

STATISTICAL INSTITUTE
ANNUAL REPORT
April 1956—March 1957

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INDIAN STATISTICAL INSTITUTE

TWENTY-FIFTH ANNUAL REPORT : April 1956—March 1957

PART I : CONSTITUTION AND ACTIVITIES OF THE INSTITUTE

1. The Indian Statistical Institute completed the twenty-fifth year of its existence on 17 December of the year under review (April 1956 to March 1957). Though work on statistics on scientific lines had started much earlier under the guidance of Professor Mahalanobis in what was known as the Statistical Laboratory, the Institute as such came into existence by a resolution passed at a public meeting held on 17 December 1931 under the Chairmanship of the late Sir R. N. Mookerjee who was elected the first President of the Institute and held that office for 5 years (1931-36). The Institute was registered as a non-profit learned society under Act XXI of 1860 in April 1932.

2. Starting with a single part-time computer and a total current expenditure of Rs. 238 in the first year, the Institute has passed through alternating stages of acute financial difficulty and relative prosperity in reaching its present dimensions when it has a staff of over 1750 paid workers and a current expenditure budget of about Rs. 72 lakhs. During the first few years of its existence the Institute was mostly engaged in analytical studies including design of experiments. Gradually it began to undertake small-scale enquiries (indebtedness of agriculturists, economic conditions of handloom weavers, consumer preferences, etc.) on behalf of Government departments and private concerns. From 1936 the Institute became increasingly involved in crop estimating and land utilization surveys undertaken on behalf of the Indian Central Jute Committee, the Government of Bengal and the Government of Bihar and developed the technique of large-scale sample surveys for this purpose. Since 1950 the Institute has taken a leading part in planning, organizing and carrying out the National Sample Survey at the desire of the Government of India; since 1954 it is actively helping in the work of planning for national development. A short history of the origin and development of the Institute is given in Appendix I of this report.

3. *Constitution* : The supreme control of the Institute is vested in the general body of members of the Institute, which includes ordinary, life and honorary members, honorary fellows and patrons. It is this body which has the authority to make and amend the rules of the Institute. The Annual Report and Audited Accounts are presented at the Annual General Meetings; other General Meetings are held whenever necessary.

4. *Management* : The management of the Institute is vested in a Council consisting of the President, Chairman, two or more Vice-Chairmen, Treasurer, Secretary and other office-bearers, and 20 members, elected by the members of the Institute, and ex-officio representatives of regional branches and co-opted members. Subject to overall coordination by the Council, the management of the Research and Training School is vested in a

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Governing Body with elected representatives of the Council, of the Government of India, and of a number of public bodies. There are two finance committees, one of the Governing Body and the other of the Council; an *ad hoc* committee for allocation of expenditure on which the Government of India is represented; a journal committee and an examinations committee. There are several other committees, executive and technical, for carrying out the day-to-day administration and for coordination of the work of different departments.

5. *Audit*: The Institute has a chartered accountant as internal auditor, while a firm of chartered accountants, qualified to audit accounts under the Companies Act, is appointed by the General Body of members at the Annual General Meeting as external auditor.

ACTIVITIES

6. The Institute's activities which cover a wide field can be grouped into the following sectors:

1) *Society-type Activities*: The Institute has, since its establishment, functioned as a learned society, with *Sankhyā: The Indian Journal of Statistics* as its official organ. It has society-type branches in Aligarh, Bangalore, Bombay, Delhi, Madras and Poona, each branch having its own managing organization. The Institute also promotes a two-way flow of scientific visits for maintaining contacts with scientific institutions and workers in different parts of India and in other countries of the world.

2) *Research and Training School (RTS)*: The Institute maintains a Research and Training School for post-M.Sc. training in professional statistics, and offers facilities for advanced study and research in both theoretical and applied subjects. The RTS has well-equipped departments for theoretical and applied statistics, biometry, psychometry, demography, anthropology and applied economics. The School also organizes the training of statistical computers at different levels and conducts several other special courses of training in collaboration with the Central Statistical Organization of the Government of India.

3) *Examinations*: Since 1938 the Institute has been holding all-India examinations in a number of centres in the Indian Union for the award of Statistician's Diploma and Computer's Certificates and also Certificates of Proficiency in Field-Work.

4) *Projects*: The Institute has for many years been actively carrying out large-scale sample surveys for the collection of information on agricultural crops and social and economic conditions of people on behalf of different governments and other parties with the help of contract grants. The Institute has been handling since 1950 the big project of the design and technical work of the Indian National Sample Survey financed by the Government of India. A very large portion of the Institute staff is at present engaged in this project.

5) *Electronic Computer*: The Institute has an Electronic Computation Laboratory, which maintains an electronic digital computer HEC-2M and renders computation service

to different departments of the Institute and other scientific institutions in India. The Laboratory is also engaged, in collaboration with the Workshop, in developing devices and equipment for electronic computers.

6) *Development Workshop* : The Institute has a well-equipped Workshop which, in addition to the maintenance and servicing of calculating machines and instruments and equipment of the Institute, assists the Electronic Computer Laboratory in the maintenance and development of electronic computers. The Workshop is carrying out developmental work for the manufacture of desk calculating machines and scientific instruments. It has recently received many items of precision tools and equipment from the USSR through the United Nations.

7) *Statistical Quality Control (SQC)* : The Institute maintains three whole-time Statistical Quality Control (SQC) Units, at Bangalore, Bombay and Calcutta to give service to industrial concerns on a fee basis and also to promote the use of SQC generally. General guidance is given in this matter by a Policy Advisory Committee set up by the Government of India.

8) *Operational Research Relating to Planning* : The Institute is engaged in Operational Research relating to planning for national development since 1954 when studies in this connexion were inaugurated by the Prime Minister Sri Jawaharlal Nehru. The first phase of the work led to the preparation of the "Draft Plan Frame" which was submitted to Government in 1955 and was accepted as the basis for the formulation of the Second Five-Year Plan. Since then one unit has been engaged in economic analysis and studies relating to planning, while another unit posted in Delhi is working on problems of scientific and technical man-power and perspective planning in collaboration with the Planning Commission. An experimental unit for the study of the economics of cottage industries, called *Kalyanasari**, was started in Calcutta in 1955. Another unit, the Industrial Management Research Unit for Planning (IMRUP), was also started in 1955 with its headquarters at Bangalore for research and studies in industrial management. Another unit was started in 1956 for research in regional planning with emphasis on geographical surveys with headquarters at Bangalore. The work on planning is being done in collaboration with the Central Statistical Organization, the Planning Commission and relevant Ministries of the Government of India.

9) *General Services* : The Institute has a central library consisting of over 80,000 volumes and more than 1,200 journals and periodicals. There is a Translation Unit attached to the Library which is engaged in translating documents of interest for purposes of planning from the Chinese, the Japanese, and the Russian languages. There is also a well-equipped photographic section. The Institute has a Machine Tabulation Unit with punched card equipment of both Hollerith and Powers-Samas types consisting of about 20 sorters, 18 tabulators and necessary complements of multipliers, collators, reproducers and gang-punching equipment in Calcutta and a smaller unit at Giridih and Delhi. There is an Estate Department for the construction, repair and maintenance of the Institute's buildings, roads, grounds, furniture and other equipment.

* The spelling adopted in this Report is 'Sri' instead of 'Shri or Shree' in accordance with the existing international convention for transliteration from the Devanagiri (or Sanskrit) into the Roman script.

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10) *Social Services* : The Institute maintains hostels for students, a canteen for supplying subsidized meals and refreshments, a circulating library, medical units including a health home at Giridih, a night school, an adult literacy centre, an educational aid unit, and a workers' club for sports, recreation and cultural activities. The Institute also publishes a house-journal, "Samvadadhvam". It provides for a good deal of "in-service" training. There is also a workers' Cooperative Credit Society. The Institute maintains guest-houses for visitors and a transport unit whose main function is to provide transport for the conveyance of workers between the Institute premises at Baranagar and the city.

7. In addition to the work done under the direct control of the Institute, the following associated organizations located in or near the Institute work in close cooperation with the Institute :

1) *International Statistical Education Centre (ISEC)* : Established in 1960 under the auspices of the UNESCO it is run under the joint direction of the International Statistical Institute and the Indian Statistical Institute with the support of the Government of India.

2) *Statistical Publishing Society* : This was established in 1936 on the initiative of the Institute as a non-profit association and registered under Act XXI of 1960 for the publication of Sankhyā : The Indian Journal of Statistics. The Society maintains the Eka Press which is adequately equipped for undertaking scientific and technical work.

3) *Indian Calculating Machine and Scientific Instrument Research Society* : This was established in 1943, on the initiative of the Institute, as a non-profit society registered in 1943 under Act XXI of 1960 with the object of promoting research, study, production and use in India of calculating machines, statistical, mathematical, scientific and engineering instruments and apparatus and appliances. This Society is now working in association with the Institute Workshop.

8. The main premises of the Institute are at present located on the Institute's own land of 4.78 acres at 203 Barrackpore Trunk Road in a multi-storeyed building with a floor-space of over 62,000 sq. ft. and about 21,260 sq. feet of ground-floor space in sheds. In addition, about 60,000 sq. feet of floor-space are occupied by the Institute at 202 Barrackpore Trunk Road which has been placed at the disposal of the Institute by the Government of India. The Institute also uses about 60,000 sq. feet of space in rented premises in Baranagar and Calcutta. The Institute has about 35 acres of land and a working branch with a staff of about 130 persons at Giridih. It also maintains offices at Bangalore, Bombay and Delhi.

