels. It has three units for biometric, anthropometric and psychometric researches

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attached to it. During 1955-56 it received a grant of Rs. 7,26,000 from the Government of India for this purpose.

2) *Examinations:* Since 1938 the Institute has been awarding Statistician's Diplomas and Computer's Certificates. It has also arrangements for the award of Associateship and Associate Fellowship of the Institute on the basis of professional qualifications.

3) *Projects:* For statistical enquiries and investigations which are undertaken on the basis of ad-hoc grants. The biggest project the Institute has been handling since 1950 is the technical work of the National Sample Survey.

4) *Electronic Computers:* These activities cover both development and construction work in connection with electronic (analogue and digital) computers, desk and other types of calculating machines, precision measuring instruments and associated equipment. The Institute has an electronic laboratory and a well-equipped workshop. The Institute has, of late, been receiving electronic and other equipments from USSR through the United Nations.

5) *Statistical Quality Control (SQC):* Three whole-time SQC Units are maintained at Bangalore, Bombay and Calcutta which work under the guidance of a Policy Advisory Committee.

6) *Operational Research relating to Planning:* An Operational Research Unit (ORU) started work on a small scale at the end of 1953. In November 1954, Prime Minister Nehru inaugurated at the Institute studies relating to planning which led to the preparation of the Draft Plan-frame of March 1955. The Institute in association with the Central Statistical Organization, the Ministry of Finance and the Planning Commission, is continuing the work on perspective planning.

7) *General Services:* The Institute maintains common services in the form of a large Machine Tabulation Section and a specialized library with a Photographic Section. There is also an Estate Office to look after construction, repair and maintenance of buildings and water, drainage and electricity.

8) *Social Services:* The Institute offers various social services and amenities to its workers, students and guests such as medical welfare, hostels, guest houses for visitors, canteen, night school, transport service and workers' club for sports, recreation and cultural activities. An adult literacy drive has recently been launched among the workers of the Institute.

5. The following associated bodies were organized on the initiative of the Indian Statistical Institute and work in close relation with the Institute:

1) *International Statistical Education Centre:* This is an associated institution established in 1950 under the sponsorship of UNESCO and is being maintained under the joint control of the International Statistical Institute and the Indian Statistical Institute with the support of the Government of India.

2) *Statistical Publishing Society:* This Society was established in 1935 on the initiative of the Institute to undertake the publication of *Sankhyā*, the Indian Journal of Statistics as the official organ of the Institute. The Society has under its control the *Eks Press* which is well equipped for undertaking scientific and technical work of a high quality and is managed in close association with the Institute.

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3) *India Calculating Machine and Scientific Instruments Research Society*: This is a 'non-profit' society established on the initiative of the Institute and registered in 1943 under Act XXI of 1980 with the object of promoting research, study, production and use in India of calculating machines, statistical, mathematical, scientific and engineering instruments, apparatus and appliances of all kinds.

6. The Institute, of course, still functions as a learned society with *Sankhya*: The Indian Journal of Statistics, as its official organ and has society type branches at Aligarh, Bangalore, Bombay, Madras and Poona. Besides, it has today many other activities for which operating offices are maintained at Baranagar (Calcutta 35), at three places in the city of Calcutta, and at Bombay, Bangalore, Delhi and Giridih (Bihar). The staff increased to over 1400 workers in December 1955 and the annual expenditure went up to fifty-two lakhs of rupees in 1955-56.

7. The main offices of the Institute are at present located on the Institute's own land at 203 Barrackpore Trunk Road in a seven-storeyed building covering 62,400 sq.ft. of floor space. In addition about 30,000 sq. ft. of floor space is occupied by the Institute at 202 Barrackpore Trunk Road, acquired by the Government of India for the Institute's work. The Institute also uses about 50,000 sq.ft. of space in other premises in Baranagar and Calcutta. In Giridih, the Institute acquired about 35 acres of land for location of an experimental farm.

STATUS AND CONSTITUTION

8. The Indian Statistical Institute had started receiving grants from the Government of India in 1936; and practically since then the question of the stabilization of the Institute has been under consideration by the Central Government. Many different approaches have been explored for this purpose during the last twenty years. From time to time there were proposals from Government to take over the Institute, or to convert the Institute into a primarily educational and research institution. After several years of negotiations new rules were framed in 1950, at the desire of the Ministry of Education, in which the teaching activities were made the main function of the Institute under the control of a Governing Body with Government representatives. The new rules could not, however, be brought into effect owing to certain technical difficulties; and in 1951 the provision for the Governing Body was incorporated in the constitution in the form of regulations and the Council retained its status as the general co-ordinating agency.

9. In 1952 the Cabinet of the Government of India decided that the Institute should function as a focal centre for advanced studies and research in statistics in India; and since then extensive programmes of professional training have been developed jointly by the Institute and the Central Statistical Organization. In 1953 there was a proposal that the Institute should be converted into a University under a Central Act, but it was felt that there would be difficulties in preserving the operational and society type activities within the framework of a University. Since 1954 the Institute has been increasingly participating in studies relating to planning for national development. It was agreed that the Institute should retain its autonomous status but would be recognised by the Government of India as an institution of national importance. The rules of the Institute were substantially changed in April 1955.

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APPENDIX : HISTORICAL BACKGROUND

1. The beginnings of the Indian Statistical Institute were modest enough : a solitary computer working part-time and a total current expenditure of rather less than Rs. 250— that was all when it started in April, 1932. In September 1956, the Institute had on its roll 1674 regular workers who were backed by an annual budget allocation of Rs. 52,00,000. Impressive as these figures are, they convey little idea of the nature of the work that is being carried on by the Institute, its wide range, its complex character and the specialization at high scientific levels that is necessary for carrying out investigations that have an intimate bearing on the life of the nation.

2. A long period of preparatory activity, going back to the early years of the first world war, preceded the formal inauguration of the Institute. Prasanta Chandra Mahalanobis was back in India in 1915 on a short holiday after he had been awarded a senior scholarship of King's College, Cambridge, for research in Physics. Just before his departure from Cambridge, his tutor, W. H. Macaulay, had drawn his attention to the *Biometrika* and Karl Pearson's *Biometric Tables*, copies of which he brought with him to India and which he studied with much interest while waiting to return to Cambridge for his Physical researches. But he did not return to Cambridge. Accepting the post of a professor of Physics in the Presidency College, Calcutta, he decided to stay back in India and carry on his statistical studies alongside of his work as a teacher of Physics. In Calcutta, he came into intimate contact with the eminent scholar and philosopher, Brajendra Nath Seal, who had a full appreciation of the importance of modern statistical methods and encouraged Mahalanobis to take up this subject as his life's work.

3. Urged by the great savant, young Mahalanobis entered upon his statistical career with gusto. Not content to confine his interest in statistics to merely academic studies, he was soon applying statistical methods for the solution of problems in anthropometry, which led to the formulation of the Generalized Distance (D^2 -statistics). In meteorology, he found ample scope for trying out his now-found tool, enabling him to locate, at a height of about four kilometers above sea level, the region of highest control for changes in meteorological conditions on the surface of the earth; later, this result was confirmed by Franz Baur from physical considerations.

4. More far-reaching from the point of view of national welfare were the results of extensive investigations into rainfall and floods in North Bengal, Orissa, and West Bengal. These led not only to suggestions for really effective flood control but also supplied in later years some of the basic calculations for two great river valley schemes, namely, the Damodar Valley and the Hirakud Projects.

5. Meanwhile, Mahalanobis had gathered around him several part-time assistants and a group of young research workers to form the nucleus of the Statistical Laboratory which was located in the Presidency College, Calcutta. Amongst this pioneer band were Sudhir Kumar Banerjee, Subhendu Sekhar Bose, Nistaran Chakraburty and Jaladhar Sarma, the only one amongst the four who is still serving the Institute. Nistaran Chakraburty is now the Director of the West Bengal Statistical Bureau. Sudhir Kumar who became the Chief Computer and Subhendu Sekhar, who was the leading spirit amongst the workers of the Institute, have both been out off by untimely death in the prime of their careers. In them, the Institute has lost two of its most ardent pioneers.

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6. The Laboratory also had been gradually developing. By 1930 it owned about Rs. 25,000 worth of books, calculating machines and other equipment; and had undertaken some enquiries on behalf of the Government departments and private concerns. The first official recognition came in July 1931 with an annual grant of Rs. 2,500 from the Imperial (now Indian) Council of Agricultural Research for statistical investigations relating to agriculture.

7. The year 1931 marks another milestone in the progress of statistical organization in India. At a meeting convened by P. N. Banerjee (at that time the Minto Professor of Economics), N. R. Sen (Ghosh Professor of Applied Mathematics) and P. C. Mahalanobis (Professor of Physics, Presidency College) and held on 17 December 1931, with Sir Rajendra Nath Mookerjee in the Chair, a resolution was unanimously adopted to establish the Indian Statistical Institute. The constitution was approved at the end of February and the Institute was formally registered as a non-profit learned society in April 1932. Society type branches were established quite early in Mysore, Poona, Bombay, Madras, Lahore, Banaras, Lucknow and Delhi; and the Statistical Laboratory in Calcutta continued to function as the active nucleus of the Institute.

8. This was how the Indian Statistical Institute was formally organized. The first general grant for research and training came in 1935 in the shape of Rs. 5,000 a year from the Government of India. A big development occurred when the Institute took up in 1937 a five-year project, on an expanding scale, to develop a sampling method for estimating the acreage and out-turn of the jute crop in Bengal with the required accuracy at a reasonable cost. Since then, the Institute has been a foremost centre of sample surveys in the whole world. From this time, the larger part of the income of the Institute began to be derived as contract grants for applied projects and enquiries.

9. The training of officers deputed by Central and State Governments had started from 1932. In the earlier years such training was more or less on an individual basis; and over 150 individuals received such training at the Institute between 1932 and 1939. From 1939, the Indian Statistical Institute started organized courses of instructions and the training courses gradually developed into the present Research and Training School at a post-graduate level.

10. A scheme for examinations for the award of certificates for computers and diploma for statisticians was got ready in 1935. These examinations, which were started in April, 1938, served a real need, and have become quite popular and are held all over India every year.

11. To offer facilities for the publication of research papers in India, it was decided in 1933 to start *Sankhyā*; The Indian Journal of Statistics, as the official organ. On the initiative of the Council of the Institute, arrangements were also made to establish an associated non-profit institution, the Statistical Publishing Society to maintain the Eka Press and publish *Sankhyā*, which soon became a journal of international recognition.

12. The Indian Statistical Institute had been for some time pleading for a separate statistical section to the Indian Science Congress. Such efforts, however, did not bear any fruit and so in 1938 the Institute organized on its own the First Session of The Indian Statistical Conference which continued for several years. The Indian Science Congress agreed to start an independent section for Statistics from 1946.

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13. Ventures in research and project work along with promotional activities soon earned international recognition for the Institute and helped to enlist active association with it of distinguished foreign statisticians who came out to India to work and lecture in the Institute as visiting professors. The first to come was Professor (now Sir) Ronald A. Fisher, who paid his maiden visit in 1938, repeating it in 1945, 1951 and 1954. Other visits have followed and except for an unavoidable break during the Second World War, a stream of distinguished foreign scientists, statisticians as well as specialists in other fields of science, have responded to the invitation of the Institute to come here and work as research workers and guest lecturers.

14. The Institute has thus become a real international centre of research as well as a forum for scholars and scientists from all over the world to work and hold discussions. Mention may be made of a few amongst these distinguished visitors, such as, R. A. Fisher, J. B. S. Haldane, J. R. N. Stone, F. Yates of the UK; J. K. Galbraith, Harold Hotelling, W. Hurwitz, Simon Kuznets, Walter A. Shewhart, Abraham Wald, Norbert Wiener of the USA; D. D. Degtyar, V. A. Ditkin, Y. V. Linnik, I. Y. Pisarev, M. I. Rubinstein of the USSR; C. Bettelheim (France); Tosio Kitagawa and Motosaburo Masuyama (Japan); J. Tinbergen (Netherlands); Ragnar Frisch (Norway); Oskar Lange (Poland); H. Wold (Sweden) and Arthur Linder (Switzerland).

15. After some initial dislocations caused by the Second World War, the project side of the Institute developed rapidly, as a result of the increasing need of statistics by Government. The Sample Survey in Bengal was extended in 1943 to cover both the area sown and the total yield of jute, rice and other important agricultural crops throughout the year. The tabulation on the basis of the two per cent *Y*-sample of the 1941 Population Census started in 1944-45, and various other socio-economic surveys were undertaken.

16. The post-war years have witnessed a rapid expansion and many new developments. The question of stabilization of the Institute had been under consideration of the Government of India since 1938. Shri Chintaman Deshmukh, who has been the President of the Institute since 1945, helped in solving many difficulties; and it was mainly through his efforts that the Research and Training School was established with an initial recurring grant of Re. 4.5 lakhs from the Government of India from 1949-50. Administrative sponsorship of the Institute was transferred from the Ministry of Education to the Ministry of Finance in 1950, and to the Cabinet Secretariat of the Government of India in 1956. A Governing Body was established in 1952 to look after the affairs of the Research and Training School, subject to general co-ordination of the work of the Institute as a whole by the Council.

17. From about this time, the Indian Statistical Institute began to emerge as a national institution. From 1950, the Institute started working on a vast project, namely, the design and analysis of the data of the National Sampling Survey which is collecting comprehensive information relating to social, economic and demographic characteristics on a countrywide basis in the form of two "rounds" of survey every year covering both rural and urban areas. This is reputed to be the biggest sample survey of its kind in the world today.

18. In 1950, the Institute also helped to bring into being, in collaboration with the International Statistical Institute and under the sponsorship of the UNESCO, the International Statistical Education Centre, which is being maintained with the financial support of the Government of India. Since then, the ISEC in Calcutta has been providing statistical training to students from many Asian countries; about 202 trainees have come up to 1956.

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19. The work of the Institute began to receive increasing recognition both in India and abroad. Professor Mahalanobis was elected a Fellow of the Royal Society in 1945, and acted as the Chairman of the United Nations Sub-Commission on Statistical Sampling from 1947 to 1951; he has been a member of the UN Statistical Commission from 1946 and Chairman from 1954. Other workers of the Institute enjoy international reputation and some of the old members of the staff are working in other places in and outside India. The Institute acted as the host society to the International Statistical Conferences in India in 1951.

20. Since Professor Mahalanobis started working as Honorary Statistical Adviser to the Central Cabinet in 1949, the Institute is becoming more and more closely associated with the Central Statistical Organization (CSO) and other Government agencies in New Delhi. From 1952, the Institute is functioning as the focal centre for professional training and research and as a National Statistical and Computational Laboratory.

21. An associated non-profit institution for the development of calculating machines and scientific instruments had been established in 1943 with the approval of the Council of the Institute and a small workshop was started which, however, did not make much progress in the beginning. A small workshop was started in the Institute in 1950 for the repair and maintenance of desk calculating machines and other equipment a little later : and is now in operation. An electronic laboratory was started a little later where a small electronic analogue computer was designed and constructed in 1953. An electronic digital computer was purchased. In 1955, arrangements were made to secure a bigger digital computer and a large number of machine tools from the USSR, through the United Nations Technical Assistance Administration and further developments are in progress.

22. The Institute has been promoting the introduction of Statistical Quality Control for a long time; and had started the earliest courses in this subject in India in 1946-46. A separate SQC Section was established in 1953 which has whole-time units at present working at Bangalore, Bombay and Calcutta.

23. Still more significant were the developments in 1954. The Indian Statistical Institute was called upon by the Planning Commission to undertake, jointly with the CSO, work on national planning with a dual objective of solving the unemployment problem in 10 years and continuously increasing the national income as rapidly as possible. In November 1954 Prime Minister Nehru inaugurated in the Institute studies relating to planning for national development. This work was carried on with the active collaboration of the CSO, the Department of Economic Affairs (Ministry of Finance), and the Economic Division of the Planning Commission. Many of the foreign experts who came to the Institute also participated in the studies and discussions on planning.

24. On the basis of the above work, the "Draft Plan-Frame" was submitted to the Prime Minister in March 1955 and was accepted in May, 1955 by the National Development Council as the basis for the formulation of the Second Five Year Plan. The Institute thus became intimately connected with national planning in India.

25. The activities of the Institute are diverse and developments have occurred and are still occurring in many directions but there is a unity in its purpose. The Institute has been trying for twentyfive years to promote national development through the patient collection and analysis of statistical and technical information and their utilization for policy and administrative decisions in a scientific manner.

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PART 2. YEAR UNDER REVIEW : 1955-1956

1. RESEARCH AND TRAINING SCHOOL

1. The main activities of the Research and Training School fall under the three heads—(i) Research, (ii) Consultation and (iii) Training.

RESEARCH

2. Research has been conducted at various levels : (a) theoretical research on the foundations of probability and the logic of statistical inference, (b) applied research involving the development of statistical tools for application to specific problems, and (c) research in fields of application in which the approach is statistical.

3. *Research Seminars* : Besides the seminars regularly conducted by the Research and Training School for exchange of ideas among the staff, special courses of lectures on recent advances in mathematics and statistics were arranged. The first was a series of 60 lectures of Harmonic Analysis and Multiple Prediction Theory by Prof. Norbert Wiener of the Massachusetts Institute of Technology, USA. Twenty participants attended Prof. Wiener's seminars in response to the Institute's offer of financial assistance for this purpose to interested research workers all over India.

4. Continuing the seminar lectures started in 1954-1955 on some problems related to planning in India, Prof. P. C. Mahalanobis developed the basic statistical and computational problems involved in the formulation of a plan for economic development. He gave a four sector model for determining the investments in (1) producer goods, (2) factory production of consumer goods, (3) cottage industries and (4) services (health, education etc.) and explained its usefulness in solving the problems of planning in India to achieve the main targets : (a) liquidation of unemployment in 10 years, and (b) doubling of national income in 14 years.

5. *Theoretical Research* : The research work carried out in theoretical statistics by the staff and research scholars of the School has been on the following topics :—Design of Experiments, Tests of Hypotheses, Estimation Theory, Sample Surveys, Stochastic Processes, Distribution Problems, Mathematical Models for Economic Planning, Industrial Sampling, High-speed Computation, and Problems of Optimum Selection. About 35 research papers on these subjects have been prepared during the year. Some have already been published or are in the press, while others have been preliminary reports. A summary of research work done by the School is given in Appendix 9.

6. *Applied Research* : Work in applied research by the School was mainly undertaken by the Biometric, Anthropometric and Psychometric Units and members of the staff attending to scientific enquiries.

(i) *Biometric Unit* : This unit for applied research in biometry was started in April 1954 under the leadership of Dr. M. Masuyama who returned to Japan in August 1954. Professor J. B. S. Haldane, F.R.S. and Mrs. Haldane (Miss Helen Spurway) arrived in July 1954 and worked in the Biometric Unit for about two and a half months. The unit is now under the charge of Dr. B. C. Das who joined the Institute in October 1955. Besides Dr. Das, the Unit has six professional workers including a biochemist and a medical practitioner. A well-equipped laboratory has now been set up which possesses among other things,

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electrophoresis with scanning and other accessories, direct reading meter, magnum centrifuge, incubator, thermostatic bath, distilled water plant, air conditioner, microscopes etc. Some of the activities of the unit have been study of worm-activity on soil, experiments on fish culture, clinical and blood group tests, etc.

(ii) *Anthropometric Unit* : A good deal of anthropometric studies were carried out in the Institute in the early days by Professor Mahalanobis and later by Dr. C. R. Rao but there was no provision for systematic work. During the year, an Anthropometric Unit was started with two anthropologists who had been trained by Dr. D. N. Majumdar, Professor of Anthropology, Lucknow University and had been doing research for some considerable time under his guidance with the help of Institute research fellowships. This Unit is currently engaged in techniques of data collection such as of measurement, standardization of instruments, etc.