9. *Twenty-fifth Anniversary* : The 25th Anniversary of the Institute was celebrated in December 1956 and January 1957. Members of the staff and their friends and many foreign and Indian Scientists attended the two general meetings held on 17 December 1956 and on 22 December 1956 in the mango grove on the Institute's grounds. The most important feature of the celebrations was a programme of about 80 lectures and seminars by leading statisticians and economists from different parts of India and abroad, spread over nearly three weeks. There was also a crowded programme of entertainments, such as a musical soiree, staging of Bengali plays, a folk play and cinema shows. A detailed account is given in Appendix 2.

PART 2 : YEAR UNDER REVIEW

1. *Planning for National Development* : When the Institute undertook its first sample survey way back in the early thirties, the first step was taken in a direction which was ultimately to result in the Institute undertaking planning for national development as its principal objective. It is in terms of this objective that a brief survey can best be made of the work of the Institute during the year under report (April 1956-March 1957).

2. In the Planning Division of the Institute, while an attempt was made to prepare an annual plan, the main emphasis was on long-range or perspective planning. Particular mention should be made in this connexion of Professor N. Kaldor's work on taxation undertaken under the auspices of the Institute which has since been largely drawn upon by the Union Government in framing its latest budget.

3. *Industrial Management Research* : The Industrial Management Research Unit for Planning (IMRUP), which actually started functioning on the very first day of the year under report, has already carried out investigations in regard to management, control and human relationship in three public enterprises, namely, the Mysore Iron & Steel Works, the Hindustan Shipyard (Private) Ltd., at Vishakapatnam and at the Sindri Fertilizers & Chemicals (Private) Ltd., besides certain studies within the Institute itself.

4. *National Sample Survey* : By far the most important project in the way of economic surveys, now under way in the country, is the National Sample Survey, a countrywide fact-finding agency operated jointly by the Government of India and the Institute. The surveys are organized in rounds—roughly two every year. During the year under review, the 10th round of the Survey, started in the preceding year as well as the field-work for the 11th round were completed. The 12th round was started early in 1957.

5. *National Sample Survey Review Committee* : A Committee, with Sir Ronald A. Fisher as Chairman, and Messrs. Morris Hansen (USA), Arthur Linder (Switzerland), Tosio Kitagawa (Japan) and Frank Yates (UK) as members, which had been set up with the approval of the Government of India, assembled in Calcutta in December 1957 and examined the work of the National Sample Survey and submitted its report in January 1957. The Committee appreciated the foresight shown in setting up this fact-finding agency and, while commending generally the conduct of the survey, made many valuable suggestions for its improvement and indicated lines of future development. The Institute in due course passed on this report with its own observations to the Government of India.

6. *Research and Training* : Besides carrying out theoretical research at a high level, the RTS has made it its duty to turn out trained personnel for statistical work. The number of persons who received training during the year under report was 350. Training in statistics is also imparted by the International Statistical Education Centre run jointly by the International Statistical Institute and the Indian Statistical Institute. Since its inception in October 1950, the Centre had conducted 10 terms of training up to April 1957 for 231 participants from 17 Asian countries.

7. *Surveys, Reports and Research Papers* : Ten sample surveys and pilot studies were conducted during the year, the total number till the end of the year being 185. The

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number of reports on large-scale sample surveys submitted during the year was 9, bringing the total till the end of the year to 84. Altogether 48 working papers were drafted for circulation during the year under review, the total number of such papers circulated till the end of the year was 144.

8. The research papers and reports submitted by the workers during the year numbered 36, making a total of 577 of such papers and reports published till the end of the year.

9. The Research and Training School also brought out during the year 4 occasional publications.

10. *Visit to Japan and China*: A delegation consisting of Sri Pitambar Pant, Sri R. Natarajan and Sri M. Mukherjee visited China and Japan in the summer of 1956. Professor Mahalanobis was to have joined the delegation in Japan on his way back from the USA, but unfortunately he was suddenly taken ill in the USA and in his absence Sri Pitambar Pant acted as the leader of the delegation. Leaving Calcutta on 10 June 1956, the delegation spent about a month each in Japan and China and returned to Calcutta on 19 August. The delegation studied various aspects of planning in both the countries and brought back valuable materials on the subject.

11. Before passing on to the sectional reports mention should be made of two notable events of the year under review:

a) *Visit of the Chinese Premier*: Premier Chou En-lai, accompanied by Mr. Ho Lung, Vice-Premier of the People's Republic of China, visited the Institute on 9 December 1956 and was taken round the different departments in the activities of which they showed keen interest. Mr. Chou En-lai observed during the visit that technical cooperation between China and India in the field of statistics and planning would be very welcome. His visit was followed by that of a delegation from China led by Mr. Wang Szu Hua, Vice-Director of the Chinese Central Bureau of Statistics, who came to India as guests of the Institute and stayed in the country from 11 December 1956 to 15 January 1957 studying sampling and other statistical methods in use in India. It is expected that these visits will strengthen the ties between India and China.

b) *Conferment of Doctorate (Honoris causa)*: In connexion with the Centenary Celebrations of the Calcutta University the degree of Doctorate of Science (*honoris causa*) was conferred among others on the following persons who are intimately connected with the Institute: Sri Chintaman D. Deahmukh, President; Professor Satyendranath Bose, Vice-President; Professor Prasantsahandra Mahalanobis, Director and Professor T. Kitagawa, a Visiting Professor and a member of the Institute Council.

A brief history of the Institute is given in Appendix 1.

1. RESEARCH AND TRAINING SCHOOL

1. The main activities of the Research and Training School (RTS) fall under the three heads: (i) research; (ii) consultation and (iii) training. A brief account of the work is given below. Full details will be found in a separate report of the Research and Training School.

(i) Research

2. The research programme of the RTS for the year covered both statistical theory and the logic of statistical inference as well as the development and use of statistical tools for application to specific problems. On the theoretical side, the studies included design of experiments, estimation, tests of hypotheses, stochastic processes and problems of distribution. On the applied side, the Psychometric Unit of the RTS was engaged in developing techniques for selection of personnel both within and outside the Institute, the preparation, scoring and validity of psychological tests and other studies. The Anthropometric Unit was busy with the standardization of measurements on the living. The Biometric Unit continued its work on certain bio-chemical studies, blood group tests and other problems. A summary of research work in theoretical statistics together with a full list of papers contributed, is given in Appendix 3.

3. The RTS also collaborated in the researches in other sections, such as, the design of sample surveys and other studies in the National Sample Survey (NSS) and associated projects; mathematical models for economic planning and other problems in the Planning Division; problems in high speed computation in the Electronic Computer Laboratory and industrial sampling and associated problems in the Statistical Quality Control Units of the Institute. A fuller account is given in the separate Report of the Research and Training School.

4. *Research Seminars*: Besides the seminars periodically conducted by the RTS for exchange of ideas among the staff and students, several courses of lectures on recent advances in mathematics and statistics were arranged during the year. Among them, mention may be made of a course on biometry by Professor J. B. S. Haldane of the University College, London*; on statistical inference by Professor G. A. Barnard of the Imperial College of Science and Technology, London; and on operational research by Dr. R. L. Ackoff of the Case Institute of Technology, USA.

(ii) Consultation

5. *Scientific Enquiries*: As in previous years, the RTS continued during the year to provide consultation service for all scientific workers in the country. Advice was given in response to various enquiries on the planning of investigations and analysis and interpretation of data from research workers in various fields, government departments and business firms. Further details are given in Appendix 4.

* Professor Haldane joined the ISI as Research Professor in July, 1967.

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(iii) Training

6. An increased demand for training in statistics has led to an expansion of the scope of the training programme of the school, both in regard to the number of courses conducted and the number of trainees admitted to each course.

7. The short-term (6 months) Statistician's Course, which was introduced in 1965 for persons who are already in employment and who intend acquiring a knowledge of basic statistical methods for use in their own work, was extended to one year spread over two sessions of six months each (junior and senior courses), the senior course providing for specialization in one or two fields of application.

8. Another new feature was the introduction of short intensive courses. Two such courses were arranged during the year under review: one was a six-week course on the theory and practice of the design of experiments, for which 12 out of 84 applicants were selected; the other was a three-week course on operations research, which was attended by 30 technical workers drawn from different occupations.

9. The following courses of training (including the new courses mentioned above) were conducted during the year, the number of trainees being mentioned within brackets in each case:

- (a) Three-year Statistician's Course in collaboration with the Central Statistical Organization (CSO) of the Government of India (75);
- (b) Short-term Statistician's Course (junior and senior) (84);
- (c) Officers' Training Course (jointly with the CSO) (25);
- (d) Training of individual officers on deputation (8);
- (e) Computer's Training Course (junior and senior) (118);
- and (f) Short Intensive Courses on special subjects (42).

In addition, the staff of the RTS participated in the teaching work of the International Statistical Education Centre (ISEC).

10. *Advanced Studies*: Research scholarships were awarded to 13 students for carrying out work on subjects such as Advanced Probability, Stochastic Processes, Statistical Inference, Multivariate Analysis, Statistical Quality Control, Psychometry, Biometric Methods, etc. Three members of staff on the RTS were admitted to the degree of D.Phil. of the Calcutta University during the year; a fourth member submitted his thesis for the degree. Three research students submitted theses for the Associateship of the ISI. Details are given in Appendix 5.

2. INTERNATIONAL STATISTICAL EDUCATION CENTRE

1. The International Statistical Education Centre (ISEC), Calcutta, was opened in October, 1950 under the auspices of the UNESCO. It is being run 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 selected participants from countries of the Middle, South and Far East.