(iii) *Psychometric Unit* : This has been an year of rapid growth for the Psychometric Research and Service Unit established in 1954. The staff of the unit has increased from three to ten during this period. The unit's major activity was concerned with selection tests. A number of tests have been constructed, administered, scored, reported, and interpreted in connection with the selection of job-applicants, trainees, college students etc. Besides, some theoretical problems which arise in testing projects, like correction for 'guessing', validity coefficients for 'restriction of range' and its extension to 'two-stage' selection, etc., have been investigated. The Unit continues to edit the Psychometrics section of the 'Psychology News Bulletin', which reports work in progress or recently completed in India.

CONSULTATION

7. *Scientific enquiries* : Consultation has been open to all scientific workers in the country. Advice has been given to various enquiries on the planning of investigations and analysis and interpretation of data. The Research and Training School attended to a number of scientific enquiries from research workers in various fields, government departments and business firms. Some of the enquiries handled are listed in Appendix 5 and included such problems as (i) correlation between mental age and scores in arithmetic of secondary school students; (ii) analysis of manurial and varietal experiments on paddy; (iii) statistical analysis of the effect of a new drug on cholera; (iv) estimation of linkage between certain factors in paddy.

TRAINING

8. During the year under review there has been increased demand for training in statistics and considerable expansion in the training programmes of the School, both in the number of courses conducted and the number of trainees attending each course. The two-year advanced training course has been converted with effect from July 1955 into a three-year advanced theoretical-cum-professional course to meet the rapidly increasing demand all over the country for statisticians adequately trained in professional work in a large variety of jobs. A special training course in statistics of six or nine months' duration for officers deputed by the Central and State governments and recognised institutions was organized jointly with the Central Statistical Organization (CSO), New Delhi. A short-term evening course for statisticians has also been introduced to suit the convenience of persons who are already in employment and who intend to acquire knowledge of basic statistical methods for use in their actual work.

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9. The different courses of training that have been given during the year including the new courses mentioned above have been :

- (a) Three-year Statistician's Course,
- (b) Short-term Statistician's Course,
- (c) Officer's training (jointly with the CSO),
- (d) Officers on deputation,
- (e) Training for Computers.

In addition, training is also given at the International Statistical Education Centre.

10. *Advanced Studies* : Research scholarships were awarded to 12 students for carrying out work on subjects such as Advanced Probability, Stochastic Processes, Statistical Inference, Multivariate Analysis, Statistical Quality Control, Psychometry, Biometric Methods etc. (List in Appendix 11). During the year under review, three workers were admitted to the degree of Doctor of Philosophy of the Calcutta University and two others submitted theses for the same.

11. *Training courses* : (a) *Three-year statistician's course* : As already mentioned, the two-year statistician's course has been converted into a three-year course with effect from this year. This training is arranged in collaboration with the CSO, where the trainees spend from three to six months for training in official statistics. A special feature of the new course is that only highly qualified students i.e., those with at least a good Master's Degree are admitted; no tuition fee is charged and the trainees receive stipends ranging from Rs. 120 to Rs. 200 per month according to their performance. In May 1955, 16 students of the first-year class and 16 students of the second-year completed training. For the new sessions which started in June 1955, 47 students were admitted to the first-year and 20 students to second-year class.

(b) *Short-term statistician's course* : This new course has been arranged to suit persons already in employment, the classes being held in the evening. The course is generally non-mathematical in character with emphasis on the logic and proper use of statistical tools. During the year two courses were arranged with a total of 87 students.

(c) *Officer's course (jointly with CSO)* : This is also a new course, started in September 1955, for the purpose of training officers of the State and Central Governments and other recognized institutions, in different fields of application of statistics. During the year 19 officers took a six months' course, 10 of them continuing for an additional three months specialization course.

(d) *Officers on deputation* : During the year 6 officers were accepted for individual short duration training in different subjects. Besides, 20 other officers were deputed by various institutions to attend Prof. Wiener's seminars.

(e) *Computer's Training Course* : The computers' training course was started in 1951 for the benefit of those desiring to sit for the Computer's Certificate Examination of the Institute. There were two sessions during the year in which 87 candidates participated. [The list of trainees for the various courses is given in Appendix 10].

2. INTERNATIONAL STATISTICAL EDUCATION CENTRE

1. The associated institution, International Statistical Education Centre (ISEC), Calcutta, was opened in October 1950. This Centre is maintained jointly by the International Statistical Institute and the Indian Statistical Institute with the support of the UNESCO and the Government of India. The Centre provides courses of training in theoretical and applied statistics at various levels to trainees from countries of the Middle, South and Far East.

2. From the inception of the Centre upto April 1955, the Centre had conducted eight terms of training, of either six months' or nine months' duration. During these eight terms training was imparted to 191 participants, involving 237 'student terms', and representing 16 Asian countries (Afghanistan, Burma, Cambodia, Ceylon, India, Indonesia, Iran, Iraq, Japan, Malaya, Nepal, Pakistan, Philippines, Syria, Thailand and Vietnam).

3. The Eighth Term, with 24 students from 7 countries, an account of which was given in last year's annual report, closed in the middle of April 1955. The Ninth Term opened on 15 August 1955 and closed on 14 April 1956.

4. The number of trainees admitted to the Ninth Term was 11, distributed among 3 countries as follows : Philippines 3, Pakistan 3 and India 5. Besides these 11 trainees, two trainees from Iran who joined the Eighth Term stayed on for specialization courses till December 1955. Participation during this term was limited in contrast to the previous terms, owing chiefly to the delay in issuing the announcement for the term. Arrangements have been made for making the announcement sufficiently early for the Tenth Term to start in July 1956. Increased participation is expected during the Tenth Term.

5. *Instruction* : Training during the Ninth Term comprised lectures, laboratory work, assisted reading, seminar discussions, in-service training (both at the Indian Statistical Institute and at the Central Statistical Organization (New Delhi) and field work at Giridih, relating to Sample Surveys. The first 3 months of the term were devoted to theoretical work involving about 180 lectures and 350 hours of laboratory work. About three weeks were spent on field work at Giridih and another month on training in official statistics at the CSO. The remaining period had been set apart for training in statistical projects at the Indian Statistical Institute and for specialization courses. The bulk of the lectures were delivered by members of the staff of the Research and Training School. A number of statisticians from different ministries and departments of the Government of India delivered lectures during the training organized by the CSO at New Delhi.

6. *Visiting Professors* : A number of visiting professors arranged for by the International Statistical Institute or the Indian Statistical Institute, or deputed by the UN, and the specialized agencies of the UN have been associated with the instruction at the Centre. The visiting professors during the Ninth Term were Dr. M. Ziauddin (Pakistan), Dr. H. Lubell (USA), Mr. C. A. Links (Netherlands), Dr. P. V. Sukhatme (FAO), Mr. C. K. Dilwali (UN), Dr. W. R. Leonard (UN), Prof. John Maclean (Bombay), Dr. K. S. Banerjee (West Bengal), Dr. T. Podes (USA), and Dr. Q. M. Hussain (Pakistan).

7. The students of the ISEC also attended lectures and seminars given at the Indian Statistical Institute by various distinguished visiting scientists.

8. *Fellowships* : Out of Government of India's contributions to the Technical Co-operation scheme (Colombo Plan), a number of fellowships were being granted to the

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trainees of the Centre. During the first eight terms a total of 96 fellowship awards were made. In the Ninth Term six trainees were awarded fellowships.

9. *Certificates*: The 11 students of the Ninth Term who had satisfactorily completed the course received certificates of training at a function held on 5 April 1956.

10. *Student activities*: The ISEC students' association arranged excursions to places in Calcutta, Agra and Delhi. A Souvenir volume for the Ninth Term has been prepared.*

3. PROFESSIONAL EXAMINATIONS

1. *The Statistician's Diploma Examination of the Institute* was held once in August 1955 and again in March 1956 at Bombay, Calcutta, Delhi, Lucknow, Madras and Poona. In all 204 candidates registered for the examination in one or more papers of whom 133 appeared and 77 passed.

2. *The Computer's Certificate Examination* was also held two times during the year (August 1955 and February 1956) at Calcutta, Delhi, Girdih and Poona. 448 candidates registered, 402 appeared and 219 passed.

3. *The Statistical Field Survey Certificate Examinations* (Junior and Senior) were held in August 1955 and February 1956, at Bangalore, Calcutta, Delhi, Lucknow and Poona. 337 candidates registered, 249 appeared and 115 passed.

The names of successful candidates in the different examinations are given in Appendix 12.†

* *ISEC Tenth Term*: The term started on 16 July 1956 and would continue till April 1957. In response to the announcement of the tenth term, 38 applications were received from 8 countries; 30 candidates were admitted; and 29 students from eight countries had joined, the distribution being as follows: Burma-2, Ceylon-2, India-11, Japan-4, Pakistan-4, Philippines-2, Singapore-2, Thailand-2. Training during the term would comprise lectures, laboratory work and assisted reading in methodology, seminar discussions, in-service training at CSO and project work (including field work) at the Institute. An added feature of this term's training is the introduction of 'take-home' periodical tests, which give the students ample opportunities to discuss and understand the subjects better.

† The three examinations were also held in September 1956 at the above centres; 121 candidates registered and 92 appeared for the Statistician's Diploma Examination, 248 registered and 220 appeared for the Computer's Certificate Examination and 82 registered and 47 appeared for the Field Survey Certificate Examination.

4. PROJECT WORK

4.1. National Sample Survey and Associated Projects

1. The statistical work relating to the countrywide continuing National Sample Survey (NSS) has been the charge of the Institute since 1950-51 when the Survey was started. The Field Branch of the Survey has been under the direct control of the Ministry of Finance. except for a special survey unit under the Institute. By the beginning of the year under review, 8 rounds of the survey had already been completed. The 9th round of the survey was started and completed during the year under review, while the 10th round survey work was started and was still continuing at the end of March 1956. On the basis of the analysis of data collected during different rounds, various reports were prepared, and among these, the NSS Report No. 7 : Couple Fertility, and NSS Report No. 8 : Report on Preliminary Survey of Urban Unemployment, were published.

2. In January 1956 the NSS Statistical Section was reorganized into 3 functional units:—(a) Project, (b) Pilot and Research, (c) Special Unit. The functions allotted to the Project Unit were sample selection, preparation of schedules and instructions, clarification of technical points raised by field staff during the course of the survey, tabulation and preparation of summary of results, statistical analysis, drafting and submission of reports and project training. The Pilot and Research unit was charged with improvement of sample design and the assessment of the quality of material, exploring profitable lines of tabulation and analysis etc., and the functions of the Special Unit were project development studies.

3. In the 8th round of the survey the main emphasis was on land holdings with particular reference to operational holding, whereas in the 9th round, emphasis was shifted to collection of information on employment and unemployment. Over and above this, the usual enquiries relating to household consumer expenditure and productive enterprises of household, prices etc., were conducted. Another special feature of this round was collection of data on the small and household industries from households who reported *self-management* under the means of livelihood 'manufacture'.

4. The state of employment, on which special emphasis was laid in this round, was examined from different angles, namely, (a) usual features without particular reference to any short period or point of time, (b) specific features obtaining on a single day of reference, and (c) special features obtaining on each of the seven days of the week of reference.

5. Due to the above changes in the scope of the survey in this round, the sample size was increased but it was considered expedient to try to increase the sample size gradually so that the work of recruitment, training and management of the additional investigation staff as well as of the statistical work was kept within manageable limits. In actual fact there was no noticeable increase in the sample size in the rural sector but in the urban sector it was quite appreciable.

6. There was no substantial change in the scope of the survey conducted in the 10th round except that the collection of data on yields by direct observation by crop-cutting experiments was an additional feature. Emphasis was laid on collection of data on land utilization which included, besides, cultivation of crops, any type of use or non-use of a piece of land. Considerable attention was also given to the collection of data on employment. Questionnaire on village statistics was reintroduced in this round with some modi-

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tion with a view to getting a picture of rural life in the country in its various aspects, e.g. marketing facilities, proximity to important communication and administrative points, condition of roads and modes of conveyance, important local crops and sowing practices, educational facilities with their standards, sources of finance and the number of scholars and teachers, medical facilities etc.

7. A training conference in which the field supervising staff of the NSS received their instruction from the technical experts of the Institute as to how to collect the data properly on the schedules and in which the objects, scope and definition of terms used were explained, was held in the Institute premises from 18 to 28 April 1955 and again from 21 to 28 November 1955, the first one in connection with the 9th round of the survey and the second one for the 10th round of the survey.

8. The National Sample Survey primarily meant for estimates of national level was intensified within certain States for the purpose of increasing the reliability of the survey estimates on State levels. This was made possible by the States of UP, Bombay and Travancore-Cochin participating with NSS on the basis of identical coverage and number of sample units. The number of sample units was thus doubled in so far as these States were concerned.

9. An intensive training on the various aspects of project work including training in field survey work and mechanical tabulation was imparted to 19 officers deputed from the different States and the Centre, 11 trainees of the International Statistical Education Centre, and 18 second-year post-graduate students of the Indian Statistical Institute. The training was for an approximate period of 6 months.

10. *Sample survey of manufacturing industries* : As in the previous years, this survey was continuing during the year under review. The reference period of this survey was 1954; field work which commenced from the 1st week of October 1955 and was expected to continue up to the end of September 1956. The special feature of this round of survey was the inclusion of undertakings relating to certain industries included in schedule (1) of the Industries (Development and Regulation) Act of 1951.

4.2. Other Projects and Applied Studies

1. *Socio-Economic Surveys in Rural Areas, Girdih* : Apart from Family Budget Enquiry in Rural Areas which started in June, 1953 the following surveys were conducted during the year under review : Employment Survey, Nutrition Survey, and a survey of Bullock Utilization (Daily) in Rural Areas.

2. *Socio-Economic Surveys in Urban Areas, Girdih* : Family Budget and Employment Surveys were conducted during the period under review and figures of purchases made in workers' families were collected.

3. *Crop-cutting Experiments, Girdih* : Some designs of crop-cutting experiments were tried by the ISEC students and the Institute trainees during their stay at Girdih in November and December, 1955.

4. *Progressive Harvest Surveys, Girdih* : An experiment was conducted during November and December, 1955 with a total of 1125 samples cut in 5 plots.

5. *Field Trials and Precision Studies, Girdih* : Experiments on *Aus* and *Aman* paddy for studying the effect of different methods of sowing, inter-culture, different kinds

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of manures and fertilizers, different spacing and number of seedlings per hole etc., as also the effect of manures on the yield of different methods of plantation continued during the period.

6. *Data regarding rainfall and maximum and minimum temperatures, Giridih* : The collection of these data which had started in 1953 continued during the period under review.

7. *Special Demography, Health and Employment Surveys : (March, 1955 to October, 1955)* : A special Demography, Health and Employment Survey was conducted in 112 urban blocks and villages throughout the State of West Bengal.

8. *Harvest Survey (October, 1955-March, 1956)* : Harvest Survey on a new design with special treatment on the border plants was conducted on different crops. A study of consumption pattern was also attempted for the pre-harvest and post-harvest periods. This intensive study was made in 14 villages of all the districts of West Bengal.

9. *Enumeration of casualties due to cancer for a year in Calcutta* : This study started in August 1955 and it was found that there were about 800 casualties in a year due to cancer in Calcutta.

10. *Pilot Survey on production and utilization of cattle dung* : A short pilot survey was taken up to study production and utilisation of cattle dung in 3 villages of 3 police stations of 24-Parganas, West Bengal.

5. ELECTRONIC COMPUTERS

1. Preparatory work for the building up of a well-equipped modern electronic laboratory has been going on for the last three or four years. There was some significant progress this year. An Electronic Computer HEC-2M was purchased from the UK, and valuable electronic equipment also began to be received from the USSR through the United Nations. Two members of the staff, Shri S. K. Mitra and Shri D. S. Kamat were deputed to the USSR in September 1955 by the UNTAA on a special fellowship, to make a technical report on the electronic computer which the USSR Government had offered to the Institute through the UNTAA. They visited Moscow, Penza and other places, where they saw factories and technological institutes concerned with computing machinery. Shri Mohimohan Mookerji and Shri Amarach Roy also completed their training in the British Tabulating Machines Works at Letchworth, and visited different computing machine laboratories in Europe and returned to India early in 1956.

2. The Hollerith Electronic Computer HEC-2M, was received in February, 1956. The Machine has been installed in an air-conditioned room situated on the ground floor of the Institute building at 203, Barrackpore Trunk Road, and was ready for operation by the end of March, 1956. The Research and Training School of the Institute has many problems to be solved on the machine. Requests have been received from several scientific institutions in India for assistance in computational problems. Efforts are also being made to use this machine for certain classes of data-processing work of the Project Division.

3. A good number of Soviet electronic instruments obtained through the UNTAA have also been received and included six Q-meters and six impulse generators of a very high quality. The remaining items in the list of electronic instruments and the punched card machines to be received from USSR are already on the way. An electronic computer, called the "URAL", much larger in capacity and with greater flexibility than the HEC-2M machine, is expected to be received by the end of 1956.

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4. Attempts are being made to organize a computing centre for the benefit of scientific institutions in India. Some service is already being rendered. A problem for preparing a table of values of an improper, convergent integral was received from the Indian Institute of Technology, Kharagpur at the end of 1955, and was solved partly by an electronic calculator. Other problems have been received from the Indian Association for the Cultivation of Science, Calcutta, and from the Indian Institute of Science, Bangalore, which are now being run on the HEC-2M machine.

5. The Analogue Linear Equation Solving Machine, designed and constructed in the Institute in 1953 was reassembled with improvements to achieve greater accuracy. Two electronic Random Number Generators designed, on a new principle, have been constructed and successfully operated.

6. The plan of work on the development of an electronic digital computer, which had begun early in 1954, was modified during the course of the year in view of the availability or near availability of machines like the HEC-2M and URAL. The earlier work on a magnetic drum device and associated auxiliary equipment is being incorporated into the design of faster switching and selector circuits.

7. Dr. Clarence Ross, a computing machine specialist in USA spent a few days in the laboratory in November 1955 and had discussions with the staff about programming methods. Messrs. Konoplev and Sychev, engineers, arrived from the USSR in January 1956, to install the punched card machines from the USSR.

8. A number of tape recording machines, speech amplifiers, projectors and other electronic instruments were maintained and repaired by the laboratory as usual. Two speech amplifiers were constructed for the Delhi and Giridih offices of the Institute during the year.

6. STATISTICAL QUALITY CONTROL

1. Three SQC Units were in operation during the year at Bombay (started in 1953) and at Bangalore and Calcutta (started in 1954). The activities of these SQC Units cover (a) installation and maintenance of SQC in factories, (b) training for SQC, and (c) promotion of SQC. Service, which is partly subsidized, is given to member firms on a fee basis. At the end of March 1956 there were 32 firm members on the roll.

2. *SQC Policy Advisory Committee:* The SQC Policy Advisory Committee which had been set up in 1954 with Shri C. D. Deshmukh as Chairman and Shri K. C. Neogy (*Planning Commission*), Sir Shri Ram, Shri Kasturbhai Lalbhai, Dr. S. S. Bhatnagar (*Director, Council of Scientific and Industrial Research*), Dr. Lal C. Varman (*Director, Indian Standards Institute*), Shri H. H. Keil, Shri M. G. Kotibhaaskar, Shri S. C. Jain and Professor P. C. Mahalanobis as members and Shri Pitambar Pant as Secretary had one meeting on 7 September 1955. The Committee suffered a great loss in the death of Dr. S. S. Bhatnagar. The Committee requested Professor P. C. Mahalanobis to prepare a scheme designed to meet the growing requirements of trained SQC statisticians in the country. The Committee was of the view that the existing scheme of contribution from industry should be continued for the present. The members thought that it would be very useful if the SQC Units could collect material for the assessment of gains arising from the use of SQC and associated methods.