2. During the year under review, important decisions were taken by the Government of India regarding the future of the ISEC. During the past six years of its existence,

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the work of the centre was reviewed every year and grants for its maintenance made by the Government of India on a year-to-year basis. This has made it difficult to plan the programme of the centre in advance. The Government of India have now kindly sanctioned grants to the ISEC up to the end of the Second Five-Year Plan period (1960-61).

3. Since its inception up to April 1967, the centre has conducted 10 terms of training of either six months or nine months for 231 participants from the following 17 Asian countries : Afghanistan, Burma, Cambodia, Ceylon, India, Indonesia, Iran, Iraq, Japan, Malaya, Nepal, Pakistan, Philippines, Singapore, Syria, Thailand and Vietnam.

4. The 9th term terminated about the middle of April 1966. The 10th term, which started on 18 July 1966, terminated in April 1967. During this term, 30 candidates were selected from 38 applicants and 28 candidates from 8 countries actually joined and received training; 18 students came from outside India: 2 each from Burma, Ceylon, Philippines, Singapore and Thailand and 4 each from Japan and Pakistan. A full list of students is given in Appendix 6.

5. *Instruction* : The course of training during the 10th term consisted of lectures, laboratory work, seminar discussions and on-the-job training. The first four months were devoted to theoretical work involving about 175 lectures and 400 hours of laboratory work. About a month was spent in imparting training in statistical projects in the ISI. Another 2 months were set apart for a specialization course, for which students were divided into appropriate groups. This was followed by a course of training in official statistics for a month in the CSO at New Delhi. Instruction at the Centre was provided by the staff of the RTS and project divisions of the ISI, statisticians and economists in the CSO and from various ministries and departments of the Government of India and visiting teachers from abroad.

6. In addition to their regular work, the students of the ISEC had an opportunity to attend various lectures and seminars held in the ISI. For example, they attended the series of seminars in the ISI which formed a part of the 25th Anniversary Celebrations of the Institute.

7. *Fellowships* : The Government of India have awarded, under the Technical Cooperation Scheme (Colombo Plan), 102 fellowships to ISEC trainees during the first nine terms and to 17 students during the 10th term.

8. *Certificates* : Out of the 29 students who joined the 10th term, one from India could not complete the course. The remaining 28, having satisfactorily completed the course, were awarded certificates at a function held on 5 April 1967.

9. *Students' activities* : The students were taken out on an educational tour to places of historical interest, such as, Agra, Banaras, Gaya and a Community Project Centre at Nilokheri near Delhi. Excursions were also organized to places of interest in and around Calcutta. A souvenir volume covering the 10th term has already been prepared and is available for circulation.

10. *Symposium on the teaching programme of the ISEC* : Advantage was taken of the presence of statisticians from various countries during the 25th Anniversary Celebrations of the ISI to organize a symposium on the teaching programme of the ISEC, which was

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held on 26 December 1956. Among those who participated were Mr. A. Afzal (CSO, Pakistan), Mr. S. K. Banerjee (ISEC Student, Calcutta), Dr. C. Chandrasekharan (Ministry of Health, New Delhi), Mr. Q. M. Hussain (Dacca University), Prince M. C. Athiporn P. Keemaeri (CSO, Thailand), Mr. Faiz El. Khuri (ISEC, Beirut), Dr. N. Keyfitz (Bureau of Technical Cooperation, Colombo), Mr. E. Lunenberg (International Statistical Institute, The Hague), Dr. A. Matthai (Indian Statistical Institute), Mr. R. Minobe (Bureau of Standards, Tokyo), Dr. P. B. Patnaik (CSO, New Delhi), Dr. B. Ramamurti (CSO, New Delhi), Dr. C. R. Rao (Indian Statistical Institute), Mr. S. Sen Gupta (Eastern Railway, Calcutta), Dr. M. Ziauddin (Punjab University, Lahore) and Professor A. Linder (University of Zurich). Professor Linder was the Chairman of the Symposium. On the basis of discussions at the Symposium, a committee on teaching courses was appointed consisting of six members nominated from among the participants. The committee made recommendations on different types of courses, curricula of the courses, system of examinations, award of certificates and the selection procedure of candidates. Some of the recommendations will be given effect to in the 11th term.

3. PROFESSIONAL EXAMINATIONS

1. Since 1938 the Institute has been conducting professional examinations on an all-India basis for the award of certificates for computers and field investigators and of post-graduate diplomas for statisticians. These examinations are conducted by an Examinations Committee consisting of statisticians and economists selected from all over India. The examinations are open to all candidates who satisfy certain educational and/or training requirements. Paper-setting and examination of scripts are done by examiners selected by the Examinations Committee from both inside and outside the Institute. These examinations are of a professional nature.

2. Apart from the examinations mentioned, the Institute also awards its Associate-ship and Associate Fellowship to candidates on the basis of certain regulations which are somewhat similar to those recently initiated by the Royal Statistical Society and are conducted by a standing committee appointed under the regulations.

3. For statistical and computational posts in some Government and private institutions, the Institute's diplomas and certificates are given as much weight as university degrees.

4. During the year under review, professional examinations were held twice, in September 1956 and in March 1957. In the September examinations, there were 121 candidates for Statistician's Diploma, 148 candidates for Computer's Certificate and 72 candidates for the Field Survey Certificate. The examinations were held at 8 Centres: Bangalore, Bombay, Calcutta, Giridih, Lucknow, Madras, New Delhi and Poona. 50 candidates were successful in at least one paper of the Statistician's Diploma Examination; the corresponding figures for Computer's Certificate and Field Survey Certificate were 136 and 24 respectively. The March examinations commenced during the last week of the month; the number of candidates registered were 133 for Statistician's Diploma, 180 for Computer's Certificate and 82 for Field Survey Certificate. The results of the examinations published during the year are given in Appendix 7.

4. NATIONAL SAMPLE SURVEY

1. The National Sample Survey (NSS) is a country-wide fact-finding agency operated jointly by the Government of India and the Indian Statistical Institute (ISI). The Field Branch is under the control of the Cabinet Secretariat and the statistical work is done in the Institute. Although a large part of the work done in the Institute is of an operational nature, a good deal of research and experimental studies are being carried on in the Institute to improve the design of the survey and the techniques of collection, processing and analysis of the data. Only a general account of the work done during the year under review is given here. More detailed information will be found in Appendices 8, 9, 10, and 11.

2. The survey is organized in rounds, roughly two every year. The 10th round of the survey, which commenced in December 1955, was completed in May of the year under review. Immediately after this, a special survey was carried out at the request of the Ministry of Food and Agriculture.

3. The field work for the 11th round was started in August 1956 and completed in February 1957. In addition to standard items, detailed information was collected, at the desire of the Ministry of Labour, regarding agricultural labour, such as size and composition of agricultural labour households, employment, wages, income, expenditure etc. Some information was also collected in this round, at the instance of the Standing Metric Committee, on different systems of weights and measures actually used in the country.

4. The 12th round of the survey, which started early in 1957, was scheduled to be completed by August 1957. There was no substantial change in its scope apart from introduction of a new schedule designed to ascertain the output of milk in the country. The agricultural labour enquiry was continued in this round and certain improvements were incorporated in the schedules on the basis of discussions with the Agricultural Labour Unit of the Labour Ministry. The field training conference for this round was held in February 1957.

5. The 5th round of the sample survey of manufacturing industries (SSMI), covering the reference year 1955, started during the year under review. A survey of some scheduled industries, listed in the First Schedule of the Industries (Development and Regulation Act, 1951), was conducted for the first time along with the 4th round of the SSMI. The scope of the SSMI was extended in the 5th round to cover nearly all the industries under the above Act. Several new items were introduced in the schedule with a view to collecting information regarding various labour welfare measures. Information was also collected on the occupational structure of employment, with particular reference to skilled personnel, which was urgently required by the Planning Commission.

6. Considerable progress was made in the preparation of reports. Ten draft reports were got ready, out of which nine were submitted to the Government for obtaining clearance for final release; clearance was received for the publication of four reports and four reports were in the press. Apart from these reports, information collected through the NSS was supplied to a number of Government and other agencies.

7. A large part of the processing work of the NSS is done mechanically in adequately equipped machine tabulation sections located at Baranagar (Calcutta), Girdih and Delhi (in the Army Statistical Office). With the addition of one new machine unit each at the

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3 stations, the present equipment comprises 2 IBM electronic statistical machines, 23 sorters, 15 tabulators, 5 multipliers, 5 collators, 21 reproducers and gaug summary punches of the Hollerith (IBM and BTM types) and 2 sorters, 1 tabulator, 1 interpolator and 1 multiplier of the Powers-Samas type.

8. Two tabulators (type T. 5), 4 sorters, 20 automatic electronic key punch duplicators and 6 electrical verifiers, received from the USSR through the UNTAA, were duly installed. These new machines were serviced and maintained by the Institute itself. The machines, which were rented from the Hollerith, IBM and Power-Samas organizations, however, continued to be serviced by the respective firms.

9. Special training courses were arranged with a view to an expansion of the operating staff. Out of 25 candidates, 12 successful candidates were absorbed at Baranagar, 5 other candidates were recruited, trained and absorbed at Giridih and 18 other trainees were selected at Giridih for training. During the year, 7 trained machine operators left the Institute, which made it necessary to organize a second training course to fill the vacancies.

10. In addition to the operational work, researches and investigations were taken up in the Research Unit and the Special Unit. The Research Unit was mainly engaged in studies for the improvement of the design of successive rounds of the NSS. This Unit made 22 pilot studies (based mostly on small self-weighting samples) to assess the quality of primary material and the effectiveness of methods of collection of data and to explore profitable lines of tabulation and analysis. The small size of the pilot samples and the simple method of estimation used made it possible for the technical workers to examine the material critically, judge its quality and recommend methods for improvement.

11. The work in the Special Unit related mainly to land utilization and crop surveys. Among the investigations taken up during the year mention may be made of experiments on land surveys in areas (near Giridih) carried out in August-October 1956, a study of the distribution of harvestable fields on different days of a crop season in three areas in West Bengal (August-October 1956), experiments with sample-cuts of various sizes and shapes for estimating the yield of crops per acre; comparison of different methods of collecting information on crops (a team visiting 6 sample-villages per month on foot, a team visiting 12 sample-villages per month on bicycles; and a team visiting 24 sample-villages per month in a motor-car), and a study to find out whether the rate of yield per acre of crops varies with the distance of the plot from the nearest road.

12. Several other studies on socio-economic conditions and on survey techniques were carried out during the year, such as a re-survey of 410 households in Calcutta (originally surveyed in April-September 1952), to study the change in the pattern of consumption, in which only 280 of the original households could be traced; a study to find out how information on consumer expenditure varies when the data are collected from different respondents; an experimental study of the level and character of trading activity in West Bengal; a pilot survey with pre-coded schedules; a complete enumeration of population on census slips in 3 census blocks by one investigator in November 1956, which was repeated later by a second investigator to study the accuracy of complete enumeration; a study of biases in enquiries on household consumption in Calcutta which was started in January 1957.

13. A number of agricultural field trials were also conducted in the Institute's own farm at Giridih to study the effect of different numbers of seedlings per hole, different

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spoings between holes and different treatments of fertilizers in the case of paddy; the effect of fertilizers on sugarcane; and the progressive maturity of *amaa* paddy transplanted according to the Japanese method.

14. The Demographic Unit conducted a preliminary survey of family planning in 49 census blocks of Calcutta in the course of which married persons in 8000 households were interviewed. A somewhat similar survey was made of the extent to which the benefits of hospital services were actually availed of in Calcutta by interviewing a sample of ex-patients of hospitals.

15. *Review Committee* : Mention has been already made of the NSS Review Committee in an earlier section. The NSS staff derived much benefit on the technical side through personal discussions with distinguished members of the Committee. The recommendations made by the NSS Review Committee were examined by the NSS staff and the views of the Institute were submitted to Government.*

5. ELECTRONIC COMPUTATION

1. An important part of the research activity of the ISI in recent years has been the development and utilization of digital electronic computation. A general purpose electronic computer, HEC-2M, which was received in February 1956, started work under full load during the year under review. A fair number of computational problems submitted by the departments within the Institute and by other scientific institutions and Government departments were solved on this machine. Mention may be made of the following institutions from whom problems were received :

(1) The Andhra University, Waltair; (2) The Indian Institute of Technology, Kharagpur; (3) The Indian Institute of Science, Bangalore; (4) The Indian Association for the Cultivation of Science, Calcutta; (5) The Physical Research Laboratory, Ahmedabad and (6) The Tata Institute of Fundamental Research, Bombay.

2. The Institute staff not only maintained this complex and delicate machine but also spotted out the most frequent causes of breakdown and made a large-scale modification of the machine with a view to eliminating these causes. Some useful monitoring devices have already been added to this machine. Experiments have also been started to replace the mechanical switching device of HEC-2M machine by an all electronic switch. Some experiments on magnetic gates have also been made.

3. A large number of electronic instruments, consisting of 10 synchroscopes, 6 Q-meters, 6 pulse generators, 10 vacuum tube volt-meters, 4 quartz calibrators, 8 insulation testers, 10 ampere-volt meters, 8 universal resistance bridges, 6 tube testers, 15 volt-ohm meters, 10 signal generators and a few audio-signal generators, were received during the year from the USSR under the United Nations Technical Aid Programme. The Russian machines received were maintained by the staff of the section and regular training on the plug-board setting and operations of these machines was also undertaken. A number of simple computational problems were solved on the Russian Tabulator by an ingenious setting of the plug-board, thus relieving the electronic computer of some of its load.

* Since then the Institute has set up a Special Committee consisting of Professor D. R. Gadgil, Sri J.J. Anjaris and Sri N. C. Chakravarty.

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4. Transferring data from 86-column Powers-Samas to 80-column IBM cards presented a serious problem in the Institute. (A machine for the reverse operation, that is, for transferring information from IBM cards to Powers-Samas cards, is available in the market). The design of a scrap reproducer was modified to solve this problem and a few thousands of cards were reproduced successfully in the new machine.

5. A new method of finding the reciprocal of a matrix of a large order on electronic computers was evolved during the year. If the matrix happens to be singular, the method can dictate the presence of singularity and the coefficients of the linear dependence of the column (or row) vectors can be determined directly from the results of previous computation. The method has been successfully applied to the problem of inverting a matrix of order 34 which arose in connexion with an econometric problem. Several research papers on numerical analysis, applied statistics and electronic engineering were completed by the members of the staff.

6. Mr. Konoplev, a senior engineer from the USSR deputed by the UNTAA and Academician Dorodnitsin of the USSR Academy of Science, gave lectures during the year on the electrical system of the Russian tabulators and on the organization and activities of the Computing Centre of the Academy respectively. Mr. S. N. Alexander, Chief of the Data Processing Systems Division of the National Bureau of Standards, USA, whose visit was sponsored by the American Government, delivered 4 lectures on the research and development of high speed electronic computers in the National Bureau of Standards and also participated in numerous technical discussions with the members of the Institute.

7. Four engineers, deputed by the Departments of Radiophysics and Electronics of the Calcutta University, successfully completed training in electronic computation in the Institute during the year.

a. STATISTICAL QUALITY CONTROL

1. The Institute has been advocating since 1935 the use of Statistical Quality Control (SQC) in the country and since 1950 has been maintaining three SQC Units in Calcutta, Bombay and Bangalore with the help of grants from the Government of India. The programme included (a) introduction and maintenance of SQC in factories, (b) training and (c) promotion of SQC in general. Service, which is partly subsidized, is given to member firms on a fee basis. At the end of March 1957, there were 44 member firms on the roll as against 32 in March 1956.

2. *SQC Policy Advisory Committee*: It would be recalled that the SQC Policy Advisory Committee was set up in 1954 under the Chairmanship of Sri C. D. Deshmukh, then Finance Minister of the Union Government. In the year under review at a meeting held on 7 January 1957 Sri Deshmukh suggested that as he was no longer connected with the Government and as the work of the Institute had also been transferred from the Ministry of Finance to the Cabinet Secretariat, the Committee might be reconstituted under appropriate Government sponsorship. All members present agreed to his suggestion and the Committee has since been reconstituted under the sponsorship of the Cabinet Secretariat with the following membership: Sri C. D. Deshmukh, Chairman; Sri K. C. Neogy, Prof. P. C. Mahalanobis, Sri G. D. Somani, M.P., Sir Shri Ram, Sri M. G. Kotibhaskar, Sri Vikram Sarabhai, Sri S. C. Jain, Dr. D. S. Kothari, Sri S. Ananta

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Ramakrishnan, Dr. Lal C. Verma, Dr. M. S. Thacker, Sri S. S. Khers, Sri Vishnu Sahay, Sri P. A. Gopalkrishnan, Dr. A. Nagarajaso, Members and Sri Pitambar Pant, Member-Secretary.

3. Mention was made in the previous year's report of the decision of the Ministry of Defence to set up a Statistical Quality Control Unit for the Ordnance Factories which would operate under the guidance in policy matters of the SQC Policy Advisory Committee. This Unit, it is satisfactory to note, achieved significant results in the very first year of its existence.

4. *SQC Unit, Calcutta* : The Unit had 10 member factories on its roll as against 8 in the previous year. Pilot investigations were conducted in 3 other factories and introductory visits were paid to 4 others. The first series of courses for local industry was organized during the year which stimulated a demand for SQC service. An advanced Seminar, held in September-October 1956, was addressed by Professor Barnard of the Imperial College of Science and Technology, London. The introductory course on SQC attracted 23 trainees from 16 factories while 16 trainees from 10 factories attended the advanced course.

5. Arrangements were made during the year for close collaboration with the Research and Training School (RTS). Three RTS trainees received practical training in SQC with the help of the Unit and the staff of the Unit participated in the RTS course on design of experiments. Lectures, talks and discussions were also organized as a part of the promotional activities of the Unit.

6. Fresh recruitments of graduate assistants and technical assistants were made in the Unit during the year; and were placed in factories under senior technicians. Training courses were organized for the benefit of managerial and technical staff in the industry. Special lectures by experts were also arranged from time to time. All staff members were encouraged to attend a course of 3 lectures on Operations Research by Mr. R. L. Ackoff already mentioned.

7. Mr. D. J. Desmond, who joined the Unit in December 1955, was away for seven months in 1956. The Unit had the benefit of guidance from Mr. A. L. Raich during the winter of 1956-57. Some experts who came by arrangements with UNTAA also helped the work of the unit during this period. The strength of the Unit was 10 technicians and 2 general assistants at the end of the year under review.

8. *SQC Unit, Bombay* : This Unit had 16 member factories on its roll as against 14 in the previous year. Apart from servicing the member factories, pilot studies were conducted in the Bombay Telephone Workshops and some testing work was undertaken on the *Ambar Charaka* yarn at the request of the All India Khadi and Village Industries Board.

9. Lectures, talks, discussions and an exhibition of "SQC in Industry" were organized by the Unit by way of promotional activities. Professor Barnard addressed a meeting of statisticians representing different industries on 27 October 1956. Mr. A. Zelinovsky, Deputy Chairman of the USSR Planning Commission and Mr. A. Poloukhine, Industrial Specialist to the USSR Economic Commission, also addressed a meeting held in their honour. Sri C. D. Deshmukh, President of the Institute and Chairman, Policy Advisory Committee on SQC, met a group of industrialists on 22 February 1957. Promotional visits were also paid to 5 factories which subsequently enrolled themselves as members.