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3. The Committee expressed satisfaction at the decision of the Ministry of Defence to set up a Statistical Quality Control Unit for the Ordnance Factories which would be guided in policy matters by the SQC Policy Advisory Committee.

4. The Committee decided to invite Dr. Thacker, (who had succeeded Dr. Bhatnagar as Director, CSIR) and Shri G. D. Somani, M.P. to join the SQC Policy Advisory Committee.

5. *SQC Unit, Bombay*: The Bombay Unit which was started under Dr. (Miss) S. P. Vaswani in December 1953, made good progress during the period under review. She was assisted by a team of 4 technical officers and a staff of 7. Recently the Unit has been allotted 4000 sq. ft. of space in a new building on Dinshaw Wacha Road. At the end of last year, 9 factories were enrolled as annual members of the Unit. During this year 5 more firms got enrolled and 5 other applications are on the waiting list pending expansion of the Unit.

6. A five-day course in SQC for industrial management was organized by the Unit in Bombay in October, 1955. Admission to this course was restricted to managing directors, managing agents, technical directors and managers of mills and factories. The course was attended by 43 participants from 27 factories including 8 out-station participants from Ahmednagar, Hathras, Sholapur, Ratlam, Sidhpur, Moradabad and Ellichpur. This was followed by a 2-month training course for technicians; 54 trainees including 6 from outside Bombay, nominated by 30 factories representing textiles, automobiles, engineering, cycles, iron and steel, ordnance, oil, matches and silk industries were admitted to the course. In-factory training for inspectors, operative and setters were also organized in member mills yielding good results. Also, seven apprentices and four officers deputed by institutions were given training with the SQC Unit. Lectures, talks and discussions were also organized at various institutions and promotional work was done and studies made in several factories. Visits were also paid to 6 factories on request from management.

7. *SQC Unit, Bangalore*: Shri R. Natarajan was the Administrative Officer of the Unit till the middle of September, 1955; and was succeeded by Shri A. K. Ghose, ICS, Managing Director, Bharat Electronics Ltd., Mr. T. Hanada, SQC expert from Japan, worked with the Bangalore Unit from December, 1955 till the end of March, 1956. There were, on 31 March 1956, 10 establishments on the roll as members of the Unit.

8. A number of lectures and talks and discussions were arranged by the Unit at institutions and societies concerned with industry. Some talks were also arranged in co-operation with the Quality Control Association, Bangalore, and papers were submitted by the Unit for discussion at the Chemical & Textile Standards Convention of the Indian Standards Institute held at Bombay from 9th to 15th January, 1956.

9. At the meeting of the Advisory Panel of the Unit held on 7th and 8th May, 1955, in Bangalore, Prof. S. K. Ekambaram gave a talk on "SQC in Industry" and Messrs. E. H. Osman and A. R. Frederick of the US Technical Co-operation Mission to India spoke on "The Role of Standards in Quality Control", and "Managerial Prerequisites of Quality Control" respectively. Practical demonstration of SQC methods and techniques were given by the Unit staff from materials brought from the production lines in factories. Visits to 19 factories and mills were undertaken by the staff of the Unit and guidance in technical work was given.

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10. A 10-Day course was conducted between 9th and 19th May, 1955 in Bangalore by the Quality Control Association in which the Unit staff fully participated. A second similar course for managers and supervisors was held in Coimbatore from 19th to 29th December, 1955 by the Unit. This was attended by 26 candidates from textile, rubber, textile-machinery, engineering and other industries.

11. *SQC Unit, Calcutta*: The Calcutta Unit which had been established in September 1954 got into stride during the year under review. The staff consisted of 6 technical assistants and 2 others at the end of March 1956. The Unit was fortunate in having technical guidance from Messrs. G. Taguchi, and T. Hanada from Japan and Mr. D. J. Desmond from the United Kingdom. Mr. Taguchi, who was associated with the Unit from the beginning returned to Japan in the middle of August 1955. Mr. Hanada worked with the Unit from April to December 1955. Mr. Desmond, whose services had been made available by the Government of UK under the Colombo Plan, was in charge of the Unit for the rest of the period under review.

12. The Unit started its regular service to industry in April 1955 with three factories as members. By 31 March, 1956, 5 more firms had joined, bringing the total number of members to 8. The Unit arranged for two courses for training factory-technicians in SQC methods. A course of lectures on Design of Experiments was given by Mr. Taguchi to the technicians of the Indian Aluminium Co. Ltd., Belur, in April 1955. An intensive course of ten working afternoons, was organized from 17 to 31 May, 1956 for the SQC technicians of the member factories. Facilities were also provided by the Unit for practical training in SQC for officers from outside.

7. WORK ON PLANNING FOR NATIONAL DEVELOPMENT

7.1. Economic Planning

1. A small Operational Research Unit (ORU) for planning was established early in 1954, and work was started on a small scale. Prime Minister Jawaharlal Nehru inaugurated studies on planning for national development in the Institute on 3 November 1954. Work on planning was then organized on a large scale and culminated in the preparation (by collaboration between the Institute, the Central Statistical Organization, the Ministry of Finance and the Planning Commission) of the Draft Plan-frame of March 1955. This was accepted by the National Development Council (which consists of the Central Cabinet, the Planning Commission and the Chief Ministers of all the states of India) as the basis for the formulation of the Second Five Year Plan of India.

2. In September 1955 it was decided by Government that the technical and statistical work on the Second Plan in the Institute should continue and greater attention should be paid to perspective planning and more especially to statistical work in this connexion. It was further agreed that in order to facilitate this work the operational research unit (ORU) in the Institute should continue on an expanded scale in close collaboration with the Central Statistical Organization, the Ministry of Finance, and the Planning Commission. In accordance with the above decisions by Government, the staff for work on planning was expanded and an economic wing was set up in the Institute in the last quarter of the financial year 1955-56. Since then work on planning in the Institute has been continuing in both Calcutta and Delhi and is organized in several broad groups.

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3. One section was engaged in studies on methodological aspects of long-term planning. Professor Charles Bettelheim of Paris, who came to the Institute in October 1955 with an assignment under the United Nations, was actively associated with this work. The general approach in this section is to assess physical requirements and available resources; and to work out plans for various periods with the help of input coefficients and technological constants. Work was also started on transport requirements, and on the coal industry in all its aspects.

4. Another section continued the study of inter-industry relations which had been started in 1954 on the lines of Leontief's work. A table of inter-industrial transactions for 1951-52 was completed which distinguished between 34 broad groups of activities, and showed the utilization of the product of each activity in the form of input into one or more of the other activities as well as in private and public consumption, capital formation and export. The construction of another table of transactions for 1953-54 was in progress. Analytic studies had also been started on estimating levels of activity appropriate to any assigned target of final demand; and on forecasting the final demand in 1953-54 on the basis of the coefficients of 1951-52 for purposes of comparison.

5. A third group was engaged on economic studies of a more general nature covering such topics as problems of differential excise duties, interaction between the monetized and the non-monetized sectors of the economy, labour productivity in Indian manufacturing industries, capital-output ratios, monopoly concentration in Indian industries, concepts of national income appropriate to underdeveloped countries etc. A report on a special survey of the Chittaranjan township was in progress.

6. In Delhi the Institute staff worked in close collaboration with the Central Statistical Organization (CSO) and undertook a number of special studies among which may be mentioned the problems of financing the Second Five Year Plan, and the statistical relationship between changes in national income and changes in the production of basic commodities like steel, coal, electricity and cement in the UK, USA and the USSR.

7. Besides studies on planning, the Planning Division collaborated with the National Sample Survey for the framing of a pilot schedule for the agricultural labour enquiry and the price schedule of the eleventh round of the NSS.

8. The work on planning greatly benefited from discussions with foreign scientists who gave lectures and participated in seminar work in the Institute. Special mention may be made in this connexion of Professors, Paul Baran (USA), V. Dychenko (USSR), Charles Bettelheim (France), J. K. Galbraith (USA), Onkar Lange (Poland), J. A. Links (Netherlands), The Rt. Hon'ble John Strachey, M. P. (UK), J. Tinbergen (Netherlands). Professor Norbert Wiener (USA) set out in a seminar lecture the theoretical considerations involved in work on planning. Dr. Frank Yates (UK) gave some preliminary considerations to agricultural planning.

9. Dr. Nicholas Kaldor of the University of Cambridge, UK, came to India at the invitation of the Indian Statistical Institute. By special arrangement he worked for nearly three months in the Ministry of Finance in New Delhi and prepared an important Report on Indian Tax Reform. He also gave lectures and had discussions in Delhi and Calcutta.

10. *Working Papers on Planning*: A series of working papers on planning, which had begun to be issued from November 1954, were continued and 22 Working Papers were released during the year under report. A list is given in Appendix 9.

7.2. Kalyanashree

A new unit called *Kalyanashree* was started in Calcutta on 28 February, 1956 to collect statistics and study the economics of small-scale household industries and handicrafts. The Institute has supplied accommodation and some equipment and also provides staff for the statistical and economic studies. The actual work in the unit is organized on an entirely self-supporting basis and current expenses are met from sales of production. Extracts from the speech delivered by Professor P. C. Mahalanobis at the opening ceremony are given below.

"1. I shall try to explain very briefly the purpose which we have in view in starting this new unit. There are no immediate prospects of our being able to get rid of unemployment exclusively through modern industrial developments. We must, of course, develop modern industries as fast as we can; but it would take a number of years, 5, 10, 15 or even 20 years before we can solve the problem of unemployment in the way it was solved in highly industrialized countries of the world. In this situation, as we have large resources of raw materials, our thinking in India is turning to the possibility of using our idle hands to increase production in the country as much as possible. Such production, we are aware, would not be immediately as efficient as production with the help of modern machinery driven by power. But it is not merely the production per hour or per person which is important—it is the total production in the country which matters; and, therefore, in India we are thinking seriously of activating the unexploited resources which are not being utilized at present; and the biggest pool of such resources is, of course, the idle hands. Therefore, we are eager to know what are the possibilities of increasing production in household enterprises.

"2. In this situation, in our own Institute, we are thinking of making a thorough study of the problem through partly controlled laboratory-type experimentation and also through field studies. As a first step, we are establishing this small centre for traditional handicrafts where those who have no employment would come and would be given tools and raw materials with which they would produce what they can. And we shall give a guarantee to purchase what they would produce. We shall, most of all, draw upon skills which are already there but are not being used. We would also supplement this, to some extent, by giving training to the unemployed (many of whom would be refugees). The aim would be to help them to earn their living as quickly as possible.

"3. * * * Our statisticians, our economists, and our technologists and scientists would use this centre as a laboratory to study what would be the output, what would be the cost, and what would be the effort needed to organize the work and so on.

"4. This is the first step. It is our hope that very soon the work would be extended to some of the households in our neighbourhood. We shall try to supply raw materials, perhaps also some small tools to people who will work in their own homes—that would be our second step. We may then extend the study wider. We may take a group of 4 or 5 villages about 3 or 4 miles away but still within easy reach so that contact can be maintained; and we shall supply raw materials or tools and try to increase production in the village enterprises. This would be the third step. We have also a fourth step in view, namely, to establish a small independent centre with perhaps one worker or may be with two for a group of 8 or 10 or even 20 villages. In these villages efforts would be made to increase production by using idle hands and skills which are already there.

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"5. At the same time, our economists and statisticians would study the effect of an increase of production and income. It will be the task of the National Sample Survey, the Special Technical Unit, and the Planning Division, to find out how the unemployed are living before they start work in our centres. Our survey staff will go to their home and find out what is their income, what they are now eating, and how they are living. When they begin to work in our centre and their income goes up, we shall try to find out how that additional income is being spent, and what are the new demands. This we hope to do not only in the indoor centre but in the outdoor unit; and, later on, also in the village unit. This, we hope, will throw some light on the question of what would be the new demands which would be created by the new purchasing power.

"6. There is a third aspect which also we are keeping in mind, namely, the evaluation of the product at market prices, and also in relation to what should be considered some kind of a living wage. That is, we want to find out to what extent subsidies would be required and what would be the amount of such subsidies, to enable the products being sold in the market; of course, we may find that in certain lines no subsidies are needed. We shall also try to learn something about the marketing aspect of the problem. Finally, we are keeping in mind the need for improving the tools for household enterprises.

"7. *** In our household enterprises in which we have a tradition of welfare wedded to beauty—the name which has been selected for the new centre gives expression to this idea—*Kalyana* may be, in a general way, translated as "welfare", and *Shree* is "beauty and grace". It is a great tradition of India to look upon production not merely from the aspect of value but also from the aspect of welfare and the aspect of beauty. Therefore, I think *Kalyanashree* which is welfare and beauty wedded together is an appropriate name for the new unit."

7.3. Industrial Management Research Unit for Planning (IMRUP)

The Council of the Institute approved in March 1956 a scheme for the setting up of another special unit with headquarters at Bangalore to study the problems of industrial management in both the public and private sectors. Two experienced engineers of senior standing, Dr. Bhola D. Panth and Shri D. P. Basu, started preliminary work in consultation with another senior engineer, Shri R. Nataraajan who joined the new Unit in the Institute a little later in May 1956.*

* The work of the IMRUP began with a preliminary Symposium on "Organization and Management of Public Enterprises" held in Bangalore on 17 and 18 April 1956 which was inaugurated by S. C. Sen, Joint Secretary of the Institute, and was attended by R. Nataraajan as Chairman, and D. P. Basu (Director, IMRUP; Director ACBI Ltd.), M. N. Dastur (Industrial Consultant, Managing Director, M.N. Dastur & Co Ltd.), D. J. Desmond (Advisor on SQC under the Colombo Plan), J. K. Galbraith (Professor, Harvard University, USA), A. K. Ghosh (Managing Director, Bharat Electronics Ltd.), P. K. Gopalakrishnan (Research Associate, IMRUP), S. S. Khors (Secretary, Ministry of Production), K. B. Madhava (Actuarial Consultant), M. K. Mathulla (Managing Director, Hindusthan Machine Tools Ltd.), K. Narayanaravany (Director of Industry & Commerce, Mysore State), Pitambar Pant (Secretary to the Chairman, Planning Commission), Bhola D. Panth (Director, IMRUP), T. Shamanna (Vice-Chairman, Mysore Iron & Steel Works Limited), J. M. Shrinagesh (Managing Director, Hindusthan Aircrafts Ltd.), the Rt. Hon'ble John Strachey, (Member, British Parliament), and P. C. Suri (Director, Public Management Studies, Planning Commission). The proceedings of the Conference have been circulated separately.

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8. SERVICE UNITS

8.1. Machine Tabulation Unit

1. The Machine Tabulation Unit was responsible primarily for (1) preparation, (2) processing and (3) storing of punched cards relating to statistical work of National Sample Survey and allied projects undertaken by the Institute. This Service Unit accommodated also special types of calculation work of the research workers of the Institute. In the year 1954-55 the size of the Machine Tabulation Section doubled at Baranagar and this necessitated, early in 1955-56, experienced workers from other organizations to be requisitioned to meet up the personnel deficiency. By the latter part of the year a new tabulating unit started functioning at Delhi. An experienced senior worker from Baranagar was sent to Delhi to organize the tabulation unit there solely for NSR work. The strength of tabulation equipment at Baranagar, Giridih and Delhi, as they were in December 1955 and in March 1956 are given in Appendix 7.

2. The rapid expansion of this Section created a number of problems of which scarcity of trained operators was the foremost. A batch of young college boys were recruited and trained in punched card system. At the end of training 11 candidates turned out successful and were absorbed as machine operators at Baranagar.

8.2. Library

1. The Central Library was located at Baranagar with service branches at the City Office at 9/B, Esplanade East, Calcutta, and at the Giridih Branch of the Institute.

2. The Library acquired 2717 volumes of books and received 1190 periodicals and annuals against 1945 volumes of books and 1126 periodicals and annuals last year. The total number of books, journals and other materials issued was 38,055 against 23,033 last year.

3. Amongst the various services rendered by the Library may be mentioned (1) Bibliographical Services, (2) Circulating Library, (3) News Clippings—a new unit started in June 1955 for systematic processing and indexing of relevant material relating to statistics and planning in India, and (4) Translation: letters, articles, books in other foreign languages specially in French and Russian were translated into English.

4. The Records Unit under the Library Service functioned as usual, classifying and indexing files, maintaining and preserving schedules, working papers and reports relating to surveys and projects carried out in the Institute, processing and shelving through serial sorting and numbering cadastral survey maps of the districts of West Bengal and the State maps of the Indian Union. [Some further details are given in Appendix 8].

8.3. Workshops

1. The workshops of the Institute began to function on an expanded scale during the year. The development sector was responsible for the repair, maintenance and development work of the Electronic Computer section and catered for other research needs. It made considerable progress in improving the proto-type desk calculating machine which was designed in 1954-55 and repaired 871 desk calculators of different types. A number of additional equipment were installed in this sector during the year

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which made it necessary to expand the floor space from about 1000 sq. feet to nearly 4000 sq. feet. The number of workers also increased from 19 to 37.

2. The general sector of the workshop, which had 12 workers including some highly skilled mechanics, looked after the general requirements of the Institute. It constructed one heavy duty handpress (capacity 40 tons), one grinding machine, one blade grinder and several other small tools. This sector manufactured 250 pieces of crop-cutting apparatus and six sets of SQC models with improvements devised in the workshops. It also executed a large number of maintenance jobs.

3. The project for securing machine tools from the USSR through the United Nations Technical Assistance Administration materialized during the year with the arrival of the first consignments of Soviet machine tools. Some of these machine tools are being installed in the workshops.

9. SOCIAL AND WELFARE SECTION

1. *Health Home*: The foundation stone of the Health Home for workers was laid by Dr. Satyasakha Maitra, F.R.C. S. at Giridih on 26 December 1955; and the Home was formally opened by Dr. F. Yates, F.R.S., on 5 March 1956. Professor P. C. Mahalanobis presided over the opening ceremony at which Mr. E. A. Rowse, Shri C. V. Narasimhan, (Joint Secretary, Ministry of Finance) and Shri N. S. Pandey (Deputy Secretary) were present among the guests. The Health Home was built on land received as a gift from Sm. Nirmal Kumari Mahalanobis with an initial donation of Rs. 6150/- received from the delegation of Soviet scientists in 1954-55.

2. *Medical Welfare Unit*: The Medical Unit at headquarters, under the charge of Dr. R. Maitra, M. B., has made steady progress and is at present housed in an independent building with a well-equipped dispensary, a reception room for patients, an examination room, an isolation room and two single-seated sick rooms.

The benefits of the Unit cover the workers and their families and include free treatment at the attached dispensary, calls at Workers' and Officers' residences by the medical officers at the subsidized rate of one rupee and eight annas per call, and prescriptions supplied on a cost basis.

The total number of cases treated during the year under report was 8,819 against 7,440 during 1954-55. The Medical Officer attended 830 calls at workers' residences, the corresponding figure for the previous year being 740. Medical consultations, minor surgical treatment and injections etc., totalled 757 against 688 in the preceding year. In all 9,079 prescriptions were served by the Unit Dispensary, the corresponding number for the previous year being 7,214. Medicine worth Rs. 10,332 was supplied to workers during the year; the cost on this account during the previous year was Rs. 7,877 only.

Six-monthly inoculations against typhoid and cholera and yearly vaccination against small pox were given as usual to the entire Institute staff at Headquarters and City offices. The benefit of the anti-malarial measures, which was so far confined to the Institute workers only, has been extended to cover the entire Field staff. The Medical Unit also looked after the sanitation of the Institute campus, including hostels and other residential quarters with the active co-operation of the Estate Office. The Medical Unit has started a preliminary statistical study on health conditions of Institute workers.

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In the Branch Medical Unit at Giridih under the care of Dr. N. K. Das, M.B., 2073 prescriptions were served and the Medical Officer attended 377 calls from the workers' families. Although there is no regular Unit attached to the ISI Office at New Delhi there exists an arrangement for medical aid to the workers and guests. The services of Dr. B. Saha, M.B. are available to the guests and workers as and when required.