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10. Three apprentices were trained in the Unit during the year under review. Five statisticians who joined member factories during the period under review were also trained in the Unit. The staff consisted of 11 technicians, 2 persons for general administration and 4 persons for miscellaneous and other work.

11. *SQC Unit, Bangalore* : The Unit continued to serve 15 member establishments in Bangalore, Coimbatore, Madras, Salem and some other places. Promotional activities were undertaken in and around Bangalore. A number of talks, discussions and meetings, covering theoretical and practical aspects of SQC, were organized for the benefit of technicians, managers and other executives of several establishments. Mr. A. L. Raich gave a talk on "Cost Function in Quality Control" on 16 February 1957 and Mr. D. J. Desmond a talk on "Economics of Sampling" on 28 August 1956. Professor Srinagabhushana of the Unit contributed two technical papers on "Quality Control in Textile Industry" and "Testing of Textile Materials and Statistical Approach to Testing of Textile Materials."

12. Three assistants were recruited and given training during the year. The Unit also gave training in SQC to engineers belonging to the Industrial and Management Research Unit for Planning of the ISI by conducting a short term course in March 1957. A 10-day course on SQC was conducted by the Unit in Madras in summer, 1956 for training factory technicians. A discussion meeting was held in Madras in March 1956 in which managing directors and managers of 26 firms participated. At their request, visits were arranged for some of the establishments to undertake pilot studies to explore the possibilities of applying the methods of SQC.

13. The strength of the technical and administrative staff of the Unit were respectively 11 and 5. Mr. Desmond worked for the Unit during the period April to August 1956.

14. *SQC Sub-unit, Coimbatore* : This Unit had 10 factories on its roll as against 5 last year. Besides servicing the member factories a number of talks and discussions were held on theoretical and practical aspects of SQC.

7. WORK ON PLANNING FOR NATIONAL DEVELOPMENT

7.1. Economic Planning

1. It will be recalled that on 3 November 1954, Prime Minister Jawaharlal Nehru inaugurated studies relating to planning for national development in the Institute. The "Draft Plan Frame", which was submitted in March 1955, was accepted as a basis for the formulation of the Second Five Year Plan. Professor N. Kaldor's work on taxation, which had been undertaken on behalf of the ISI, received serious attention in Government circles and was drawn upon in framing the budget of the Central Government. A small Operational Research Unit (ORU) was established and an Economic Wing (EW) was started in 1955-56. Work on planning in the Institute is being done from the very beginning in collaboration with the Planning Commission, the Central Statistical Organization and the Economic Division of the Ministry of Finance. Attempts were made in various directions to organize the work with some emphasis on long-range or perspective planning.

2. Some studies were taken up on certain aspects of long-term planning and an attempt was made to prepare an annual plan and, subsequently, a projection covering

fifteen years yielding output targets for 1970-71. These results were not intended to have any bearing on immediate policy decisions but were exercises aimed at developing appropriate planning techniques. Another study on long-term planning in more operational terms was under way towards the end of the year. Some studies were also undertaken on problems in the transportation sector.

3. A section was engaged in studies on inter-industry relations. A (34x34) table for 1961-62 was converted into physical terms and the coefficients of the transformed table were used to set up a method for estimating prices warranted by existing institutional factors. A much larger table (116x116) for 1963-64 was completed and a similar table for 1964-65 was under construction. Meanwhile, attempts were made to present the input coefficients in the 1963-64 matrix with their errors of estimation. Preliminary studies were made on the estimation of levels of activity and levels of final demand. An experimental model for estimating the time path of levels of activity in response to the assigned time-path of final demand was set up. A new method was developed for the solution of linear programming problems; as no rigorous proof could be worked out, studies were conducted to establish its validity.

4. A third section worked on miscellaneous economic problems. A preliminary study was completed on the degree on monetization in final transactions at the instance of Dr. Wilfred Malenbaum of the Massachusetts Institute of Technology. Other studies were concerned with labour productivity, efficiency in relation to size of establishments, direction and pattern of foreign trade, availability of investible surplus excise taxes, regional variations of prices and the consumption pattern of the workers of the Institute. A team of workers cooperated with the NSS to prepare schemes of intensive surveys relating to employment, consumption, industrial output and land utilization; they also helped in the analysis and interpretation of NSS data.

5. Working papers on various subjects were prepared during the year under review; a list is given in Appendix 12.

6. A group of the workers in ORU and EW were posted in Delhi and worked in close collaboration with Government departments. Studies were undertaken on several aspects of technical manpower and perspective planning by a group associated with the Planning Commission and the CSO. Work was also undertaken on a form for reporting projects included under the plan in collaboration with the CSO.

7. A notable feature of the work on planning in the ISI was lectures by and discussions with foreign scientists whose views and criticisms were of great value to the workers of the Planning Division. Special mention may be made in this connexion of Professor Charles Bettelheim (France), who spent nearly one year in the Institute with an assignment from UNTAA; Sir Robert Hall (UK); Professor Simon Kuznets (USA); Mr. Alvin Mayne (Puerto Rico); Mr. A. Zelinovskiy and Mr. A. Polosukhino (USSR) and Mr. J. P. Miller (USA).

8. A delegation from the ISI visited China and Japan during summer 1966 to study planning methods among other things. Apart from taking copious notes on the basis of discussions, the delegation managed to collect a good deal of valuable material in Chinese and Japanese. For translation of material of interest to planning, the scope of the Translation Unit set up under the Library was extended to cover Chinese and Japanese languages.

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7.2. Kalyanasri

1. A special unit called *Kalyanasri* was started on 28 February 1956 to study on an experimental basis (i) the extent to which production in household enterprises and crafts could be increased, if the supply of raw materials and marketing of goods could be assured; (ii) the time required to train a person to enable him to earn a reasonable remuneration and (iii) in what way and to what extent similar units can be established under usual economic and social conditions in Indian villages or urban areas.

2. The headquarters and urban centre are located in some cottage built on the grounds of the Institute with equipment and some training staff provided by the Institute. The first batch of trainees consisted of about half a dozen girls, mostly displaced persons from East Pakistan who were without work, but the number rose rapidly to about 50 by August 1956 when the programme was more or less stabilized. Some of these workers had training in cottage industries and crafts and were employed on a piece-rate basis. Others had to be given some training. The Institute provided a small staff to carry out statistical and economic studies relating to the activities of the Unit.

3. In addition, three villages were selected at a distance of about 15 to 20 miles from Calcutta, two in 24-Parganas and one in Howrah districts. A preliminary survey of all households engaged in cottage industry or crafts was carried out in each of these villages with a similar survey of a sample of other households which were selected at random. From the industrial households 15 were selected to carry out their respective crafts and enterprises under experimental conditions with some assistance from the Institute.

4. Two other rural centres were established in Midnapore district to carry out similar studies in among certain backward people under the guidance of Sri Nirmal Kumar Bose of the Calcutta University.

5. Two types of data are being collected. One type relates to outlay on implements, input of raw materials, labour, and other items of cost of production, sales, etc., to study the requirements of capital in relation to gross and net value of output, volume of employment and also the effects needed for organization, training, and supervision. The other type of data relates to the level of living of the households under observation and the effect of the additional earnings on the pattern of consumption to find out what new demands were generated by the new income.

6. In March 1957 there were 50 workers on the roll of the urban centre at the headquarters of *Kalyanasri*, of whom 48 were women; 9 were engaged in spinning on Ambar Charka, 13 in weaving with semi-automatic flyshuttle and pit looms, 6 in tailoring and 8 in weaving Manipuri-style of fabrics and other artistic crafts. All the workers were paid on a piece-rate basis, excepting 7 who were engaged in training and supervision. In the rural centres the development programme has been taken in hand since the close of the year under review except in Midnapore where a certain amount of work was done during the last part of the year.

7.3. Industrial and Management Research Unit for Planning (IMRUP)

1. The Council of the Indian Statistical Institute approved in March 1956 a scheme for the setting up of an Industrial Management Research Unit for Planning (IMRUP) with headquarters at Bangalore to study the problems of industrial management in both public

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and private sectors. It started functioning from 1 April 1956 with two directors (Dr. Bhola D. Panth and Sri D. P. Basu) and a skeleton clerical staff. The third director (Sri R. Natarajan) joined in May 1956.

2. The work of the IMRUP began with a preliminary symposium on the "Organization and management of public enterprises" held in Bangalore in which representatives of industry and Government of India participated.

3. Investigations were carried out in the fields of management, control and human relationship in respect of the Mysore Iron and Steel Works at Bhadravathi and a report on the basis of this study was submitted. Similar studies were in progress in the Hindusthan Shipyard (Private) Ltd., Vishkapatnam and Sindri Fertilizers and Chemicals (Private) Ltd., Sindri. A report was also prepared on the work of the ISI itself.

4. The work programme of the IMRUP was reviewed during the middle of the financial year and an expansion of the scale of operation was decided upon. Eleven engineers were recruited towards the end of the year and a training programme was arranged for them, which included attendance at a course on "Operations Research" conducted by Dr. R. L. Ackoff from 28 January to 9 February 1957 at Bangalore.

5. Sri R. Natarajan visited Japan and China (June-August 1956) as a member of the Institute's delegation and prepared a report on "Industrial Planning and Growth in China".

6. IMRUP is yet in its formative phase. Economic development involves rapid industrialization in the country, particularly in the Government sector and the success of the plan will largely depend on the efficient management of the industrial concerns. IMRUP is expected to study and devise efficient methods of management in individual cases and offer diagnostic and consultation service when there is need.