3. *Night School and Adult Literacy Drive*: At the beginning of the Session the Night School had 40 students on its roll. Two new teachers were appointed and a School Committee of 4 members has been formed. The School now has some permanent accommodation and some essential equipment has been obtained.

As a part of the ensuing 25th Anniversary Celebrations a drive against illiteracy has been launched among the workers of the Institute. Fiftyone students have already been enrolled and judging by the progress already made it is expected that all of them will become literate before the Anniversary celebrations in December 1956.

4. *Workers' Club*: During the year under review the Club at Baranagar made substantial progress in every sphere of its activities. The membership registered a further increase and stood at about 600 at the close of the year.

The Sports and Games Section of the Club arranged inter-section football and volleyball tournaments. Competitions in badminton, chess, cards (auction bridge) and table tennis were organized during the year. The fourth annual sports meeting was held in January 1956.

The Social and Cultural Section organized debates, film shows and an exhibition of photographs by Shri B. K. Sinha which was the first of its kind in our Institute. A large number of members participated in recitation competition arranged by the Club and a steamer trip was organized in February 1956. The third annual number of 'Lekhan', the annual literary organ of the Club, won wide appreciation and several issues of a wall paper came out during the year. On the occasion of the fourth social gathering and prize distribution ceremony held in March, 1956, the Club staged "Natun Prabhat" by Shri Manoj Bose.

The Club undertook successfully the formation of a Workers' Co-operative Credit Society. The ISI Workers' Tuberculosis Bed Fund sponsored by the Club was also started with an initial sum of Rs. 3,000/- earned by the voluntary service rendered by a large number of Club members in connection with the field work of the "Workers' Consumption Expenditure Survey" undertaken by the Planning Division of the Institute.

5. *Public Relations Work*: The growing public interest in our Institute has been reflected in an increasing flow of visitors. During the first 3 months of 1956 no less than 150 distinguished visitors came to the Institute. A Reception Room attended by a receptionist was set up in January, 1956. A brochure, explaining the work of the Institute, has also been published.

6. *"Samvadadhvam"*: It had been felt for a long time that it would be a good idea to have a house journal that would serve as a link between the different departments of the Institute and provide a common medium for exchange of information and ideas between the entire body of its workers. Plans for bringing out such a journal were taken in hand during the year and the first issue came out under the title "Samvadadhvam" (taken from a Vedic text which means "united we speak"). It is hoped that the journal will fulfil its purpose by fostering a sense of solidarity among the workers.

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7. *Canteen*: Besides the routine serving of meals and refreshments to the workers, the canteen undertook the catering arrangements for several tea and luncheon parties.

8. *Salboni Club*: The Salboni Club at Giridih celebrated the Bengali New Year's Day, the Republic Day, 'Barsha Mangal' and the Anniversary of the Foundation Day of the Institute. It held social functions on different occasions such as the opening of the Club's present premises, inauguration of the Health Home, and reception to the ISEC trainees and RTS students. The Club provided facilities for indoor and outdoor games, staged a play, held an annual sports meeting, and organized tournaments. It also organized for its members a sight seeing and educational tour to the DVC area. The Club raised a fund of Rs. 138/8/- to provide medical relief to an ex-worker.

10. EXTERNAL ACTIVITIES

1. Professor P. C. Mahalanobis (accompanied by Mrs. Mahalanobis) and Dr. C. R. Rao attended the biennial session of the International Statistical Institute held in Rio de Janeiro, Brazil, from 24 June to 2 July 1955. Dr. C. R. Rao also attended the Biometric Conference at Campinas, Brazil, in the same month. Professor and Mrs. Mahalanobis visited New York and London on their way back.

2. Professor Mahalanobis attended the meetings of the Working Group of Experts on Family Living Studies in the International Labour Organization (ILO : Geneva, September 1955); Study Group on the Measurement of Levels of Health of the World Health Organization (WHO : Geneva, October 1955).

3. Shri Samar Kumar Mitra and Shri D. S. Kamat visited the USSR in September-October 1955 for discussions on electronic computers.

4. Shri Ajit Das Gupta and Shri Ranjan Som attended the first meeting of the Working Party of the Economic Development and Planning held under the auspices of the ECAFE at Bangkok from 31 October to 12 November 1955 and also attended a seminar on Population Studies held in Bandung in November 1955.

5. Professor Mahalanobis presided over the Third Pakistan Statistical Conference at Lahore in February 1956.

6. Shri Debabrata Lahiri attended the Fourth Regional Conference of Statisticians organized by Economic Commission for Asia and the Far East at Bangkok from 26 March to 6 April 1956.

7. Dr. C. R. Rao attended by invitation the Third All Union Mathematical Conference held in Moscow from 24 June to 5 July 1956.

8. Shri S. Chatterjee, Dr. E. Harper, Shri S. Mitra, Dr. Des Raj, Shri S. P. Sangal Shri Sushil Kumar and Shri T. K. Sen attended the Agra Session of the Indian Science Congress in January 1956.

9. Dr. Shib K. Mitra attended the Third All-India Seminar on Educational and Vocational Guidance held at Baroda in February 1956.

10. Dr. C. R. Rao, Dr. G. Kallianpur, Dr. A. Matthai and Dr. Des Raj served as members of the Board of Studies and also on the Board of Examiners of different universities.

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11. VISITING PROFESSORS

As in previous years the Institute was fortunate in having a number of distinguished scientists as visitors from France, Israel, Japan, Netherlands, Norway, Pakistan, Poland, Sweden, the UK, the USA and the USSR.

The following scientists came to India at the invitation of the Institute and worked here for several months.

1. PROFESSOR PAUL A. BARAN, *Stanford University, USA* (December 1955 to February 1956). Lectures : (i) National Income Concepts and Computations and (ii) Theory of Imperialism Reconsidered. Discussions on Planning.
2. PROFESSOR CHARLES BETTELHEIM, *University of Paris, France* (Through United Nations : October 1955 to August 1956). Research on Economic Planning.
3. PROFESSOR J. K. GALBRAITH, *Harvard University, USA* (February to April 1956). Lectures : Strategy of Inflation Control. Discussions on planning. Paper: "Economic Planning in India : Five Comments".
4. DR. ARTHUR GEDDEN, *University of Edinburgh, UK* (September 1955 to January 1956). Lecture : Traversing India a geographer uses Economic Statistics. Discussions on the use of NSS data for geographical purposes.
5. DR. Q. M. HUSSAIN, *University of Dacca, Pakistan, (ISEC : September 1955 to February 1956)*. Lecture : On Design of Experiments.
6. PROFESSOR OSKAR LANGE, *Rector, Institute of Statistics and Planning, Warsaw, Poland* (January to May 1956). Lectures : (i) Organization and Working of Socialist Economy. (ii) Theory of programming. Discussions on planning.
7. DR. J. A. LINKS, *Central Planning Bureau, Netherlands* (ISEC : September 1955 to February 1956). Lectures and research on planning.
8. MR. H. LUBELL, *Falk Project for Research, Israel* (ISEC : September to October 1956). Lectures on International Accounts, Studies on analysis of consumer expenditure.
9. DR. NICHOLAS KALDOR, *Cambridge University, UK* (January to April 1956). Prepared report on "Indian Tax Reform" (published by the Government of India). Also lectures on Indian taxation.
10. PROFESSOR S. N. ROY, *University of North Carolina, USA* (February to April 1956). Lectures on "Statistical analysis" with seminar discussions on mathematical statistics.
11. THE RT. HON'BLE JOHN STRACHEY, M.P., *UK* (February to April 1956) : Lecture : Contemporary Capitalism and the Under-developed Areas: Discussions on planning.
12. PROFESSOR A. S. SOBOL'EV, *Academy of Sciences, USSR* (January 1956) : Lecture : Closure theorems of an algorithm in solving integral equations.
13. DR. G. TAGUCHI, *the Institute of Tele-communication, Tokyo, Japan* (September 1954 to August 1955) : Consultation work in Statistical Quality Control.
14. DR. DANIEL THORNER, *the Institute of Oriental Studies, Philadelphia, USA* (November to December 1955) : Lectures on Agrarian problems in India.
15. DR. J. TINBERGEN, *Planning Bureau, Netherlands* (January to February 1956). Lectures and discussions on Econometric models in planning.
16. PROFESSOR NORBERT WIENER, *Massachusetts Institute of Technology, USA* (September 1955 to April 1956). A course of 60 lectures on (i) Harmonic analysis, (ii) Ergodic theorems, (iii) Prediction problems, single and multiple with seminar discussions.
17. PROFESSOR S. S. WILKS, *University of Princeton, USA* (March to April 1956). Lectures on (i) Ordered statistics, (ii) Variance components, (iii) Government statistics in the USA, with discussions.

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18. DR. FRANK YATES, *Rothamsted Experimental Station, UK* (March to April 1956). Lectures : (i) Programming problems, (ii) Long term experiments with discussions.
19. DR. M. ZIA-UD-DIN, *University of Punjab, Pakistan* (ISEC : August to September 1956). Lectures : (i) Statistical methods, (ii) Symmetric functions.

FOREIGN LECTURERS

A number of foreign scientists visited the Institute for short periods and kindly gave lectures and had discussions in the Institute.

1. DR. MAROUS BAOM, *University of Iowa, USA* (February 1956). Lecture : Mahatma Gandhi & Albert Schweitzer : Links between East and West.
2. MR. C. K. DILWALI, *UN Statistical Office, New York* (January 1956). Lecture : UN Statistical data processing.
3. PROFESSOR V. P. DYACHENKO, *Corresponding Member of the Academy of Sciences, USSR, Institute of Economics, Moscow* (January 1956). Lecture : Organization of Economic Research in the USSR with discussions.
4. DR. J. DOWNTIE, *UK* (August 1955). Lecture : Competition theory and its relation to Macro-economics.
5. DR. ERLAND V. HOFSTEN, *Chief of the Statistical Division of the Social Welfare Board, Sweden* (November 1955). Lectures : (i) Household enquiries, (ii) Some new problems in Index numbers.
6. DR. GUNNAR MYRDAL, *Executive Secretary, Economic Commission of Europe, Geneva* (January 1956).
7. PROFESSOR EDWARD NAROEWSKI, *Poland* (March 1956). Lecture : Problems of measures.
8. DR. TITUS PODEA, *Economic Consultant, New York, USA* (February 1956). Lectures : Planning in USA.
9. PROFESSOR S. M. TUAN and S. CHENG, *China*, Lecture : Some mathematical problems.
10. PROFESSOR S. KRITSKY, *USSR* (January 1956). Lecture : Problems in river research.
11. DR. P. K. WHELPTON, *Director of Scripps Foundation for Research in Population Problems, USA* (January 1956) Lecture : Fertility analysis.

INDIAN LECTURERS

We are also grateful to a number of Indian colleagues who gave lectures in the Institute. A list is given below.

1. DR. K. S. BANERJEE (*Deputy Director, State Statistical Bureau, West Bengal*) : Lectures on Constructions of Cost of Living Index Numbers.
2. MR. K. C. CHERIAN (*Agricultural Credit Department, Reserve Bank of India, Bombay*) : Lectures on Rural Credit Surveys.
3. PROFESSOR V. M. DANDEKAR (*Gokhale Institute of Politics and Economics, Poona*) : Lecture on Fundamental concepts in Fisher's theory of estimation.
4. MR. C. R. B. MENON (*Director General of Commercial Intelligence and Statistics, Government of India*) : Lectures on Statistics of trade and industry.
5. PROFESSOR J. MAOLWAN (*formerly of Wilson College, Bombay*) : Lectures on Problems in Mathematics.
6. DR. G. B. RAO (*Deputy Director of Commercial Intelligence and Statistics, Government of India*) : Lectures on Statistics of trade and industry.
7. DR. K. S. RAO (*University of Bombay*) : Lectures on Econometric problems.

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12, GENERAL ADMINISTRATION

1. *Membership*: The position of membership of the Institute during the year under review was as follows:

	new members enrolled during the year	total number at the end of the year
Ordinary members	33	146
Sessional members	nil	9
Student members	6	21
Life members	1	48

2. *Honorary Members*: On the recommendation of the Council the following were elected Honorary Life Members:

Shri Chintaman D. Deahmukh who has been helping the Institute as its President since 1945.

Dr. Satya Churn Law, M. A., B. L., Ph. D., who has been holding the Office of Treasurer since 1936.

Professor K. B. Madhava, A. I. A., who helped in the preparatory work which led to the foundation of the Institute in 1931 and has been associated with its work since then in many capacities.

Sm. Nirmal Kumari Mahalanobis who has been actively helping the Institute since its foundation.

Dr. H. C. Sinha, M. Sc., Ph. D., who had helped in the preparatory work leading to the foundation of the Institute in 1931 and gave effective help as Joint Secretary in the earlier years.

3. *Council*: Names of the members of the Council are given in Appendix 1. The Council held nine meetings during the year. Among the important matters considered by the Council may be mentioned the Rules of the General Provident Fund of the Institute and the Staff Insurance Scheme (20 April 1955); establishment of the Industrial Management Research Unit (20 March 1956); and changes in the Rules of the Institute (24 March 1956).

4. *Governing Body*: The Governing Body of the Research and Training School met at Baranagar on 13 August 1955 with Sir D. N. Mitra in the Chair. The Finance Committee of the Governing Body also met on the same day at Baranagar. (Names of the members of the Governing Body the Finance Committee and other Committees set up by the Council are given in Appendices 2 and 3).

5. *Headquarters*: During the year under review an area of 18,000 sq. ft. was built upon in addition to the existing floor space of 44,000 sq. ft. in the main building at 203, Barrack-pore Trunk Road. Moreover, to meet the demand for more space for project work an increased floor space of 25,000 sq. ft. was made available by erecting asbestos sheds. The carpentry and smithy attached to the Headquarters met, during the year under review, the whole requirement of furniture and Hollerith Cabinets for Baranagar, Giridih and Calcutta offices.

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6. *Calcutta City Office:* The Calcutta Unit of Statistical Quality Control which was established in September 1954 had its office at 9B, Esplanade; this office was also used for general administration work and for meetings and lectures of the Institute. Other offices were located at 294/1, Upper Circular Road, Calcutta-9 and 210, Cornwallis Street, Calcutta-6

7. *Giridih Office:* During the year under review development work on land progressed satisfactorily. A survey of the entire land was carried out, and a contour map was prepared. A Health Home was opened in February 1956 (further details in Section 9). The students of the professional training course and ISEC trainees went to Giridih for field experiments and training and various experiments and surveys were organized there. (Further details in Section 4.2.)

8. *Delhi Office:* The office at Delhi continued to function at 8, King George Avenue as a link between the Institute and the Central Statistical Organization, the Planning Commission, the Department of Economic Affairs and other departments of the Ministry of Finance and other Ministries.

9. *Bombay Office:* The Bombay Office helped the Branch in the work of ninth and tenth rounds of National Sample Survey in Bombay city as also in conducting Statistician's Diploma Examinations and organizing a series of lectures, the details of which are given under section 13.1. The report of activities of the Statistical Quality Control Unit at Bombay is given under Section 6.

10. *Bangalore Office:* The Bangalore Office helped in the work of two pilot sample surveys, the details of which are given under Section 13.2. The report of activities of Statistical Quality Control Unit at Bangalore is given under Section 6.

11. *Field Branch:* The Field Branch of the Institute had a staff of 161 workers on 31 March, 1956. During the year under review, series of short-term experimental surveys were taken up along with NSS work. Among such surveys may be mentioned enquiries relating to demography, health and employment, harvest crops, casualties due to cancer year in Calcutta, and a pilot survey to study the production and utilization of cattle dung in selected villages etc.

12. *Distribution of staff at different centres:* The following table shows the distribution of workers at Baranagar, Calcutta, Giridih, Delhi, Bombay and Bangalore as on 31 March 1956 as compared with the figures at the end of the previous year. Figures are also shown for the Field Branch maintained under the direct control of the Institute for sample surveys and special enquiries.

centre	general workers		subordinate staff		total	
	1955	1956	1955	1956	1955	1956
Calcutta Headquarters	548	756	161	290	709	1046
Calcutta City	26	9	8	9	34	18
Giridih	70	100	18	29	88	129
Delhi	6	28	3	5	9	33
Bombay SQC	7	10	3	1	10	11
Bangalore SQC	8	8	1	1	9	9
IMRUP (Bangalore)	nil	1	nil	nil	nil	1
Statistical	685	912	192	336	877	1247
Field Branch	120	132	38	41	158	173
total	785	1044	230	376	1015	1420

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13. *Changes in Staff:* Some of the senior workers who joined the Institute during the year are mentioned below together with the respective joining date and, within brackets, the name of the Division: Shri Satyasankar Sengupta, 1 May 1955 (*Planning Division*), Dr. Shib Kumar Mitra, 12 July 1955 (*Psychometric Unit*), Shri Sidhartha Banerjee, 19 September 1955 (*Organization and Methods Unit*), Dr. B. C. Das, 20 October 1955 (*Biometric Research Unit*), Dr. Rhea Das, 20 October 1955 (*Psychometric Unit*), Professor Panchanan Chakravorty, December 1955 (*Planning Division*), Shri Mohanlal Ganguli, 2 January 1956 (*National Sample Survey*), Dr. Bholu D. Panth, 3 January 1956 (*Industrial Management Research Unit for Planning*), Professor P. Sarbadhikari, 9 January 1956 (*Planning Division*), Shri Ajit Kumar Biswas, 15 March 1956 (*Planning Division*).

Shri S. B. Sen who had gone on leave in May 1954 to take up an assignment under UNTAA Programme in the Philippines returned and rejoined the Institute to work on a part-time basis from 28 November 1955. Dr. Sujit Kumar Mitra who had been away for about two years as a research assistant at the University of North Carolina, joined the Institute on 20 August 1956.

The following persons left the Institute during the year: Dr. P. B. Patnaik left in September 1955 to join the Central Statistical Organizations. Dr. G. Kallianpur was given leave to take up some work in collaboration with Professor Norbert Wiener and left for USA in May 1956. Shri Ravi Kumar left in January 1956 to join the Directorate General, Ordnance Factories as statistician. Shri Ananta Pandey left in February 1956 to join the University of Lucknow.

14. *Cost Accounts Section:* This Section was, as usual, mainly concerned with evaluating output for various operational items in terms of equivalent standard hours for all primary workers, and also for all jobs undertaken by the Projects Division. The system of incentive bonus was in operation in the form of prizes for efficient performance. The Board of Standards continued to function and held 12 meetings in which reasonable levels of output rates for 238 items of work were fixed.

15. *Sankhyā: The Indian Journal of Statistics:* During the year under review four issues of *Sankhyā* were published comprising Parts 3 and 4 of volume 15 and Parts 1 and 2 of volume 16, and containing between them 21 papers including technical papers besides several important contributions on the Second Five Year Plan of India. The demand for the journal is steadily increasing and a number of new subscribers have been enrolled.

13. BRANCHES

13.1. Bombay Branch

1. The Bombay Branch, in addition to its local activities, undertook many items of work on behalf of the parent Institute. (Names of office-bearers are given in Appendix 4).

2. *Sample Surveys:* The Branch carried out the field work of the ninth round of the National Sample Survey in Bombay City from May to November 1955. The field work for the tenth round was in progress. Analysis of data on small scale industrial establishments in the City collected last year was also in progress. The Branch published the report on the enquiry into economic conditions of middle class families in Bombay city conducted in 1950.

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3. *Quality Control*: The staff of the Board of Management for Quality Control continued to work in close cooperation with the SQC Unit, Bombay. Regular visits to factories were paid by members of the Board. Apprentices of the Board helped the SQC Unit in the collection and analysis of the data from member factories.

4. *Institute Examinations*: The Statistician's Diploma Examination was conducted at the Bombay centre in August 1955 and in March 1956. Fourteen candidates appeared for the examination in August 1955 and eleven in March 1956.

5. The Branch arranged a series of lectures during the year. Among the lecturers were Shri V. P. Godambe and Prof. Oskar Lange. The Branch also received guests like Dr. Arthur Geddes, Prof. Oskar Lange, Prof. P. A. Baran, Dr. J. Links, Prof. E. A. Rowse, Mr. D. J. Desmond, Prof. J. K. Galbraith and Prof. S. S. Wilks.

13.2. Mysore State Branch

1. *Membership*: As on 31 March, 1956 there were 22 ordinary members, 3 sessional members and 2 life members bringing the total membership of the Branch to 27. The Second Annual General Body meeting of the Branch was held on 27 May 1955. (Names of members of the Executive Committee in Appendix 4).

2. *Statistical Surveys*: A pilot sample survey on 'the spread of labour and their mode of transport in industries in Bangalore at Hindusthan Aircraft Ltd.," was completed in March 1956. Another pilot sample survey on "consumers' demand for products of cottage industries in Mysore city" was also completed during this period. A scheme was drawn up for a survey on 'job satisfaction among workers in industrial concerns in Bangalore".

3. *Visiting experts, lectures and seminars*: Among the visitors to the Branch who delivered lectures were Prof. P. C. Mahalanobis, Mr. G. Taguchi, Dr. A. Geddes, Prof. Norbert Wiener, Mr. E. A. Rowse, Prof. Oskar Lange, Prof. P. Baran and Prof. H. C. Ghosh.

13.3. Aligarh Branch

1. The Aligarh Branch was inaugurated by Dr. Zakir Hussain, Vice-Chancellor of the Muslim University, Aligarh, on October 6, 1955 with Dr. Hussain as President, and Prof. D. P. Mukherjee of the Economics Department and Prof. S. M. Shah of Mathematics and Statistics Department as Vice-Presidents. (Names of office bearers are given in Appendix 4).

2. The Branch undertook the study of two important problems, viz., agricultural underemployment and potential development of cottage industries. A preliminary survey of village Sarsoi, 2 miles away from Aligarh, was carried out with the main purpose of studying the generation of rural incomes. The summary of results was sent to the Central Statistical Organization, Government of India. A detailed survey of village Faridpur was carried out for studying different aspects of rural economy. The survey extended from 13 March to 14 April, 1956. A report was prepared on the basis of the data collected and was submitted to the Indian Statistical Institute, Calcutta.

Indian Statistical Institute : Receipts and Payments Account

	<i>To Receipts</i>			
	Rs.	As. P.	Rs.	As. P.
1. Opening Balance : Cash in hand and at Banks ..	25,098	15 1		
Unadjusted suspense of 1954-55 ..	73,002	11 11		
			98,999	11 0
2. Membership subscription			3,537	4 0
3. Training fees			4,090	0 0
4. Examination fees and other receipts			32,390	9 0
5. S.Q.C. membership and training fee including service charges			76,639	2 0
6. Block grants from the Government of India, Ministry of Finance for—				
i) Research, Training & General Purposes ..	7,26,000	0 0		
ii) International Statistical Education Centre ..			85,400	0 0
iii) Statistical Quality Control Units			1,36,700	0 0
iv) Electronic Laboratory & Computing Machines Sector			1,15,000	0 0
v) Economic wing			1,50,000	0 0
vi) Operational Research Sector			2,00,000	0 0
vii) Multipurpose National Sample Surveys			38,38,700	0 0
viii) Employment Surveys (Planning Commission's restricted programme)			17,600	0 0
			52,29,400	0 0
7. Development grant received from Government of India, Ministry of Finance in lieu of Supervision fees ..			2,50,000	0 0
8. Funds received from Government of India, Ministry of Finance for disbursement to the trainees at ISEC selected as follows under the Technical Cooperation Scheme, Colombo Plan			16,170	0 0
9. Arrear dues for work in earlier years from :				
i) Government of India, Ministry of Home Affairs for United Nations & Government of India joint population studies at Mysore			68,000	0 0
ii) Government of India, Ministry of Finance for Employment Surveys integrated with NSS 9th Round			30,000	0 0
iii) Government of India, Ministry of Finance for Planning Commission's restricted programme on Employment Surveys			1,100	0 0
			99,100	0 0
10. Refund received through Government of India on account of excess amount paid during 1954-55 through the Indian Embassy, United States of America for preparation of a duplicate set of punched cards relating to Industrial Statistics			708	15 0
11. Receipts from other sources for small items of work :				
a) F.A.O. Rome			2,381	0 0
b) University of Michigan			1,419	0 0
			3,800	0 0
12. Miscellaneous receipts :				
a) Donations & contributions			5,264	0 0
b) Sale proceeds of waste paper, cards etc. ..			2,143	1 3
			7,407	1 3
13. Deposit accounts			5,514	5 3
14. Outstanding liabilities for goods & services ..			1,48,884	6 8
			59,76,641	6 0

6, HASTINGS STREET, CALCUTTA,
The 1st October, 1956.

(current expenditure) for the year ending 31st March 1956

	By Payments		Rs.	As. P.	Rs.	As. P.
	Rs.	As. P.				
1. Salary, dearness allowance, honorarium etc.	25,46,556	15 9				
Employer's contribution to workers' Provident Fund	95,259	6 0			26,41,816	5 9
2. Travelling allowances					1,30,183	3 6
3. Overtime allowances					19,826	3 0
4. Contribution to leave salary fund					1,45,000	0 0
5. Visiting Professors, Fellows, Foreign experts & scientists etc. (SQC & ORU sectors)	1,36,445	5 9				
Research & Training sector (Transfer to fund account)	45,000	0 0			1,81,445	5 9
6. Scholarships, Stipends & assistance to trainees of the R. & T. School (transfer to fund account)					1,00,000	0 0
7. Non-Colombo Plan Scholarships & assistances					14,239	12 0
8. Disbursement of Fellowship allowance to ISEC trainees under Colombo Plan					15,038	15 6
9. Prizes to workers for initiative etc.					11,500	0 0
10. Contribution to Gratuity fund					1,10,000	0 0
11. Machine Tabulation Expenses :						
a) Hire & maintenance of Tabulating equipment, Key punches and verifiers including freight, transport, etc.	5,08,643	1 0				
b) Cost of cards, Cabinets etc.	1,80,410	2 9				
c) Payments to I.B.M., B.T.M., Powers-Samas & Gokhale Institute of Politics & Economics, Poona for tabulation of N.S.S. data	1,24,818	8 6			8,13,878	12 3
12. Printing & Publication (including paper for printing)					85,191	6 9
13. Society type Activities					25,892	13 11
14. Examination expenses					15,949	8 6
15. Books & Journals (including cost of binding)					56,224	7 11
16. Workshop, Photo & Microfilm					18,717	1 0
17. Stores & materials for the Computing machine & Electronic Laboratory unit					29,240	11 6
18. Repairs & replacement of machineries, equipment, accessories, furniture & fittings etc.					53,414	5 3
19. Stationeries & consumable stores					69,084	7 3
20. Auditor's fees					3,600	0 0
21. Bank charges & interest					8,897	8 0
22. Crop-cutting labour charges & experiments					3,643	3 6
23. Telephone charges					20,714	6 0
24. Postage, telegram, advertisement, & other miscellaneous contingencies					53,470	0 6
25. Electric charges					23,373	2 0
26. Rent, rates & taxes—including those of field & camp offices					1,35,438	3 0
27. Repairs & maintenance of land & buildings including petty constructions					97,461	9 0
28. Transport					49,590	3 0
29. Workers' welfare & amenities					81,655	9 9
30. Development at Director's discretion					29,848	0 6
31. Statistical Quality Control Conference					1,332	3 6
32. Repayment of outstanding liabilities (as per last account)					63,301	5 6
33. Repayment of Bank overdraft (as per last account)					65,722	3 10
34. Repayment of loan from funded accounts (as per last account)					1,85,000	0 0
35. Repayment of old deposits (as per last account)					3,063	2 3
36. Depreciation charges (transferred to fund a/c.)					71,000	0 0
37. Development Grant (transferred to fund a/c.)					2,50,000	0 0
38. Temporary loan to Capital Expenditure A/c.					1,49,682	4 0
39. Loans to staff for educational & house building purposes					14,984	1 0
40. Amount under suspense with staff and others pending final adjustment					75,010	1 2
41. Closing Balance : Cash in hand & at Banks :						
i) with Central Office	39,858	16 8				
ii) with branches & sub-offices	26,774	6 0				
					63,631	4 8
					Rs. 59,76,641	6 0

Examined and found correct.
Sd/- P. O. NARAYAN & Co.
Chartered Accountants & Auditors

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PART 3: APPENDICES

Appendix 1 : Members of the Council, 1955-56

President: Shri Chintaman D. Deshmukh.

Vice-Presidents: Dr. P. N. Banerjee, Professor D. R. Gadgil, Shri K. C. Mahindra, Sir Shri Ram.

Chairman: Sir D. N. Mitra.

Vice-Chairmen: Dr. S. K. Banerji, Prof. S. N. Bose, Shri K. P. Goenka, Shri S. C. Ray.

Treasurer: Dr. Satya Churn Law.

Secretary: Professor P. C. Mahalanobis.

Joint-Secretaries: Shri Nihar Chandra Chakravarti and Shri S. C. Sen.

Members: Shrimati Chameli Bose, Prof. K. N. Chakravarti, Shri Nistaran Chakravarti, Shri V. M. Dandekar, Shri M. Ganguli, Prof. H. C. Ghosh, Shri Nimai Charan Ghosh, Dr. Q. M. Hussain, Prof. D. G. Karve, Prof. K. B. Madhava, Shrimati Nirmal Kumari Mahalanobis, Shri N. T. Mathew, Shri Mani Mukherjee, Dr. U. S. Nair, Shri Pitambar Pant, Dr. B. Ramamurti, Dr. C. R. Rao, Mr. N. Sundararama Sastry, Shri J. M. Sen, Shri Sadasiv Sangupta.

Appendix 2 : Governing Body of the Research and Training School, 1955-56

Shri Chintaman Deshmukh (*President, ex-officio*), Sir D. N. Mitra (*Chairman, ex-officio*), Prof. P. C. Mahalanobis (*Secretary, ex-officio*), Shri Beli Ram Bhagat and Shri C. V. Narasimhan (*Representatives of the Government of India*), Dr. N. S. R. Sastry (*Reserve Bank of India*), Dr. U. Sivaraman Nair (*Inter-University Board*), Mr. J. A. R. Tainah (*Associated Chamber of Commerce*), Shri D. N. Mukherjee (*Federation of Indian Chambers of Commerce and Industry*), Dr. V. G. Panse (*National Institute of Sciences*), Dr. J. P. Niyogi (*Indian Economic Association*), Sir Shri Ram, Dr. S. K. Banerji, Prof. S. N. Bose, Prof. K. B. Madhava, Shri N. C. Chakravarti and Dr. C. R. Rao (*Representatives of the Council of the Indian Statistical Institute*).

Finance Committee (of the Governing Body): Sir D. N. Mitra (*Chairman, ex-officio*), Prof. P. C. Mahalanobis (*Secretary, ex-officio*), Dr. C. R. Rao (*Director of Research and Training School*), Shri C. V. Narasimhan and Shri S. Jayasankar (*Representatives of the Government of India*), Mr. J. A. R. Tainah and Shri Nihar Chandra Chakravarti (*Members of the Governing Body*).

Appendix 3: Committees set up by the Council, 1955-56

Finance Committee: Sir D. N. Mitra (*Chairman*), Dr. S. C. Law (*Treasurer, ex-officio*), Prof. P. C. Mahalanobis (*Hony. Secretary, ex-officio*), Dr. S. K. Banerji, Shri S. C. Ray, Shri C. V. Narasimhan, Shri P. Pant, Shri S. C. Sen, Shri N. C. Chakravarti (*Member and Secretary*).

Journal Committee: Prof. S. N. Bose, Dr. Debabrata Basu, Dr. G. Kallianpur, Prof. K. B. Madhava, Prof. P. C. Mahalanobis (*Editor, Sankhya, ex-officio*), Shri Mani Mukherjee, Dr. U. S. Nair, Shri D. B. Lahiri, Shri P. Pant, Dr. B. Ramamurti, Dr. C. R. Rao, Dr. N. S. R. Sastry and Dr. P. B. Patnaik (*Representatives of the Governing Body*), Shri Anikendra Mahalanobis (*Member and Secretary*).

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Examinations Committee : Dr. N. S. R. Sastry, Shri V. M. Dandekar, Prof. P. C. Mahalanobis, Shri M. L. Ganguli, Shri N. C. Ghosh, Shri P. Pant, Dr. B. Ramamurti, Shri N. C. Chakravarti, Dr. C. R. Rao, Shri J. M. Sengupta, Shri Sadasiv Sengupta, Shri D. Y. Lele, Prof. K. B. Madhava, Dr. S. K. Banerji, Dr. U. S. Nair (*Representative of the Governing Body*) and Shri J. M. Son (*Member and Secretary*).

Appendix 4 : Office Bearers and Council Members of Branches, 1955-56

Bombay : Shri V. L. Mehta (*President*), Prof. C. N. Vakil, Shri R. G. Saraiya, Shri L. S. Vaidyanathan and Dr. N. S. R. Sastry (*Vice-Presidents*), Dr. K. S. Rao and Shri K. C. Cheriyan (*Joint Secretaries*), Dr. D. T. Lakdawalla (*Treasurer*), Dr. R. L. N. Iyengar, Prof. M. C. Chakravarti, Shri H. T. Parekh, Shri A. S. Palekar and Shri M. A. Telang (*Members of the Council*).

Mysore : Prof. S. K. Ekambaram (*President*), Shri A. Ananthapadmanabha Rao (*Vice-President*), Shri Srinagabhushana (*Secretary*), Sri R. Gurusaja Rao (*Joint Secretary*), Shri R. Ramaswami (*Treasurer*), Shri Ravi L. Kirlokar, Shri S. K. Rama, Shri H. S. Narayana Rao, Shri M. C. Satyanarayana, Shri R. Natarajan and Shri M. V. Venkataraman (*Members of the Council*).

Aligarh : Dr. Zakir Hussain (*President*), Prof. D. P. Mukherji (*Vice-President*), Prof. S. M. Shah (*Secretary*), Shri Hariish Ch. Gupta, Mr. Abu Salim, Shri A. R. Kokan, Shri S. S. Gupta, Shri. K. A. Naqvi, Shri M. A. Raj, Shri Abdul Qayum, Shri M. A. Rizvi, Shri M. Sultan and Mrs. Syera Irfan (*Members of the Council*).

Appendix 5 : Scientific Enquiries

Sponsors and Subjects

MISS A. DASGUPTA, *Government Training College for Women, Simla* :

Correlation between Mental age and scores in arithmetic of Secondary School students.

DEPARTMENT OF APPLIED PSYCHOLOGY, *University of Calcutta* :

Differential effect (in respect of age, sex and levels of intelligence) of practice on the score in a psychological test.

Differential performance of delinquent and normal children in psychological tests.

Effect of time interval on recall in the case of nonsense and meaningful syllables.

Reminiscence effect in whole and part learning of paired associates.

DEPARTMENT OF PSYCHOLOGY, *University of Gauhati* :

The influence of colour in the assessment of lengths.

AGRICULTURAL COLLEGE, *Government of West Bengal* :

Analysis of inbred and varietal experiments on paddy.

NATIONAL MEDICAL COLLEGE, *Calcutta* :

Statistical analysis of the effect of a new drug on Cholera.

RICE RESEARCH INSTITUTE, *Cuttack* :

Estimation of linkage between certain factors in paddy.

CITY COLLEGE, *Calcutta* :

Land utilisation statistics for the different states of India;

CALCUTTA PURE DRUG COMPANY, 2, *Cooper Lane, Calcutta* :

Certain vital statistics relating to India.

Appendix 6 : Sampling Design of the 9th and 10th rounds of the NSS

1. *Ninth Round* : In the 8th round there were 1242 sample villages (central sample only) which increased in the 9th round to 1624, or by about 14 per cent. The state samples were concerned with land holding surveys etc., in the 8th round only, and are therefore excluded from the comparison with the size of the sample in the 9th round. In the urban sector in the 8th round 444 urban blocks (central sample) were selected, and this number was increased in the 9th round by 2108 or nearly five times.

2. The sample villages were allocated to districts or groups of districts, which were the ultimate strata, in proportion to their relative rural population. The allocated numbers were so adjusted as to make them multiples of four. Samples were then drawn from these strata at random with probability proportional to population and with replacement. In the urban sector the sample blocks, which were the first stage units, were allocated to States, in the first instance, in proportion to their respective non-agricultural population. Within each State, the State quota was further allocated to each of the big cities with population (1951 census) of 3 lakhs and above and capitals of part A and part B States with population below 3 lakhs, except in the case of Shillong, capital of Assam, and to the rest of the urban area in that State. The ultimate strata were the individual cities mentioned above, and the remaining urban area within a natural division of a State. Some deviations from the above rule of stratification had however to be made with respect to the area known as "Greater Calcutta", exclusive of the cities of Calcutta and Howrah. This area was kept separate from the remaining urban areas of West Bengal. Similar was the case with "Greater Bombay", less the city of Bombay. The allocation of the State quota to the strata so formed was made proportional to the respective non-agricultural population (1951 Census), and preferential weights in varying degrees were assigned to the strata constituted by individual cities. Adjustments were further made to make the strata allocations multiples of 4 in all cases. Within each stratum the required number of sample blocks were drawn according to the method of systematic selection taking a random start and completing the cycle. Four such systematic samples of blocks were taken so as to provide four independent sub-sample estimates.

3. The State sample of Bombay consisted of as many sample villages and blocks as the central sample in the State, excepting for Bombay City proper, where the size of the State sample was half the size of the Central sample. The extended State sample of U.P. numbered only half the total of sample villages and blocks constituting the Central sample in the State. As regards the subject coverage, Bombay covered all the schedules as in the Central sample, but U.P. took up two enquiries only, namely employment and unemployment, and household manufacture and handicrafts.

4. *Tenth Round* : The same set of 1624 sample villages selected for the 9th round was surveyed for all subjects of enquiry in this round. In addition, a sample of 3260 villages which was divided into 5 independent sub-samples, was selected for land utilization survey and of these 5 sub-samples, villages of sub-samples 3, 4 and 5 were selected for crop-cutting experiments. In the rural sector, out of 2108 sample blocks selected for the 9th round, 1328 blocks were surveyed in the 10th round.

5. For the 1614 villages and 1328 urban blocks the design remained the same as in the previous round. For the 3260 villages the districts usually formed the strata.

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Allocation to different strata was made by a joint consideration of the geographical area of the stratum and the proportion of the area under various crops for the season covered by the present round. Selection of villages within each stratum was done with probability proportional to area and with replacement. In cases where area figures were not available, selection had to be made at random with equal probability.

Appendix 7 : Machine Tabulation Unit

1. The strength of Tabulation Equipments at different centres

period	machines	Baranagar		Giridih	Delhi		total
		IBM/Holl.	Power-sizes		IBM/Holl.	Power-sizes	
	Accounting machine	8	2	1	-	-	11
April	ESM (101)	2	-	-	-	-	2
to	Sorter	10	2	1	-	-	13
Dec. '55	Multiplier	2	1	-	-	-	3
	Collator	2	-	-	-	-	2
	Reproducer	6	-	-	-	-	6
	Gang Punch	3	2	1	-	-	6
	Accounting machine	9	2	1	1	1	14
	ESM (101)	2	-	-	-	-	2
Jany. to	Sorter	13	2	1	1	2	19
	Multiplier	2	1	-	1	-	4
Mar. '56	Collator	2	1	1	1	-	5
	Reproducer	7	-	1	-	-	8
	Gang Punch	5	2	1	1	-	9

2. *The output:* The per hour output from tabulating units recorded an increase from 0.95 to 1.39 for accounting machines and from 4.62 to 5.43 for ESMs. The total card-passage through all the tabulating units and ESMs during the year was 16,327 thousands and 11,308 thousands respectively. In spite of the improved output record for the year, it was felt that further improvement in output record can be achieved by effecting some changes in the composition of punched card tabulating equipments by giving optimum number of auxiliary machines for tabulating units. A sub-committee was formed in February 1956 to effect necessary changes.