7. The headquarters of IMRUP are situated at Bangalore, although the Directors frequently visit the other offices of the Institute as well as industrial enterprises. The staff at the end of the year under review consisted of 3 Directors and 26 other members including 11 engineers.

7.4. Geographical Projects

1. Located at IMRUP headquarters are also the offices of Dr. A. T. A. Learmonth, who came from the Department of Geography, Liverpool, to work with the Institute on 6 August 1956 with an assignment from the United Kingdom under the International Technical Assistance Scheme of the Colombo Plan. He is engaged on a pilot project for Regional Planning in which an attempt is being made to combine the geographical with the statistical methods, thus leading to a new technique for economic surveys. Dr. Learmonth's immediate objective is a micro-survey of the State of Mysore for the production of a series of maps to indicate the physical as well as the economic features. Dr. Learmonth is also cooperating with a macro-survey of the surrounding regions in Andhra, Mysore and Kerala, so that the new method may be tried on both macro and micro scales. A committee consisting of officials of the Planning Commission, CSO and IMRUP assists Dr. Learmonth in his work.

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2. Before initiation of the above project Dr. O. H. K. Spate, a well-known geographer, was in India for about a month and a half in October-November 1956, as a guest of the Institute. A three-day conference was organized in the Planning Commission on 19-21 October 1956 in New Delhi. Sri Guljarilal Nanda, Minister of Planning, inaugurated the conference on 19 October 1956 and Dr. J. C. Ghose, Member, Planning Commission, Prof. P. C. Mahalanobis and officials of the Planning Commission participated in the discussion. Besides Dr. Spate and Dr. Learmonth, Sri Mani Mohan Mukherjee, Central Statistical Organization, New Delhi, Dr. B. Ramamurti, Central Statistical Organization, New Delhi, Dr. V. Nath, Director, Programme Evaluation Organization, New Delhi, Dr. V. L. S. Prakasa Rao, Senior Lecturer in Geography, University of Madras, Dr. G. K. Ghori, Professor of Geography, Maharaja's College, Mysore, Dr. O. P. Bhardwaj, Lecturer in Geography, Punjab University, Dr. R. L. Singh, Professor of Geography, Banaras Hindu University and Sri V. A. Phillippe, Delhi Town Planning Organization took an active part in preparing a broad scheme for the project. Subsequently another conference was arranged in the Institute in Calcutta on 24-25 November 1956 which was presided over by Prof. O. H. K. Spate and was attended by Dr. E. Ahmed, Ranohi College, Ranchi, Dr. S. M. Ali, Aligarh University, Prof. S. P. Chatterjee, Calcutta University, Prof. C. D. Deshpande, M. N. College, Visnagar, Prof. G. Kuriyan, Madras University, Dr. A. T. A. Learmonth, Liverpool University, U. K., Prof. P. C. Mahalanobis, ISI, Mr. M. P. Thakore, Punjab University College and Dr. R. L. Singh, Banaras Hindu University.

8. SERVICE UNITS

8.1. Machine Tabulation Unit

The activities of the Machine Tabulation Unit have been briefly mentioned earlier in this report under NSS (paragraphs 4.7 to 4.9) and Electronic Computer Section (paragraph 5.4). The strength of tabulation equipment at Baranagore, Giridih and Delhi, as in April, August and November 1956 are given in Appendix 13.

8.2. Library

1. The Central Library, which had so far been partially housed at 204 Barrackpore Trunk Road, was shifted to the main premises at 203 Barrackpore Trunk Road. It contained about 60,000 books and monographs towards the end of the year under review. Service branches were maintained as before in the City Office at 9B Esplanade East, Calcutta and at Giridih.

2. The Library acquired during the year 2873 volumes of books and monographs and received 1297 periodicals and annuals against 2717 volumes of books and monographs and 1190 periodicals and annuals last year. The total number of books, journals and other materials issued was 46,271 (to 995 persons) against 38,055 (to 758 persons) in the previous year.

3. Apart from routine work, other services rendered by the Library included: (1) bibliographical services; (2) a workers' circulating library; (3) news clippings; (4) translation from foreign languages and a language class in Russian; and (5) maintenance of records. Full details are given in Appendix 14.

8.3. Special Technical Unit

1. The Special Technical Unit (STU) was formed at the instance of the Director on 1 April 1955 with a small staff. Its object was to take up urgent work whenever necessary and to train up promising workers.
2. The demand increased rapidly and the STU had to be expanded considerably. An auxiliary Computing and Punching Unit, which had been established earlier, was first brought under the control of the STU and was completely integrated with the STU in 1956. During the last two years, about 50 workers were deputed or transferred after training in the STU to other departments. The STU prepared a draft report on the NSS data on investigators' time records (8th round) and some important tables with notes on the data relating to land utilization covering the 6th, 6th and 7th rounds of the NSS were under preparation at the end of the year. The STU was also responsible for the collection of data and various studies on cottage industries in the Kalyanasri.
3. Evening classes were organized to give systematic training to the STU workers in computation and project work.

8.4. Workshop

1. The Institute workshop functioned on an expanded scale during the year under review. The development section was responsible for the repair, maintenance and development work of the Electronic Computer Section and served other research needs. The Design and Drawing Office attached to the workshop was reorganized in April 1956 and acquired, during the period under review, complete drawing accessories including one ferro-printing machine made in the Institute.
2. A prototype desk calculating machine was manufactured and work in connexion with a second machine, with major alterations in the control arrangements, was also completed during the year under review.
3. The precision work for transferring information from 65-column Powers-Samas punched cards to 80-column IBM cards was successfully completed. The development work on the punched card sorter machine was well under way. The principles of other statistical machines were also being studied for developmental purposes.
4. During the year, 434 desk calculators were repaired and 6 desk calculators were reconditioned almost from scrap. The workshop also looked after the repair and maintenance of all motor vehicles of the Institute.
5. Maintenance and installation of electrical equipment developed rapidly; to increase the capacity of the 200 k.v.a. transformer, two capacitors were installed. The Institute also acquired electric arc-welding plants, motors of various types, rectifiers, motor converters, portable electric tools, etc.
6. Air-conditioning being essential for the smooth operation of electronic and other precision calculating machines and also for the testing and maintenance of high precision machine parts, the installation and maintenance of air-conditioning and refrigeration units were taken up during the year. A maintenance shop with 3 workers was started for this purpose and installation of 4 machines with a capacity of 18 tons was completed.

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7. During the period under review, the Institute received 218 pieces of Russian machinery through UNTAA valued at about 12 lakhs of roubles or about Rs. 14.4 lakhs approximately, bringing the total to date to 236 items valued at about 13 lakhs of roubles or about Rs. 15.5 lakhs. A large number of these units were installed during the year.

8. SOCIAL AND WELFARE SECTION

9.1. Medical Welfare Unit

1. In Calcutta and Giridih the benefits of the Medical Welfare Unit cover all workers of the Institute as also members of their families and include free consultation and service at the Unit, house visits to workers' residences at a subsidized rate, and prescriptions served on a cost basis. Arrangements have been made by the Institute for providing medical aid to Institute workers and guests in the New Delhi Office also, though no separate unit has been set up there.

2. The Calcutta Unit treated 10,803 patients against 8,819 in 1955-56; and supplied medicine worth about Rs. 13,500 to the workers against about Rs. 10,000 last year; gave six-monthly inoculations against typhoid and cholera and yearly vaccination against small-pox; the benefit of anti-malarial measures was extended to the entire field staff and the Unit also looked after the sanitary condition of the Institute campus, including hostels and residential quarters.

3. The Giridih unit treated about 2,000 patients and supplied medicine worth about Rs. 2,600.

4. There is also a Health Home at Giridih for convalescent workers, which was built on a plot of land received as a gift from Sm. Nirmal Kumari Mahalanobis partly with the help of a donation of Rs. 5,150 from the Soviet scientific delegation in 1955 and was opened by Dr. Frank Yates in March 1956.

9.2. Rehabilitation Loan to Refugee Workers of the Institute

A loan of Rs. 6,451 was granted to 10 workers of the Institute for house-building during the period under review. A total of Rs. 13,435 was spent for educational help to Institute workers during the year, the beneficiaries numbering 425.

9.3. Night School and Adult Literacy Drive

The Institute provided accommodation and some essential equipment to the Night School which made steady progress during the year. Out of the five students sent up for the School Final Examination, three proved successful. At the beginning of the new session, there were 106 students on the roll of the School, one-third of the students being workers of the Institute. Adult literacy classes were also conducted during the year with some success; the maximum attendance in the Hindi classes was 58.

9.4. Public Relations Work

Public interest in the Institute has increased considerably in recent years, particularly since work was started on national planning. Over 600 visitors were shown round the Institute during the year under review, and the list of visitors contained many eminent

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names. A Bengali translation of Professor Mahalanobis's radio talk on "Approach to Planning" was published during the year under review.

9.5. Guest House

The Institute maintains a Guest House for visiting scientists and experts; during the year under review practically all guests from abroad preferred to stay in the Institute, as this not only eliminated long journeys from the city but gave them the opportunity of more intimate social contacts within the Institute. As it became necessary to receive a very large number of foreign guests at the time of the 25th Anniversary in 1966, some hutsments were erected to provide accommodation. During the year under review accommodation was provided for (a) 140 foreign and (b) 36 Indian guests with a total of (c) 549 and (d) 2636 guest-days respectively, or for (e) 178 guests for 3185 guest-days altogether. The Guest House made arrangements for showing the visitors round Calcutta and its environments and visits to cultural shows (dance, drama, music, cinema etc.).