3. Unlike previous years, card-stores were located at Baranagar, Giridih and Delhi with 250 lakhs of cards stored in cabinets with 50 drawers and 25 drawers. This constitutes the punched cards of 2nd to 9th rounds of NSS and related surveys. Besides, about 5 lakhs of Y-sample cards of 1941 census stored at Giridih were brought down to Baranagar for MIT work.

4. During the year under review, method of scoring by the PRS Unit conducting individual tests of aptitude and ability was mechanized through the probability method of sorting by electronic statistical machines. This has widened the field of application of ESMs.

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Appendix 8 : Library

1. The Central Library containing about 56,000 books and monographs and 1190 journals besides a large collection of special material was located at Baranagar. Service centres were maintained at the City Office at 9/B Esplanade East, Calcutta, and at Giridih. Transfer of material and personnel from 204 Barrackpore Trunk Road, where the library was partially accommodated was taken up with a view to concentrating it in the main premises at 203 Barrackpore Trunk Road as well as to make room for the proposed Museum at the former place.

2. *Books* : The library acquired 2717 volumes of books against 1945 last year. Of these 552 were received as gifts, 53 in exchange and 82 through Review Section. In addition to these, 719 volumes from the Late J. C. Sinha's collection which was purchased last year were integrated into the library stock.

3. *Periodicals* : The library received 1190 periodicals and annuals against 1128 last year. Of these 257 periodicals were subscribed, 354 were received as gifts and 579 were received on exchange basis. The library subscribed 42 new journals and entered into exchange arrangements with 4 new Indian and 8 foreign agencies among which 1 was in East Germany, 1 in the USA, 1 in Spain, 1 in Switzerland, 1 in Pakistan and 3 in France.

4. *Special Gifts* : The library thankfully accepted a concession of \$ 125 offered by the Joint Committee on Slavic Studies (American Council of Learned Societies and the Social Science Research Council) towards the annual subscription of \$ 150 for the Current Digest of the Soviet Press.

The United States Information Services offered one year's subscription to the New York Times (International Edition) Sunday Issues only, which was thankfully accepted.

5. *Bibliographical Services* : Two bibliographies were compiled—one on Cottage Industries and the other on Industrial Management and Industrial Technology.

The library continued to issue the weekly list of selected periodicals and the monthly bulletin of new acquisition. The issue of the Index to Current Periodicals had to be kept suspended for want of adequate technical staff.

6. *Service and Circulation* : The number of library members increased to 758 from 624 last year. The total number of books, journals and other materials issued was 38,056 against 23,033 last year, of which 28,211 were issued from the Reference Section and 9844 from the Lending Section. The total number of requests received was 43,120, so that nearly 11.5 per cent of the requests could not be fulfilled, against 6 per cent last year. The rise in the number of unfulfilled requests was mainly due to increased demand for text books from the students of several new training courses.

7. *Circulating Library* : There was new acquisition of 733 Bengali, 152 English, 26 Hindi and 38 Oriya books bringing the total to 6581 volumes. Stocks were regularly rotated amongst the branches of the library. The number of books issued from Baranagar, Calcutta and Giridih were 14,999, 1240 and 3384 respectively.

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8. *News Clippings* : With the formation of the Planning Division and the publication of the Draft Plan-frame growing need was felt for easy and quick reference to topics relating to statistics and planning in India which appeared in important dailies and periodicals. For this purpose a new unit was started in June 1955 for systematic processing and indexing of relevant material.

Clippings were gathered from 5 dailies of Calcutta and the cuttings received through the All India Press Cutting Service which covered more than 100 dailies and periodicals all over India. The total number of clippings processed and properly indexed was 11,559. The number of articles indexed from periodicals was 1625.

9. *Translation* : Several requests were received and complied with for English translation of various matters—letters, articles, books in other foreign languages, specially French and Russian. A major work taken up was the translation of three Russian books on the introduction of metric system in the USSR.

10. *Records Unit* : The Records Section continued to function at 206 Barrackpore Trunk Road, Calcutta. The Project Unit which maintains schedules, working papers and reports relating to surveys and projects carried out in the Institute arranged, classified and indexed 5004 files, against 4387 last year, bringing the total number of files thus arranged so far to 12,429.

In the map unit, 84,249 cadastral survey maps, 251 P.S. maps and 10 district maps of West Bengal as well as 6185 State maps of Indian Union, totalling 90,668 sheets, have been finally processed and shelved through serial sorting and numbering. The number of maps issued to Field Branch and other units was 1866.

11. *Photographic Unit* : Major work on documentary reproduction consisted of 2588 frames of microfilms, 1359 paper prints from microfilm and 1038 photostats. The Photographic Unit also took 1489 still photographs of individuals, groups and important functions at the Institute as well as 1200 feet of motion picture. In addition to these, 2766 bromide enlargements were made.

Other types of work included preparation of profloscope pictures, acre plates, projection slides (black and white, and colour) etc., involving about 220 exposures. Requests for documentary reproduction from other Institutions were also complied with by supplying microfilms, photostats and photoprints.

To supplement the existing equipment the library acquired a Remington Rand Transcopy unit for preparing multiple copies of documents and material within a short time.

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Appendix 9 : List of papers completed during 1955-56

A. Theoretical Statistics

A.1 SUMMARY OF RESEARCH WORK IN THEORETICAL STATISTICS

(The figures within brackets refer to the list of papers appearing later in this Appendix.)

1. *Tests of significance* (3,21,22,23,24,33): Considering the conditional probability given the total of a number of observations from a Poisson distribution some exact tests of significance were constructed for judging (i) goodness of fit, (ii) homogeneity of observations, (iii) deviations in the frequency of the 'zero' class. Tables have been provided in a limited number of cases. The same technique was exploited in obtaining some exact tests of significance in the case of a binomial distribution also.

The concepts of partial and multiple correlations associated with a multi-normal population have been extended to the case of populations admitting a multiple classification as in a contingency table and large sample tests for hypotheses concerning them have been developed. Analogous problems of testing 'main effects and inter-actions' in cases of sampling from multinomial populations have been discussed. Limiting power functions (in Pitman's sense) of the frequency chi-square tests have been obtained and their possible uses indicated.

2. *Design of experiments* (2,11,12,13,20,27,28,29,30,35,36,37): 'Orthogonal arrays' have been used to construct fractional replicated designs for asymmetrical factorial experiments. A new class of arrangements called partially balanced arrays have been introduced and their use in industrial experimentation demonstrated.

The conditions on the design matrix for certain parametric functions to uncorrelated estimates have been investigated.

With reference to variational trials a number of contributions were made both on the construction of designs and analysis. A new system of arrangements known as the Quasi-factorial designs, which occur as a sub-class of PBIB designs has been introduced. All linked block designs with number of replications and block size less than 10 have been enumerated. A complete enumeration of all two associated PBIB designs involving three replications have been carried out. By considering the dual of group divisible designs with block size two, a very useful class of PBIB designs with two replications and a maximum of 5 different errors has been obtained. On the analysis side simple methods of carrying out inter-block analysis have been suggested. It was shown that the expressions for inter-block analysis can be obtained from the corresponding expressions of the inter-block analysis by just changing the parameters of the designs in a simple way. This is applicable in whatever way intra-block analysis is carried out by estimating the treatment contrasts first or otherwise by estimating the block contrasts first.

3. *Estimation* (8,26,32): The efficiency of estimating parameters by the method of moments has been investigated in the case of Poisson and Binomial distributions, truncated at zero. The loss of efficiency is not serious while the method of estimation is simple compared to the labour involved in obtaining maximum likelihood estimates. Extensive tables have been provided to obtain likelihood estimates in a simple way.

Under conditions of Fisher consistency and Fréchet differentiability lower limit to the asymptotic variance of a statistical functional is shown to be the information limit, information being as defined by Fisher.

4. *Sample Surveys (34,38)* : The variance of the estimate of the population total in a multi-stage survey where units are chosen with probabilities proportional to size is decomposed into meaningful stage components and their unbiased estimates are derived.

A simple sampling scheme has been devised by which at most $(n-1)$ sample units are examined for two sampling enquiries involving two systems of p.p.s. sampling for the units, which ordinarily require the examination of $2n$ sampling units. A great reduction in cost can be achieved with no loss in precision.

5. *Characterization theorems (1,9,10)* : Work on characterization of distribution functions mentioned in the earlier reports was continued. An important characterization of the normal distribution was obtained using the properties of distributions of linear statistics.

Using the necessary and sufficient condition for a k -dimensional vector to be distributed as multivariate normal, that every linear function should be univariate normal, several characterization theorems of the multivariate normal distribution have been obtained by first reducing the problem to the univariate case for which a solution is readily available.

6. *Stochastic processes (4,5,6,15,16)* : Making use of the canonical representation of an infinitely divisible distribution due to Kolmogorof and Polya it was proved that an infinitely divisible distribution is necessarily bounded.

Some theorems on the limiting distributions of maximum of partial sums have been proved assuming the existence of the second moment. This generalizes all the results of Chung obtained on the assumption of the existence of the third moment.

7. *Miscellaneous (7,14,25,31)* : There were a number of other contributions relating to the construction of analogue machines for solving linear equations, mathematical models of planning, acceptance sampling for variables and problems of optimum selection in multivariate analysis.

A.2. PAPERS

1. BASU, DEBARATA : A note on the multivariate extension of some theorems related to the univariate normal distribution. (submitted to *Sankhyā*).
2. CHAKRAVARTI, INDRAMOHAN : Fractional replication in asymmetrical factorial designs and partially balanced arrays. (*Sankhyā*, 17, 143).
3. ——— and C. R. RAO : Some small sample tests of significance for a Poisson distribution. (*Biometrics Bull.*, Sept. 1956).
4. CHATTERJEE, SRISITIDHAR : A note on mean first passage and recurrence times.
5. ——— : A generalization of a result due to Chung.
6. ——— and R. P. FAKHIRAJAN : On the unboundedness of the i.d. law. (submitted to *Sankhyā*).
7. DES RAJ : On optimum selections from multivariate populations. (*Sankhyā*, 14; 363).
8. KALLANPUR, GOPINATH and C. R. RAO : On Fisher's lower bound to asymptotic variance. (*Sankhyā*).
9. LAHA, RADHA GOVIND : On a characterization of the normal distribution from properties of suitable linear statistics. (*Ann. Math. Stat.*, in press).

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10. ———: Characterization of probability distributions and statistics. (Thesis submitted to Calcutta University for the degree of D. Phil.).
11. ——— and J. Roy: Classification and analysis of linked block designs. (*Sankhyā*, 17, 116).
12. ——— and J. Roy: Partially balanced linked block designs. (*Sankhyā*, in press).
13. ——— and J. Roy: Two associated PBIB designs involving three replications. (*Sankhyā*, 17, 178).
14. MATTHAI, ABRAHAM: A class of acceptance sampling plan for variables. (*Bull. of the Quality Control Association*, Bangalore, Vol. III).
15. PAKSHIRAJAN, RAJAKULARAMAN PONNUSAMI: On the maximum partial sums of sequences of independent random variables.
16. ——— and S. D. Chatterjee: On the unboundedness of the i.d. law. (Submitted to *Sankhyā*).
17. MAHALANOBIS, P. C.: The approach of operational research to planning in India. (*Sankhyā*, 16, parts 1 & 2).
18. ———: Approach to planning in India. (Based on a talk broadcast from All India Radio on 11 September, 1955).
19. ———: Statistics must have purpose. (Presidential address to the Third Pakistan Statistical Conference, Lahore, February 1956).
20. MITRA, SUJIT KUMAR: A note on orthogonality and design of experiments. (*Sankhyā*, in press).
21. ———: On Bartlett's test of complex contingency table interaction. (*Sankhyā*, in press).
22. ———: On the limiting power function of the frequency Chi-Square test. (*Sankhyā*, in press).
23. ———: Contributions to the statistical analysis of categorical data. (North Carolina Institute of Statistics Mimeograph Series No. 142, December 1956).
24. ——— and S. N. Roy: An introduction to some non-parametric generalizations of analysis of variance and multivariate analysis. (*Biometrika*, in press).
25. MITRA, SAMAR: Electrical analogue computing machine for solving linear equations and related problems. (*Review of Scientific Instruments*, 1, 28, 453, May 1955).
26. PATIL, G. P.: The efficiency of the "Two-Moments" estimate of the parameter in a single truncated binomial distribution.
27. RAMAKRISHNAM, C. S.: The dual of a two associate PBIB design and new designs with two replications. (*Sankhyā*, 17, 133).
28. ———: Designs with two replications as duals of certain group divisible designs.
29. RAO, C. RADHAKRISHNA: On the recovery of inter-block information in variatal trials. (*Sankhyā*, 17, 105).
30. ———: A general class of Quasi-factorial and related designs. (*Sankhyā*, 17, 165).
31. ———: Analysis of dispersion with missing observations. (*Jour. Roy. Stat. Soc.* Sept., 1956).

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32. ——— and G. Kallianpur : On Fisher's lower bound to asymptotic variance. (*Sankhyā*).
33. ——— and I. M. Chakravarti : Some small sample tests of significance for a Poisson distribution. (*Biometrics Bull.*, Sept., 1956).
34. ROY, JOGABRATA : Variance components in multistage PPS sampling. (*Sankhyā*, in press).
35. ——— and R. G. Laha : Classification and analysis of linked block designs. (*Sankhyā*, 17, 116).
36. ——— and R. G. Laha : Partially balanced linked block designs. (*Sankhyā*, in press).
37. ——— and R. G. Laha : Two associates PBIB designs involving three replications. (*Sankhyā* 17, 175).
38. ROY CHOUDHURY, D. K. : An integration of several PPS surveys. (*Science & Culture*, Vol. 22, No. 2).

B. Applied Statistics

B.1. BIOMETRIC STUDIES

39. DAS, BHUPENDRA CHANDRA and Nalvandov, A. V. : Responses of prepuberal chicken ovaries to avian and mammalian gonadotrophins. (*Endocrinology*, 57, 705).
40. ROY, SUBODH KUMAR : Studies on the activities of earthworms.
41. VERMA, V. K. : A note on the relative length of fingers in a group of prisoners in a U.P. Jail.
42. ——— : Observations taken on the ear lobes of a group of U. P. convicts.
43. ——— : A note on the human face-observations on convicts.

B.2. PSYCHOMETRIC STUDIES

44. CRATFELT, S. : Machine scoring of objective tests.
45. DAS, RHEA S. : A logical analysis of the concepts 'personality' and 'attitude'. (Submitted to *Psychological Review*).
46. ——— : Recommendations for personnel selection in India based on British selection methods in Civil Service & in Industry. (Submitted to *Sankhyā*).
47. ——— and J. P. Das and R. Rath : Understanding versus suggestion in the judgement of literary passages. (*Journal of Abnormal and Social Psychology*, 1955).
48. DAS GUPTA, B. : Some aspects of scaling in the two-stage selection process.
49. ——— : A simplified method of item analysis.
50. ——— and others : The validity of the Vellore Medical College selection methods. (*Sankhyā*).
51. HARPER, A. EDWIN, Jr. : Modern objective examination marking. (Cyclostyled).
52. ——— : A manual of test scoring and edge marking for item analysis for use with the Harper-Mitra Answer Sheet.
53. ——— and others : The validity of the Vellore Medical College selection methods. (*Sankhyā*).
54. SURESH KUMAR : Development of a new edge-marking method for psychological uses.

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55. MITRA, SHIB K. : Roles available to psychologists in the draft plan-frame of the Second Five Year Plan. (*Psychology and Education*, Baroda, 1956).
56. ——— : On correction for chance success.
57. ——— and D. W. Fiske of University of Chicago and J. Osterweil of the Meringer Foundation, Topeka, U.S.A. : The relationship between variability and group frequency of responses.
58. SANGAL, S. P. and others : The validity of the Vellore Medical College students selection methods. (*Sankhyā*).
59. ——— : Some aspects of problem of validity study in selection programmes.
60. SEN, TAPAS KUMAR : A systematic method of calculating discriminant functions for psychological data.

C. Working Papers on Economic Planning : 1955-56

Working Paper Series :

54. BABAN, P. A. : The concept of the economic surplus.
56. BETTELHEIM, CH. : Foreign trade and planning for national economic development.
52. ——— : Planned economic growth and foreign trade.
43. DIVISA, F. : Technical coefficients (consumption units physical), France 1949.
53. GOPALAKRISHNAN, K. P. : Financing the Second Five-year Plan.
37. LANGE, O. : Some problems concerning economic planning in under-developed countries.
38. ——— : Fundamentals of economic planning.
56. ——— : Some observations on input-output analysis.
44. LOBEL, E. and DAS, P. : Productive capacity of large-scale industries in India.
46. MUKHERJEE, M. : Value of material production in India (1948-49).
47. ——— : On the shift of employment from capital intensive production processes.
45. MUKHERJEE, M. and DUTTA, UMA : A note on the ratio of increment of national income to investment.
49. ——— : An attempt at estimating parameters of a simple model of economic growth.
39. MOSEVYN, P. M. : Basic problems of the statistics of the national income in the USSR.
41. ——— : Balance of the national economy.
55. NARAYAN, A. V. : Introduction to a study of industrial, non-industrial and financial groupings in India (Calcutta region).
38. PISAROV, I. Y. : Balance method in the Soviet socio-economic statistics.
40. ——— : Statistics and planning.
42. ——— : The most important categories, concepts, definitions of Soviet State Statistics of Population and Industry based on 'Dictionary-Reference Book of Social Economic Statistics' of the Central Statistical Department.
57. ROY, A. and BANERJEE, N. : Monopolies and concentration of economic power—Part I.
51. RUDRA, A. : A scheme of calculations for an Annual Plan.
48. SENGUPTA, S. S. and BOSE, D. K. : A study in maximisation of employment.

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D. Miscellaneous Observations on Indian Planning

- BARAN, P. A. : Reflections on planning of the economic development of India.
- BUTTELHEIM, CH. : Remarks on the second Five Year Plan : Draft outline.
- GALBRAITH, J. KENNETH : Economic planning in India, Five comments.
- LANGE, O. : Observations on the Second Five Year Plan. Long-term and short-term capital.
- ROY, A. and BANERJEE, N. : The position of foreign capital in big joint-stock companies incorporated in India.
- RUDRA, A. : Food production targets in the Second Five Year Plan.
- SINGUPTA, S. S. : Macro economic dynamic programming.
- STRACHEY, J. : A note on Indian development.
- TALUQDAE, S. N. : Planning and integration in coal.
- TREBERGEN, J. : Accounting interest rates and accounting wage rates.
- : A note on employment policy.
- : On the optimum use of the factors of production.
- : How to split up a plan into its geographical components.
- : The socialistic pattern of society.
- : The need for a uniform method of appraising investment projects.
- : A possible set up for a planning model with supply and demand equations.
- : A note on employment policy.
- : The optimum rate of saving.

Appendix 10 : List of Trainees

(a) Three-year (formerly two-year) Statistician's Course

(i) Trainees attending first year class on 1st April 1955.

1. Rattan Chand Arora; 2. Satnam Das; 3. Chandra Shekhar Dutt; 4. P. Gopalakrishnao; 5. Govind Ram Gupta; 6. Jai Prakash Gupta; 7. Satish Mohan Kansal; 8. Kaushalendra Kumar; 9. Gyanendra Deo Misra; 10. Amar Nath Nankana; 11. Vinod Prakash; 12. Miss G. Premlata; 13. Keshav Roop Rai; 14. G. Divakara Rao; 15. V. Subramaniaswamy; 16. Tilakraj Talwar.