9.6. Canteen

The Institute Canteen continued to serve subsidized tiffin and provide meals and refreshments broadly on a cost basis. It also took charge of catering arrangements for the numerous Institute receptions and functions. About 1400 workers availed themselves of the subsidized tiffin daily and about 100 workers had other daily meals. The canteen had a staff of 35 and a total turnover of Rs. 1.9 lakhs during the year under review.

9.7. Cultural and Other Activities of Workers

A considerable expansion of the cultural and other activities of workers was noticed during the year. The ISI Workers' Club at Baranagar, the ISI Field Workers' Club with headquarters in Calcutta and the Salboni Club at Giridih organized usual sport-meetings and recreations and cultural activities. A journal under the name of *Lekhan* was brought out by the ISI Workers' Club at Baranagar, which also runs a fairly popular Cooperative Credit Society. The representative workers also maintained contact with the administration to draw attention to the grievances of workers and to offer suggestions for the improvement of conditions of work.

9.8. Samvadadhvam

The second issue of the Institute Workers' House Magazine, "Samvadadhvam" came out in October 1966 with Bengali and Hindi supplements. A special anniversary number of the journal was published in March 1967.

10. EXTERNAL ACTIVITIES

1. Professor P. C. Mahalanobis left India on 8 April 1966 accompanied by Mrs. Mahalanobis to attend the Ninth Session of the United Nations Statistical Commission held in New York (16 April to 3 May 1966) as Chairman of the Commission. At the invitation of H. E. the Governor of Puerto Rico, Professor and Mrs. Mahalanobis went to San Juan for a visit of one week beginning on 6 May 1966 to see what was called "Operation Bootstrap" and which was intended to celebrate the turning point in the progress of the national economy, when the contribution of the industrial sector overtook that of the agricultural sector to the national income. Professor Mahalanobis visited the Planning Board and the

INDIAN STATISTICAL INSTITUTE

Department of Economic Development, and had discussions with the members of the staff of these agencies and also with the Governor and some of the members of the Government. He also spoke on Indian planning at an economic seminar. On his return to USA, he went to Washington, where he met a number of leading economists and businessmen and also visited and had discussions at the Bureau of Standards and the Bureau of Census. He gave a lecture on planning in India and had some discussions at the Yale University and the Cowles Commission for Research in Economics.

2. Professor Mahalanobis gave two public lectures on planning in India, a subject in which considerable interest is taken in the USA—one at the New India House in New York, arranged by the Indian Embassy and another at the Economists' Club at the United Nations Headquarters. He also participated in a discussion meeting on the subject at the Columbia University held under the auspices of the Faculty of Economics. He received invitations from a number of other places in the USA, but the whole programme had to be cancelled, as he was taken ill. His illness made it necessary also to cancel his scheduled trips to Japan (where a delegation from the Indian Statistical Institute was waiting for him) and from there to China. Professor Mahalanobis left USA on 4 July, and after a short halt in London, returned to India on 12 July 1966.

3. A delegation from the ISI consisting of Sri Pitambar Pant, Sri M. Mukherjee and Sri R. Natarajan visited China and Japan during summer 1966. The delegation studied various aspects of planning in these countries and returned with a great deal of valuable materials. Full details are given in Appendix 15.

4. Dr. C. R. Rao attended the Third All Union Mathematical Conference in Moscow from 24 June to 5 July 1966. He presented two papers at the Conference in Moscow—one on Estimation and another on the Analysis of Growth Curves; and also visited several institutes of statistical education in the USSR.

5. Sri D. B. Lahiri attended, as a member of the Indian Delegation, the Fourth Regional Conference of Statisticians organized by the Economic Commission for Asia and the Far East at Bangkok from 26 March to 6 April 1966. He made many contributions to discussions on census problems and methods.

6. The following members of the staff of the Institute attended the Science Congress Session held in January 1967 at Calcutta and presented papers and/or participated in the discussions: Debabrata Basu, Indra Mohan Chakravarty, Sibabrata Chatterjee, Bhupendra Chandra Das, Bhagabat Das Gupta, A. E. Harper, Radha Govinda Laha, Sivkumar Mitra, Samarendra Kumar Mitra, S. Janardan Poti, C. S. Ramakrishnan, C. R. Rao, Jogabrata Roy, Subodh Kumar Roy Choudhury, Satya Prakash Sangal, Tapas Kumar Sen, and V. S. Varadarajan.

7. S. Naqvi, N. K. Chatterjee, Sitangahu Bhattacharyyas and Chitta Mitra attended the Indian Economic Conference and Indian Agricultural Conference in Cuttack held in December 1966.

8. S. Sen Gupta, A. Chakravarti, A. Biswas, Ajit Das Gupta and N. C. Ghosh attended the Preliminary Conference on Research on National Income held in New Delhi in February 1967.

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9. Dr. Rhea S. Das served as a personnel selection consultant to Hindustan Aircraft (Private) Ltd., Bangalore.

10. Dr. C. R. Rao served as a member of Board of Studies in Statistics in a number of universities. Many other members of the Institute staff served on various Committees and actively participated in scientific and technical activities organized by other institutions and agencies.

11. VISITING SCIENTISTS

1. As in previous years, the Institute was fortunate in having a number of distinguished scientists from various countries as visitors. Some of them came as visiting professors to work in the Institute for several months, while others came for shorter periods of work participating sometimes in lecture or seminar activities. In addition, some 25 scientists came from abroad to participate in the lectures and seminars arranged in connexion with the 25th Anniversary Celebrations of the Institute held in the winter of 1966-67.

2. An account of the work of the visiting scientists who stayed for a relatively long period is given below.

1 & 2. PROFESSOR J. B. S. HALDANE and MRS. HALDANE (DR. HELEN SPURWAY), *University College, London* (July to September in 1966). Professor Haldane delivered eight lectures on biometry, three lectures on 'genetical effects to be expected from artificial radio-activity', and one on 'occupational mortality'. These lectures were attended, besides workers and students of the Institute, by representatives from other scientific institutions as well as by members of the public interested in the subjects. He also conducted a series of experiments on the behaviour of air-breathing fish in collaboration with Mrs. Haldane as noted earlier in the report. Arrangements were also made for Professor and Mrs. Haldane to visit a number of scientific institutions and universities, where they delivered lectures on subjects of general scientific and cultural interest as also on topics connected with statistical methods in Biology. The institutions visited by them were: Indian Council of Agricultural Research, New Delhi; Indian Central Jute Committee, Calcutta; Central Leather Research Institute, Madras; Delhi School of Economics, Delhi; Indian Institute of Technology, Kharagpur; Central Building Research Institute, Roorkee; Indian Institute of Science, Bangalore and the Universities of Allahabad, Andhra, Annamalai, Mysore, Nagpur, Poona and Bombay.

PROFESSOR G. A. BARNARD, *Imperial College of Science and Technology, London*, (September-October 1966). He delivered a course of lectures on statistical inference with special reference to current controversies and industrial applications of statistics. He worked with the SQC Unit in Calcutta and took an active part in the SQC Conference held on 1 October 1966 and drew up a report on the basis of discussions. He went to Delhi and Bombay on short visits and gave lectures there on SQC methods and their applications in India. At Bombay he also met the representatives of industry for discussion.

4. DR. R. L. ACKOFF, *Group Director, Operations Research, Case Institute of Technology, Ohio, USA* (January to March 1967). As already mentioned he gave a course of lectures on operations research.

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5. DR. ARAN G. BORG, *Massachusetts Institute of Technology, USA*, came to the Institute with a Fulbright Scholarship (September and October 1956). He delivered a course of lectures on non-linear system characterization, filtering and prediction.
6. PROFESSOR SIMON KUENETS, *Johns Hopkins University, USA* (December 1956 to February 1957) came to India accompanied by his wife, as guests of the Institute. Apart from participating in various discussions, he made a critical evaluation of the present position of national income estimation and prepared a report on the subject, a copy of which has been submitted to the Government. He took a leading part in organizing the Preliminary Conference on Research on National Income held in New Delhi in February 1957. He also gave some lectures and had discussions in Delhi. He attended the Indian Economic Conference held in Cuttack on 26-28 December 1956.
7. MR. ALVIN MAYNE, *Planning Board, Puerto Rico* (February to April 1957). He worked mostly on the organization of planning activities of the ISI, visiting in this connection the offices of the Institute in Delhi. Besides, he gave a number of lectures and participated in discussions and meetings there on Planning.
- 8 & 9. MR. A. F. ZELINOVSKY, *Deputy Chairman, Planning Commission* and MR. A. I. POLOSUKHINE, *Deputy Chief of Machine Building Department and Member of the State Economic Commission, USSR* (November 1956 to January 1957). They helped in the work of planning, particularly in the field of heavy machine building industry and long-range planning. They stayed mostly in Calcutta and Delhi and also paid a short visit to Bombay in connection with their work.
10. DR. J. P. MILLER, *Yale University, USA* (December 1956 and January 1957). Dr. Miller's itinerary in India included a visit to Delhi, where he had talks with ministers, members of the Planning Commission and Government officials. He also paid visits to Madras, Bangalore, Mysore and Bombay, where he had discussions with prominent people in the field of industry, administration and finance. Both at Calcutta and Bangalore Dr. Miller delivered some lectures on 'industrial administration and management.'
- 11 & 12. SIR ROBERT HALL, *Economic Adviser to the Treasury of the Government of UK* and LADY HALL, *Staff member of the University of Oxford* (October to November 1956) participated in a number of discussions on planning in Calcutta and New Delhi. Sir Robert gave a few lectures on planning; he also prepared a memorandum on the possible role of ISI in the field of applied economic research necessary for governmental purposes.
13. PROFESSOR J. S. NEYMAN, *Statistical Laboratory of California University*, stayed in the Institute from December 1956 to February 1957.
- 14 & 15. MR. LEO HUBERMAN, *Editor, Monthly Review, New York, USA* and MRS. HUBERMAN also visited the Institute (January to March 1957).