(ii) Trainees attending Second Year Class on 1st April 1955.

1. S. Ramanatha Iyer; 2. G. K. Nair; 3. M. Narasimhamurti; 4. B. V. Ramasarma; 5. N. Sen; 6. V. K. Sethi; 7. T. N. Srinivasan; 8. Y. P. Basain; 9. G. Hariharan; 10. R. C. Jain; 11. Miss R. Kastoori; 12. O. P. Kukreja; 13. Miss N. S. R. Nanjamma; 14. S. Rajagopal; 15. S. P. Sangal; 16. H. C. Sharma.

[All the above 16 students passed the course in June 1955]

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(iii) *Trainees admitted to the First Year Class in July 1956.*

1. Aoharyya, S. C.; 2. R. K. Agarwal; 3. P. P. Arya; 4. L. L. Aseudani; 5. S. Balakrishna; 6. K. Bhanumurti; 7. Y. K. Bhat; 8. P. K. Bhattacharyya; 9. S. K. D. Chaudhury; 10. K. M. Das; 11. D. Deverajan; 12. V. B. Dixit; 13. J. C. Gupta; 14. M. Dutta; 15. D. R. Handa; 16. Iyengar, N. S.; 17. P. K. Jain; 18. S. Khola; 19. H. Krishnamurti; 20. D. M. Mahamunulu; 21. S. P. Malik; 22. V. Muralimohan; 23. J. L. Janda; 24. V. P. Narula; 25. P. Nath; 26. J. Prakash; 27. K. Raghavan; 28. M. L. Raina; 29. M. Ramachandran; 30. S. Ramamorthy; 31. R. Ranga Rao; 32. G. N. Rao; 33. M. L. N. Rao; 34. P. B. Rao; 35. M. G. Sardana; 36. S. N. Sawhney; 37. K. Singh; 38. A. Swarup; 39. Toekarao; 40. S. Vaudevan; 41. M. Venkateshchari; 42. P. D. Verma; 43. Viswanath, R.; 44. L. A. Chandrasekharan; 45. D. K. Datta Majumdar; 46. A. S. Pankajakshan; 47. V. V. Rao.

(iv) *Trainees promoted or directly admitted to the Second Year Class in July 1956.*

1. Rattan Chand Arora; 2. Satnam Das; 3. P. Gopalakrishnan; 4. Govind Ram Gupta; 5. Jai Prakash Gupta; 6. Satish Mohan Kansal; 7. Kauslendra Kumar; 8. Amar Nath Nankana; 9. Vinod Prakash; 10. G. Divakara Rao; 11. V. Subramaniaswamy; 12. *K. Sundararajan; 13. *Sayel Hamid Pasha; 14. *M. Ramakrishna; 15. *K. Gopalakrishnamurti; 16. *Saurindra Kumar Chakravorti; 17. *Amar Sundar Roy; 18. *Ramaswami Subramanian Ganesan; 19. K. P. Geethakrishnan; 20. S. Somasundar.

[*Directly admitted to the Second Year Class].

(b) Short-term Statistician's Course

(1) *First Session: December 1955—March 1956:*

1. N. S. Raja Rao; 2. A. K. Rai Choudhury; 3. Jamini Kanta Ghosh; 4. Nishith Ranjan Chaudhury; 5. *Nirmal Kanti Dasgupta; 6. *Srieh Chandra Basu Roy; 7. *Nirmalendu Bhowmik; 8. *Kalyan Kumar Dasgupta; 9. *Prakash Chandra Kundu; 10. *Amalendu Sengupta; 11. Brij Bhusan Pande; 12. Kamal Kumar Pradhan; 13. K. Gobindan Kutty; 14. Biswanath Chakravorti; 15. Asoke Kumar Dutta; 16. Manik Chandra Ganguly; 17. K. Sripathi Rao; 18. Makhan Chandra Bhattacharyya; 19. Sudhir Kumar Basu; 20. Santosh Kumar Seal; 21. *Jnanatosh Chatterjee; 22. Subhendra Kumar Banerjee; 23. *Santimoy Banerjee; 24. Sisir Ranjan Sengupta; 25. Prabir Kumar Sandell; 26. Bhupendra Nath Bhatia; 27. Anadinath Mukherjee; 28. Amiya Kumar Bagchi; 29. *Ram Prakash Sharma; 30. Mahinder Singh; 31. Kalyan Kumar Gupta; 32. Miss Shanti Dutta; 33. *Manilal Ganguly; 34. Tilakraj Talwar; 35. Ajoy Kumar Gupta; 36. Miss Ela Romola Mukherjee; 37. Miss Dipa Lahiri; 38. Miss Attivilli Sita Devi; 39. Miss Padma Dutta Roy; 40. Ishan Kumar Chatterjee; 41. *M. S. Katchapenswaran; 42. Dipak Sanyal; 43. Manajit Banerjee; 44. *Mrs. Bina Roy; 45. Shyam Sundar Bose; 46. Jiban Krishna Ghose; 47. *T. D. Srinivasan; 48. *D. S. Murty; 49. Abinash Chandra Sarkar; 50. Sukhendu Nath De; 51. Sahrudhin; 52. Kuldip Singh; 53. Miss Parbati Chatterjee; 54. Debaprasad Mukherjee; 55. *George Isaac.

(2) *Second Session: March—September 1956:*

1. Pratul Kumar Bagchi; 2. Viswanath Nikore; 3. Ajit Narayan Bose; 4. Valjee Jivandas Suraiya; 5. N. S. Raja Rao; 6. Niranjan Sil; 7. Srieh Chandra Roy; 8. Qimat Rai; 9.

* Certificates were awarded for successful completion.

† Auditors.

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Kamal Kumar Basu; 10. Santosh Kumar Seal; 11. Harihar Mitra; 12. Jyoti Prasanna Roy; 13. T. G. Ramasubramanian; 14. G. P. Mukherjee; 15. Shankar Bhaduri; 16. Bhupendra Nath Bhatia; 17. Asoke Kumar Dasgupta; 18. E. K. Sukumaran Nair; 19. Miss Ela Romola Mukherjee; 20. Sanjoy Kumar Lahiri; 21. Ranajit Kanta Lahiri; 22. Prasan Sangupta; 23. Bharat Kumar Kar; 24. Sukhendu Nath De; 25. Kultar Singh Bedi; 26. Dharam Vir Gulati; 27. Santosh Kumar Dutta; 28. Gopal Chandra Biswas; 29. Sujit Kumar Sarkar; 30. Sat Paul Bhatia; 31. Annabattala Jayaram; 32. Miss Shanti Dutta.

(e) Computer's Training Course

(1) Session: July—December 1955:

Junior (Morning): 1. Sanat Kumar Das; 2. Samarendra Barua; 3. Amiya Kumar Sinha; 4. Kamal Kumar Bose; 5. Parimal Mukherjee; 6. Bhim Chandra Mitra; 7. Brojagopal Banerjee; 8. Paramesh Kumar Das; 9. Manindra Narayan Choudhury; 10. Santipriya Bhowmick; 11. Mukendeewar Bhattacharjee.

Junior (Evening): 1. Asoke Kumar Dasgupta; 2. Sanat Kumar Bose; 3. Ranjan Kumar Bhattacharyya; 4. Ajit Kumar Chatterjee; 5. Timir Prakash Deb; 6. Nirmal Krishna Choudhury; 7. Pronob Kumar Mitra; 8. Sunil Kumar Deb; 9. Sukha Ranjan Bhattacharjee; 10. Guru Narayan Samanta; 11. Dhiraj Lal Roy Chowdhury; 12. P. Madhusudan Babu; 13. Nani Gopal Nag; 14. Golakendu Ghosh; 15. Santi Bhuson Roy; 16. Sanath Chatterjee; 17. Ajit Kumar Roy Choudhury; 18. Bibash Chandra Banerjee; 19. Sarit Kumar Raha.

Senior (Evening): 1. Subhas Chandra Roy Choudhury; 2. Ram Chandra Mitra; 3. Bhabatosh Sen; 4. Sanjit Banerjee; 5. Shankar Bhaduri; 6. Pranabananda Bhaduri; 7. Asoke Kumar Das Gupta; 8. Rajani Kumar Bhattacharjee; 9. Paramesh Kumar Das; 10. Dulal Chandra Dey; 11. Ramkrishna Chakravorti; 12. Nihar Ranjan Saha; 13. Braja Gopal Banerjee; 14. Niranjan Dhar; 15. Subimal Deb; 16. Sunil Kumar Chatterjee; 17. Paritosh Mitra.

(2) Session: January—June 1956:

Junior (Morning): 1. Amarendra Nath Ghosh; 2. Animesh Chakravorti; 3. Hirendra Lal Kar; 4. Dulal Kanti Choudhury; 5. Ananta Kumar Roy; 6. Anup Kumar Sen; 7. Chittaranjan Chatterjee; 8. Subhas Chandra Raichoudhuri; 9. Sunil Kumar Bhattacharjee; 10. Ram Chandra Mitra; 11. Manindra Chandra Basu; 12. Tushar Kanti Banerjee; 13. Shvamal Chandra Roy; 14. Amal Kanti Bhattacharyee; 15. Nirmal Chakravorti.

Junior (Evening): 1. Barun Kumar Bose; 2. Tushar Kanti Banerjee; 3. Amrita Lal Halder; 4. Kamal Behari Paul Choudhuri; 5. Dharendra Chandra Paul; 6. Samar Krishna Basu; 7. Jyotirmoy Basak; 8. Brijesh Mohan; 9. Anil Kumar Banerjee; 10. Sailendra Narayan Gupta; 11. Saurfyendra Nath Roy; 12. Madhab Chandra Munshi; 13. Raj Kumar Nandi; 14. Sanat Kumar Banerjee; 15. K. Ramalingam.

Senior (Evening): 1. Barun Kumar Bose; 2. Amiya Kumar Sinha; 3. Tushar Kanti Banerjee; 4. Sanat Kumar Das; 5. Samar Krishna Basu; 6. Dulal Kanti Choudhuri; 7. Sanat Kumar Bose; 8. Brijesh Mohan; 9. Sunil Kumar Deb; 10. Dhiraj Lal Raichoudhuri; 11. Timir Prakash Deb; 12. Raj Kumar Nandi; 13. Nirmal Chakravorti; 14. Ajit Kumar Chatterjee; 15. Pranab Kumar Mitra; 16. Kamal Kumar Basu.

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(d) International Statistical Education Centre (ISEC)

Ninth term: August 1955—April 1956:

India: 1. Dhanridhar Prasad; 2. Harbans Lal Chaudok; 3. Md. Nooruddin; 4. Paul Jacob; 5. S. C. Jaitly;

Pakistan: 6. S. M. Ayub Siddique; 7. Md. Nasuruddin; 8. Mumtaz Ahmed;

Philippines: 9. Silverio L. Felsara; 10. Miss Rodolfo R. Madamba; 11. Francisco V. Nazarat.

(e) Officer's Training Course: September 1955—February 1956

1. B. P. Bhargava, *Madhya Pradesh*, (9 months, National Income and Official Statistics); 2. U. C. Borah, *Assam*, (9 months, Socio-economic Surveys); 3. Abhay Shankar Boral, *Orissa* (9 months, Machine tabulation); 4. L. N. Chaturvedi, *U.P.* (9 months, Meteorological Statistics); 5. S. P. Singh Chauhan, *Madhya Bharat*, (6 months); 6. M. N. Kaul, Anthropological Survey (6 months); 7. D. S. Kulkarni, *Madhya Pradesh*, (9 months, Socio-economic Surveys and Mechanical Tabulation); 8. M. K. Gopala-Krishnan Nair, *T.C.* (6 months); 9. Krishna Lal Narang, Ministry of Commerce, (9 months, Machine Tabulation); 10. S Narayanaswami, *Mysore*, (9 months, National Income and Regional Income Estimation); 11. D. P. Oetania, *U.P.* (9 months, MT); 12. V. J. Puntambekar, *Bombay*, (9 months, Socio-economic Surveys and Mechanical Tabulation); 13. Y. Ayyappa Raju, *Andhra*, (6 months); 14. R. L. Saluja, *Delhi State*, (3 months); 15. Jagir Singh Sandhu, *Pepsu*, (9 months, Socio-economic Surveys); 16. R. Shedhani, *Madhya Bharat*, (6 months); 17. U. D. Vora, *Cutch*, (6 months); 18. R. Rangarajan, *New Delhi—Central*, (9 months, Socio-economic Surveys and Large Scale Sample Surveys).

Appendix 11: List of Research Scholars

1. C. S. Ramakrishnan (*Biometric Methods*); 2. R. P. Pakhirajan (*Advanced Probability*); 3. (Mrs.) S. Nundy (*Econometric*); 4. S. D. Chatterjee (*Stochastic Processes*); 5. B. Das Gupta (*Psychometry*); 6. Sushil Kumar (*Psychometry*); 7. T. K. Sen (*Psychometry*); 8. S. P. Sangal (*Psychometry*); 9. G. Patil (*Quality Control*); 10. D. K. Roychowdhury (*Sample Surveys*); 11. B. Bhattacharyya (*Multivariate Analysis*); 12. T. S. Varadrajn (*Statistical Inference*).

Appendix 12: List of successful candidates in professional examinations

Statistician's Diploma Examination: August, 1955

A. General Papers

Paper I (Theoretical): Saikant Dattarray Mathure (BI), Triloke Kholsa (B9), Venkatesh Ranganath Kanade (B11), Dipak Chakravarti (C8), Ved Prakesh Agarwal (D1), Niranjan Singh (D4), Atmaram K. Ahuja (D13), Madhusudan Shankaran Pandelai (D22), Pratap Singh Nagpaul (D25), Ramesh Shanker (L1), Jagdish Narayan Srivastava (L8), K. R. Rajagopalan (M9), D. S. Ramaratnam (M10), Arvind Parasuram Joag (P1), Narayan Kalyan Ugar (P3), Vasant Trimbak Jumde (P14), Saragopal Moghe (P18), Anant Raghavendra Kulkarni (P19).

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Paper II (Theoretical) : Gopaldas S. Monga (B4), K. Mukundan (B13), Brij Nandan Pandey (C1), Chandu Lal Gupta (D6), Avtar Singh Chawla (D17), Pratap Singh Nagpaul (D25), Rameesh Shanker (L1), Jagdish Narayan Srivastava (L6), Vasant Trimbak Jumde (P14).

Paper III (Theoretical) : Vishnupad Srinivas Gururaj (B3), A. Gandeherian (C5), Sudhindra Nath Ganguli (D9), Narayan Kalyan Ugar (P3).

Paper VI (Practical) : Vedprakash Agarwal (D1), N. P. Mahadevan (M8).

Paper VII (Practical) : Gopaldas S. Monga (B4), Narayan Kondaji Sonavane (P2), Vasant Trimbak Jumde (P14), Anant Raghavendra Kulkarni (P19).

B. Special Papers

Papers IV & V (Theoretical)

(1) *Statistical Quality Control* : Vasudeo Vyasaacharya Galsai (B10), Narayan Krishnaji Chandekar (C3), Dipak Chakravarti (C8), S. Rangachary (M5), Arvind Parasuram Joag (P1), Narayan Kalyan Ugar (P3), Narayan Narasinha Koti (P15), Sisirkumar Sridhar Jagdeo (P17).

(2) *Actuarial Statistics* : S. Viswanath (B15).

(3) *Mathematical Theory of Sampling Distribution* : A Gandeherian (C5), J. Shiva Rao (D11).

(4) *Economic Statistics* : Narayan Krishnaji Chandekar (C3), Y. Shiva Rao (D11).

(5) *Sample Survey (Applied)* : Kalyan Kumar Das Gupta (D7), Hiralal Jain (D23), Sadasshiv Dattatray Diwanji (P11).

(6) *Design of Experiment (Applied)* : Chandu Lal Gupta (D6), Charan Singh Grewal (D6), Avtar Singh Chawla (D17), Jagdish Narayan Srivastava (L6).

(7) *Sample Survey (Theoretical)* : Sadasshiv Ramchandra Gokhale (P12).

(8) *Vital Statistics and Population Studies* : Ananta Raghavendra Kulkarni (P19).

Papers VIII and IX (Practical)

(1) *Design of Experiment (Construction of Design)* : Promod Kumar Gupta (B2).

(2) *Sample Survey (Applied)* : Triloke Khosla (B9), Shivendra Bahadur (L3).

(3) *Economic Statistics* : Vasudeo Vyasaacharya Ghalsai (B10), Chandu Lal Gupta (D6).

(4) *Mathematical Theory of Sampling Distribution* : A Gandeherian (C5).

(5) *Design of Experiment (Applied)* : Chandu Lal Gupta (D6).

(6) *Probit Analysis* : Rajagopala Rangarajan (D20).

(7) *Statistical Quality Control* : Rameesh Shanker (L1), Sadasshiv Ramchandra Gokhale (P12), Narayan Narasinha Koti (P15).

(8) *Sample Survey (Theoretical)* : T. Chellaswamy (P6), Sadasshiv Ramchandra Gokhale (P12).

(9) *Vital Statistics and Population Studies* : T. Chellaswamy (P6), Anant Raghavendra Kulkarni (P19).

(10) *Anthropometry* : Shivendra Bahadur (L3).

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Statistician's Diploma Examination : March 1956

A. General Papers

Paper I (Theoretical) : Tilak Raj Talwar (C20), R. L. Khanna (D19), Amar Chand Sharma (D26), Dhara Singh Sharma (D36), Shiveendra Bahadur (L6), Narayan Kondaji Sonavane (P2), Balachandra Mahadeo Sathye (B6).

Paper II (Theoretical) : Dipak Chakravarty (C7), Nirmal Kanti Das Gupta (C9), Amalendu Sen Gupta (C16), Tilak Raj Talwar (C20), Y. Shiva Rao (D1), Kamdhampaty Suryanarayana Sastry (D31), K. R. Rajagopalan (M11).

Paper III (Theoretical) : Dipak Chakravarty (C7), Ved Prakash Aggarwal (D6), Pratap Singh Nagpal (D48), Shiveendra Bahadur (L6), N. P. Mahadevan (M4), Vasant Trimbak Jumde (P4).

Paper VI (Practical) : Avatar Singh Chawla (D3), Rajeshwar Dayal Saxena (D15), Jagdish Narain Shrivastava (L6), Narayan Kondaji Sonavane (P2), Vasant Trimbak Jumde (P4), Triloke Khosla (B8), T. Chellaswami (B11).

Paper VII (Practical) : Avtar Singh Chawla (D3), Charan Singh Grewal (D10), R. L. Khanna (D19), Niranjana Singh (D23), Rameah Shankar (L1).

B. Special Papers

Papers IV & V (Theoretical)

- (1) *Economic Statistics* : Dipak Chakravarty (C7), Balchandra Mahadeo Sathye (B6).
- (2) *Sample Survey (Theory)* : Tarun Kumar Gupta (D2), Charan Singh Grewal (D10).
- (3) *Design of Experiments (Applied)* : Tarun Kumar Gupta (D2).
- (4) *Statistical Quality Control* : Avtar Singh Chawla (D3), Ved Prakash Aggarwal (D6).
- (5) *Sample Survey (Applied)* : Pandurang Dnyaneshwar Arola (D6), Somnath Goswami (D11), Tilakraj Mahajan (D43), Ramlal Ahuja (D49).
- (6) *Actuarial Statistics* : K. Mukundan (D36).
- (7) *Stochastic Process* : Pratap Singh Nagpal (D48).

Papers VIII & IX (Practical)

- (1) *Statistical Quality Control* : Dipak Chakravarty (C7), Narayan Krishnaji Chandekar (C24), Avtar Singh Chawla (D3), Vedprakash Aggarwal (D6).
- (2) *Economic Statistics* : Dipak Chakravarty (C7).
- (3) *Design of Experiments (Applied)* : Rameah Shankar (L1).
- (4) *Sample Survey (Theory)* : Triloke Khosla (B8), K. Ramachandran (C26).

Computer's Certificate Examination : August 1955

Part IA, Sec. I : Sudhir Ch. Bhowmik (C1), Nirmal Kumar Chatterjee (C2), Amal Kumar Mukherjee (C4), Akhileshwar Banerjee (C6), Animesh Singhaw (C7), Manoj Kanti Ghosh (C9), Rabindra Nath Pal (C11), Kamal Kumar Pradhan (C12), Madan Mohan Pain

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(C14), Jamuna Behari Ghosh (C17), Santi Ranjan De (C19), Nikhil Ranjan Chakravarti (C20), Miss Attivilli Sita Devi (C21), Sushil Ranjan Das (C22), Shankar Bhaduri (C23), Gopeshwar Saha (C25), Mrs. Jharna Bhattacharyya (C26), Probbhat Kumar Mukhopadhyaya (C30), Mahendra Nath Banerjee (C32), Prasanta Kumar Chatterjee (C36), Manoharan Dey (C39), Nityananda Chattopadhyay (C40), Sunil Kumar Chatterjee-1 (C41), Paritosh Kumar Mitra (C43), Sanjit Kumar Banerjee (C46), Swadeeh Ranjan RaiChowdhury (C37), Tusar Kanti Chatterjee (C61), Manik Ratan Acharya (C67), Biswanath Chakravorti (C68), Debabrata Panji (C66), Amalendu Bhusan Sengupta (C67), Pransabananda Bhaduri (C68), Manoj Kumar Guha Thakurtha (C74), Arun Guha Thakurta (C76), Manoj Chatterjee (C78), Samir Kumar Mallick (C79), Shish Chandra Basu Rai (C80), Ranjit Kumar Naha (C82), Rabindra Nath Das (C84), Dibakar Ghosh (C86), Praaun Sen (C94), Nemi Chand Dhara (C86), Arun Prosad Singha (C98), Sunirmal Bose (C99), Bimalendu Mahalanobis (C100), Premtoosh Dev (C101), Prasanta Kumar Sinha (C103), Bimal Chandra Sengupta (C107), Mrs. Arati Sarkar (C110), Bimal Jyoti Sanyal (C112), Hrishikesh Roy (C118), Subodh Kumar Paul (C123), Sreenath Paul (C125), Sourendra Nath Paul (C126), Lokenath Mukherjee (C129), Rabindra Nath Mookherjee (C130), Pravash Mukherjee (C131), Badal Kumar BasuMallick (C133), Motilal Majumdar (C134), Amiya Bhusan Majumdar (C135), Prakash Chandra Kundu (C137), Samir Ranjan Guha Roy (C141), Tarak Das Ghole (C146), Biswapati Mookherjee (C132).

Part I A, Sec. II : Nirmal Kumar Chatterjee (C2), Sankar Bhaduri (C23), Rabindra Nath Ghosh (C27), Mahendra Nath Banerjee (C32), Sunil Kumar Chatterjee-1 (C41), Sanjit Kumar Banerjee (C46), Manik Ratan Acharya (C57), Anu Ranjan Mukherjee (C63), Biswanath Chakravarti (C65), Debabrata Panji (C66), Sudhir Chandra Chakravorti (C69), Manoj Kumar Guha Thakurta (C74), Nishit Ranjan Chowdhury (C85), Kartick Chandra Das (C89), Rajendra Lal Bhuiya (C93), Bimalendu Mahalanobis (C100), Prasanta Kumar Sinha (C103), Bimal Jyoti Sanyal (C112), Kanakeshwar Roy (C116), Swaraj Kanta Paul (C122), Lokenath Mookherjee (C129), Rabindra Nath Mukherjee (C130), Pravaah Mukherjee (C131), Biswapati Mukherjee (C132), Badal Kumar Basu Maullik (C133), Amiya Bhusan Majumdar (C135), Kalyan Kumar Gupta (C140), Binayendra Goswami (C143), Tarak Das Dhole (C146).

Part I B, Sec. I : Nirmal Kanti Das Gupta (C8), Miss Attivilli Sita Devi (C21), Santosh Kumar Bhattacharjee (C54), Amarendra Nath Dutta (C56), Prafulla Kumar Basak (C60), Bishnu Pada Paul (C61), Anuranjan Mookerjee (C63), Bishwa Nath Ghosh (C70), Subodh Kumar Mukherjee (C71), Nihar Ranjan Mukherjee (C83), Nisit Ranjan Chowdhury (C85), Radha Shyam Nath (C97), Ajoy Kumar Sarkar (C111), Sudhir Kumar Samaddar (C113), Swaraj Kanta Paul (C122), Harekrishna Paul (C124), Rabindra Nath Mookerjee (C130), Arun Kumar Mitra (C136), Kalyan Kumar Gupta (C140), Arun Kanti Ghosal (C142), Binayendra Goswami (C143).

Part I B, Sec. II : Chitta Ranjan Banerjee (C10), Rabindra Narayan Paul (C11), Sankar Bhaduri (C23), Sunil Kumar Chatterjee-1 (C41), Amarendra Nath Dutta (C56), Anu Ranjan Mookerjee (C63), Nishit Ranjan Chowdhury (C85), Sudhir Kumar Samaddar (C113).

Part I C, Sec. I : Kalyan Kumar Gupta (C140).

Part I C, Sec. II : Nirmal Kumar Chatterjee (C2), Nirmal Kanti Das Gupta (C8), Chittaranjan Banerjee (C10), Prasanta Kumar Chatterjee (C36), Sukhandu Moitra (C52), Miss Gita Shaha (C53), Amarendra Nath Dutta (C56), Bishnu Pada Paul (C62), Biswanath

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Ghosh (C70), Ranajit Kumar Naha (C82), Rabindra Nath Das (C84), Nishit Ranjan Chowdhury (C86), Dhiraj Mohan Sen Gupta (C108), Subodh Kumar Paul (C123), Kalyan Kumar Gupta (C140).

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Part IA, Sec. I: Dhiraj Lal Rai Choudhury (C4), Ajit Kumar Chatterjee (C8), Pronab Kumar Mitra (C9), Asoke Kumar Das Gupta (C12), Mihir Kumar Rakshit (C19), Ajit Kumar Sen Gupta (C21), Panchanon Mascharak (C27), Shivendra Nath Sen Gupta (C48), Sanat Kumar Bhowse (C50), Manindra Narayan Choudhury (C52), Rabindra Kumar Chakravorti (C57), Aparash Chakravorti (C61), Amalendu Choudhury (C68), Keehab Chandra Banerjee (C74), Sanat Kumar Das (C88) Sibpada Chakravorti (C95), Lakshmi Narayan Das (C 96) Saldananda Banerjee (C99), Debabrata Chandra (C108) Ramchandra Neogi (C110), Samarendra Barua (C112), Manoranjan Das (C113), Samir Baran Das Gupta (C121), Guru Narayan Samanta (C129), Kamal Kumar Basu (C130), Rajendra Lal Bhuiya (C131), Kshirode Behari Ray (C133), Timir Prakash Deb (C142), Biswadan Chattopadhyay (C156), Dhruba Ranjan Chakravorti (C157), Manindra Nath Khaskel (C169), Parimal Kumar Roy (C180), Kalidas Neogy (C181), Sukha Sinchan Roy (C191), Sunil Narayan Bose (C196), Bhagat Singh (D1), Sakti Kumar Chowdhury (G17), Debabrata Bardhan (G23).

Part IA, Sec. II: Dhiraj Lal Rai Choudhury (C4), Ajit Kumar Chatterjee (C8), Pronab Kumar Mitra (C9), Asoke Kumar Das Gupta (C12), Santi Priya Bhowmik (C14), Tapan Das Gupta (C18), Mihir Kumar Rakshit (C19), Banaj Kanti Ghosh (C31), Ranjan Kumar Bhattacharyya (C35), Srisih Chandra Basu Rai (C37), Sanat Kumar Bhowse (C50), Nihar Ranjan Mukherjee (C51), Rabindra Kumar Chakravorti (C57), Suchendra Sekhar Das (C65), Ramendra Nath Roy (C66), Rabindra Nath Das (C72), Gopeswar Saha (C75), Subodh Kumar Mukherjee (C83), Tinkari Pal (C84), Ranajit Kumar Naha (C89), Sibpada Chakravorti (C95), Sambhunnath Bhattacharjee (C97), Prasanta Kumar Chatterjee (C103), Debabrata Chandra (C108), Samir Ranjan Guha Roy (C115), Mati Lal Majumdar (C116), Samir Baran Das Gupta (C121), Guru Narayan Samanta (C129), Biswadan Chattopadhyay (C156), Dhruba Ranjan Chakravorti (C157), Amiya Kishore Das Gupta (C166), Sukha Sinchan Roy (C191)

Part IB, Sec. I: Pabitra Kumar Das (C2), Mihir Kumar Rakshit (C19), Dhiraj Mohan Sen Gupta (C20), Ajit Kumar Sen Gupta (C21), Ranjan Kumar Bhattacharyya (C35), Srisih Chandra Basu Rai (C37), Sanat Kumar Bhowse (C50), Rabindra Kumar Chakravorti (C57), Sanjit Kumar Banerjee (C58), Biswapati Mukherjee (C66), Monoj Kumar Guha Thakurta (C132), Gour Chandra Mukherjee (C163), Bimal Jyoti Sanjal (C171), Bimalendu Mahalanobis (C194), Mohd. Yusuf Ansari (G30).

Part IB, Sec. II: Kalyan Kumar Gupta (C5), Dhiraj Mohan Sengupta (C20), Ranjan Kumar Bhattacharyya (C35), Nirmal Kanti Das Gupta (C42), Sanjit Kumar Banerjee (C58), Sudhendra Sekhar Das (C65) Santosh Kumar Bhattacharjee (C78), Sibpada Chakravorti (C95), Timir Prakash Deb (C142), Gour Chandra Mukherjee (C163) Dhruba Ranjan Chakravorti (C157).

Part IC, Sec. I: Sukumar Roy Choudhury (C3), Asoke Kumar Gupta (C11), Chittaranjan Dey (C17), Dhiraj Mohan Sengupta (C20), Chittaranjan Banerjee (C22), Nirmal Chandra Dey (C25), Ranjan Kumar Bhattacharyya (C35), Nirmal Kanti Das Gupta (C42), Goeta Saha (C43), Sabita Chakravorti (C49), Birendra Kumar Nandi (C67), Santosh Kumar Bhatta-

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oharyya (C78), Amarendra Nath Dutt (C80), Nishit Ranjan Choudhury (C82), Subodh Komar Mukherjee (C8C), Pabitra Kumar Dey Sarkar (C91), Profulla Kumar Basak (C109), Mukti Nath Mukherjee (C115), Radhashyam Nath (C160), Subimal Kanti Majumder (C190).

Part I, Sec. II: Santosh Kumar Rai Choudhuri (C1), Pabitra Kumar Das (C2), Asoke Kumar Gupta (C11), Chittaranjan Dey (C17), Nirnal Chandra Dey (C25), Tarani Kanta Paul Roy (C29), Ranjan Kumar Bhattacharyya (C35), Kalipada Chakravorti (C36), Sankar Bhaduri (C41), Soobimal Chandra Ghosh (C45), Nihar Ranjan Mukherjee (C51), Anuraajan Mukherjee (C56), Arun Kumar Maitra (C59), Sudhendra Sekhar Das (C65), Birendra Kumar Nandi (C67), Harekrishna Paul (C377), Subodh Kumar Mukherjee (C83), Purnendu Bhushan Home Roy (C98), Profulla Kumar Basak (C109), Nirmalendu Basu Choudhury (C134), Bisnu Charan Poddar (C159), Radhashyam Nath (C160), Bimal Jyoti Sanyal (C171), Nagendra Chandra Das (C172), Rabindra Nath Mukherjee (C177).

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Part I, Sec. A: Abhijit Rou Choudhury (C14), Lalit Mohan Chatterjee (C22), Kamalendra Nath Dutta Roy (C31), Debesh Prasanna Sen (C43), Lekraj Munzil (D1), Ramesh Chandra (D3), Sadhulal Srivastava (D6), Surinder Kumar Gandhi (D19), Anil Chandra Bhattacharyya (D21), Lakhan Lal Chaurishya (D35), Manohar Singh Babel (D36), Kailash Shankar Tandon (D40), Premnath Kapoor (G1), Debiprosad Sinha (G2), Jay Krishna Prosad (G5), Narayan Singh (G6), Tej Paul Sharma (N6), N. Wamanarao Deshpande (N7), M. R. Kulkarni (N8), P. N. Sahasrabudhe (N21), D. K. Ganibhir (N22), Gunendra Krishna Barori (P1), G. P. Sinha (P23), Balbir Singh Bakshi (P24).

Part I, Sec. B: Anantlal Banerjee (C9), Lalit Mohan Chatterjee (C22), Kamalendra Nath Dutta Roy (C31), Lekraj Munzil (D1), Sadhulal Srivastava (D6), Surinder Kumar Gandhi (D19), Mukul Beharilal Gandhi (D25), Monohar Singh Babel (D36), Kailash Shankar Tandon (D40), Jay Krishna Prosad (G5), Narayan Singh (G6), Harinarayan Mangalamurti (N1), R. M. Bhurnalkar (N14), H. Z. Fulzeli (N20), P. N. Sahasrabudhe (N21), M. S. Wate (N26), Gunendra Krishna Barori (P1), G. P. Sinha (P23).

Part I, Sec. C: Kamalendra Nath Dutta Roy (C31), Ramesh Chandra (D3), Sadhulal Srivastava (D6), Surinder Kumar Gandhi (D19), Mukul Beharilal Gandhi (D25), Lakhan Lal Chaurishya (D35), Manohar Singh Babel (D36), Kailash Shankar Tandon (D40), Gunendra Krishna Barori (P1), Balbir Singh Bakshi (P24).

Part II, Sec. A: M. S. Rangaswamy (B8), S. V. Srinivasachar (B9), Francis Mathew Alloor (B18), S. Oliver Francis (B19), P. D. George (B20), N. S. Murty (B24), Lekraj Munzil (D1), Haken Singh Panjete (D2), D. R. Chowla (D14), Surinder Kumar Gandhi (D19), Lakhan Lal Chaurishya (D35), Manohar Singh Babel (D36), Kailash Shankar Tandon (D40), J. S. Rakhi (D39), Paranjape Sadasshiv Hanumanta Rao (N27), Narayan Yeshwentrao Gore (N28), Satish Chandra Ghosh (P23), Sedananda Jha (P13), Nalini Ranjan Jha (P16), Mahesh Chandra Prosad Singh (P18), Ramnarayan Gupta (P21), Nagendra Prosad Singh (P22), Balbir Singh Bakshi (P24).

Part II, Sec. B: Paranjape Sadasshiv Hanumanta Rao (N27), Nalini Ranjan Jha (P16), Ramnarayan Gupta (P21), C. Prabhakar (B1), S. A. Rajendran (B3), S. V. Srinivasachar (B9), Francis Mathew Alloor (B18), P. D. George (B20), N. S. Murty (B24),

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Ramesh Chandra (D3), Banki Behari Mehra (D6), Bharat Bhusan Behl (D23), Manohar Singh Babel (D26), Paranjape Sadashiv Hanumanta Rao (N27), Nalini Ranjan Jha (P16), Ramnarayan Gupta (P21).

Field Survey Certificate Examination—February 1956

Part I, Sec. A : Adhir Chandra Adhikari (C9), Jagadindu Sarkar (C10), Nalini Mohan Chakravorti (C12), Santosh Kumar Chatterjee (C21), Ananta Lal Banerjee (C28), Moti Singh Rathore (D2), Shadi Lall (D5), C. A. K. Arthur (D22), T. R. Sharma (D23), Amarendra Nath Mandal (G1), Rajjit Kumar Mukherjee (G6), H. S. Sachdeva (L4), D. C. Chaturvedi (L5), Kundan Lal (L8), Ram Adhar Singh (L10), Panna Lal Pal (L11), G. T. Samnani (L13), R. S. Dikshit (L18), Surendra Singh Chauhan (P3), Achintya Kumar Chatterjee (P6).

Part I, Sec. B : J. S. Patnaik (B2), V. Srinivasa Rao (B3), Khagendra Mohan Ganguly (C2), Nalini Mohan Chakravorti (C12), Abhijit Roy Choudhuri (C19), Rampada Dutta (C30), Sharad Madhav Wathare (D1), Moti Singh Rathore (D2), Shadi Lall (D5), Lakhan Lal Chaurishya (D19), C. A. K. Arthur (D22), T. R. Sharma (D23), Ramesh Chandra (D24), Surinder Nath Kapur (D27), Amarendra Nath Mondal (G1), Premnath Kapoor (G2), Thakur Indradeo Sharma (G5), Ranjit Kumar Mukherjee (G6), H. S. Sachdeva (L4), D. C. Chaturvedi (L5), Kundan Lal (L8), Panna Lal Pal (L11), G. T. Samnani (L13), R. S. Dikshit (L18), Premprakash Sharma (P2), Surendra Singh Chauhan (P3), Kameshwar Nath Srivastava (P6), P. K. Kulkarni (PN4).

Part I, Sec. C : V. Srinivasa Rao (B3), Khagendra Mohan Ganguly (C2), Santi Ranjan Nandi (C4), Sudhir Chandra Chakravorti (C6), Motilal Bhattacharyya (C40), Sharad Madhav Wathare (D1), Moti Singh Rathore (D2), Lekhranj Munzil (D4), Shadi Lall (D6), C. A. K. Arthur (D22), T. R. Sharma (D23), Prem Nath Kapoor (G2), Jai Krishna Prasad (G3), Narayan Singh (G9), H. S. Sachdeva (L4), D. C. Chaturvedi (L5), Kundan Lal (L8), Ram Adhar Singh (L10), Panna Lal Pal (L11), G. T. Samnani (L13), R. S. Dikshit (L18), Prem Prakash Sarma (P2), Surendra Singh Chauhan (P3), Kameshwar Nath Srivastava (P6), Achintya Kumar Chatterjee (P6), P. K. Kulkarni (PN4), Nilkanth Wamanrao Deshpande (X23).

Part II, Sec. A : R. Sehadri (B1), S. R. David (B7), G. K. Venugopal (B9), S. A. Rajendran (B10), P. Ramkrishna Menon (B11), C. Prabhakar (B16), Moti Singh Rathore (D2), Shadi Lall (D5), Bharat Bhusan Behl (D7), Kailash Chandra Chopra (D12), Yogendra Paul Seth (D13), Bankey Behari Mehra (D17), Ram Lal Ahuja (D18), Brehma Prakash Soni (D20), C. A. K. Arthur (D22), Ramesh Chandra (D24), Hukum Chand Chaurishya (D25), Bhola Nath Roy (L1), S. N. Srivastava (L2), M. Ranjan Ali (L3), H. S. Sachdeva (L4), S. S. Banga (L8), S. S. Yadava (L21), Surendra Singh Chauhan (P3), Y. D. Shende (PN2), Z. B. Kothari (PN21).

Part II, Sec. B : R. Sehadri (B1), S. R. David (B7), S. Oliver Francis (B8), P. Ramkrishna Menon (B11), Agni Kumar Das (C29), Johari Lal Ghosh (C32), Lekh Raj Munzil (D4), Shadi Lall (D5), Kailash Chandra Chopra (D12), Lakhan Lal Chaurishya (D19), Bhola Nath Roy (L1), M. Ramzan Ali (L3), H. S. Sachdeva (L4), S. S. Banga (L8), Godadhar Prasad (P10), Z. B. Kothari (PN21).