FOREIGN LECTURERS

The following scientists, who came to the Institute on brief visits, gave lectures and took part in discussions in the Institute.

1. MR. KAILAS DOCTOR, *International Labour Organization, Geneva* (February 1957).
Lecture: Statistical work of the ILO.

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2. PROFESSOR G. L. STEBBINS, *Chairman of the Department of Genetics in the University of California* (January 1957). Lecture: Non-biometric analysis of natural variation in plants.
3. DR. A. T. BHARUCHA REID, *University of Oregon, USA* (August 1956). Lectures : (i) Estimation of exponential parameter associated with Murkoff's process, (ii) Comparison of populations whose growth can be described by a branching stochastic process and random elements in Orlicon spaces.
4. DR. NATHAN KEYFITZ, *Dominion Bureau of Canada* (July 1956). Lecture: Population sampling in Canada.
5. MR. L. FISCHMAN, *Puerto Rico* (12 December 1956 to 12 February 1957). He participated in the work on planning and attended the preliminary conference on Research in National Income in New Delhi, apart from delivering a few lectures.

INDIAN LECTURERS

The following lectures were delivered by Indian statisticians and economists.

1. PROFESSOR K. V. KRISHNA SASTRY, *University of Madras* (May 1956). Lecture: Consumer's demand for products of cottage and small scale industry.
2. PROFESSOR S. K. EKAMBARAM, *University of Mysore* (August 1956). Lecture: Control charts in production.
3. PROFESSOR J. K. PARANJPE, *Sydenham College of Commerce and Economics, Bombay* (November 1956). Lecture: State enterprises in India and Planning in Poland.
4. SRI JAGJIT SINGH, *Railway Board* (February 1957). Lecture: Foundations of Probability.
5. DR. K. S. BANERJEE, *State Statistical Bureau, West Bengal* (August 1956), delivered a course of six lectures on Index number.

The above list does not include the large number of lectures and seminars arranged in connexion with the 25th Anniversary Celebrations of the Institute. A list of these lectures is given in Appendix 2G.

12. GENERAL ADMINISTRATION

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

	<i>new members enrolled during the year</i>	<i>total number at the end of the year</i>
Honorary members	nil	8
Life members	nil	47
Ordinary members	33	179*
Seasonal members	nil	9
Student members	nil	21

2. *Council* : The names of the members of the Council are given in Appendix 16. The Council held 16 meetings during the year. Among the important matters considered (6 April 1956): bringing into force amended rules 11 and 14 (5 May 1957): appointment of

* The actual number of ordinary members on the roll was 531 on 31 March 1957 but of these only 179 were effective members.

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a panel of auditors (13 June 1966); arrangements of 25th anniversary celebrations, giving effect to amended rule 11A (25 August 1966); amendment of provident fund rules by making provision for sanction of loans for housing purposes, increase of dearness allowance (28 August 1966); consideration of the Indian Statistical Institute Bill, 1966 (14 and 22 December 1966); introduction of new pay-scale (18 December 1966); changes in some pay-scales, revision of leave rules of workers on a daily wage basis and field workers, revision of rules guiding employees' and employers' contributions to the provident fund (4 February 1967); renewal of agreement with Statistical Publishing Society (29 March 1967). The meeting of 22 December was held jointly with a meeting of the Governing Body. This meeting discussed in detail the proposed legislation for declaring the Institute as an institution of national importance and set up a Committee consisting of Sri C. D. Deshmukh, Sir Shri Ram, Sir D. N. Mitra, Professor D. R. Gadgil, Professor K. B. Madhava and Professor P. C. Mahalanobis to examine the proposed legislation and submit their report to the Council.

3. *Governing Body* : The Governing Body of the Research and Training School met at New Delhi on 9 October 1966 and at Calcutta on 22 December 1966. Sri C. D. Deshmukh, President, presided over both the meetings. The Finance Committee of the Governing Body met on 8 October 1966 at New Delhi. (The names of the members of the Governing Body, the Finance Committee and other Committees set up by the Council are given in Appendices 17, 18 and 19).

4. *Finance Committee* : The Finance Committee of the Council met on 4 February 1967 and took important decisions in respect of changes in certain pay-scales, changes in rules guiding leave and leave salary on medical certificates and changes in employees' and employers' contribution to Provident Fund.

5. *General Meeting* : At a General Meeting of the Indian Statistical Institute, held on 20 April 1967, certain amendments to the rules of the Institute were approved. The Annual General Meeting of the Institute was held on 29 October 1966.

6. *Board of Management* : A Board of Management was appointed on 28 August 1966 with Professor Mahalanobis as Chairman, Sri Sidhartha Banerjee as member-secretary and Sri D. B. Lahiri, Sri M. L. Ganguli, Sri Samar K. Mitra and Dr. C. R. Rao as members. The Board was entrusted with the general management of most of the operative department and some common services sections. During the period under review the Board held 17 meetings and took decisions on 118 items.

7. *Cost Accounting Section* : This section was concerned with evaluation of output records of operational items, supplied by primary workers of project divisions, in terms of equivalent standard hours. Besides the usual primary workers, technicians, supervisors and others in senior cadres in the NSS regularly supplied their weekly diary records to this section for analysis and for the working out of standards for various technical jobs. As the incentive bonus scheme was practically withdrawn during the year under review, the Board of Standard also ceased to function.

8. *Calcutta City Office* : The Calcutta SQC Unit had its office during the year at 9B Esplanade in the city. This office was also used for general administration work and for meetings and lectures of the Institute. The Institute has two other offices in the city, one at 294/2/1 Upper Circular Road, Calcutta-9 and the other at 210 Cornwallis Street, Calcutta-6.

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9. *Headquarters* : During the year under review hutments (with asbestos roofing) containing 20,000 sq. ft. of internal floor area were constructed at 202 and 203 B. T. Road. In addition, two cottages (also with asbestos roofing) with a floor space of about 8,600 sq. ft. were constructed in the northern and eastern parts of 202 B. T. Road to provide accommodation for the guests, who attended the 25th anniversary celebrations in December 1956 and later on, for visiting scientists, trainees of the International Statistical Education Centre and officers on deputation for training or work. Certain other temporary structures were put up and extensions made to existing structures to meet a variety of purposes including the storing and maintenance of Soviet equipment received through the UNTAA.

10. *Giridih Office* : A fair amount of construction and repair work was done under the Giridih office during the year under review. As already mentioned, a Health Home was opened at Giridih in March 1956. Various experiments and surveys were carried out under the direction of the Giridih office, further details of which are given in Section 4.

11. *Delhi Office* : The office at Delhi continued to function at 8 King George Avenue as a link between the Institute and the Cabinet Secretariat, the Central Statistical Organization, the Planning Commission and various other Government departments and other agencies.

12. *Bombay Office* : The Bombay Office helped the Bombay branch of the Institute in carrying out the work of the 11th round of the NSS in the Bombay city. The office also helped in conducting professional examinations of the Institute at the Bombay centre. A series of lectures were also organized as mentioned subsequently in the report on the Bombay branch of the Institute. The activities of the SQC, Bombay Unit have already been mentioned.

13. *Field Branch* : The field branch of the Institute, the office of which is located at 204/2/1 Upper Circular Road, Calcutta-9, took up a series of experimental surveys over and above the field work in connexion with the National Sample Survey in West Bengal. Some of these special surveys have already been covered in the sections on project work.

14. *Distribution of staff at different centres* : The following table shows the distribution of the staff at Baranagar, Calcutta, Giridih, Delhi, Bombay and Bangalore as on 28 February 1957 as compared with the figures at the end of the previous (financial) 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	
	1956	1957	1956	1957	1956	1957
Calcutta Headquarters (Baranagar)	766	907	390	390	1046	1297
Calcutta City	9	22	9	7	18	29
Giridih	100	100	29	33	129	133
Delhi	28	38	5	8	33	46
Bombay (SQC)	10	14	1	4	11	18
Bangalore (SQC)	8	17	1	3	9	20
IMRUP (Bangalore)	1	24	-	4	1	28
Statistical Field Branch including Bombay NSS	912	1122	226	449	1247	1671
	132	145	41	41	173	186
Total	1044	1267	376	490	1420	1757

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15. *Changes in senior staff*: The staff of the Institute was strengthened during the year by the addition of the following persons: Sri D. P. Basu joined IMRUP on 2 April 1956; R. B. Banerjee joined the Electronics Section on 1 August 1956; Dr. Raghuraj Bahadur joined the RTS on 1 December 1956; Sri Teru Sasaki joined the Planning Division on 12 December 1956; Sri K. V. Ramachandra joined the IMRUP on 2 January 1957. Dr. Dea Raj went on leave in September 1956 to take up an assignment under the American University of Beirut. Sri Ranjan Som was given leave for one year to accept a post of Statistician under WHO at Colombo. Sri K. Naqvi of Aligarh University worked in the Institute for about 9 months. Dr. Anoke Rudra was given leave for two years for higher studies in France.

The following persons left the Institute during the year: Sri Mohi Mohan Mukherjee left in August 1956 to join Philips Electrical Co. (India) Ltd.; Dr. P. K. Gopalkrishnan left in September 1956 to join Delhi University; Sri I. R. K. Sarma left in December 1956 to join the National Council of Applied Economic Research.

16. *Obituary*: (1) The sudden and unexpected death of Professor J. M. Sen during this year was a great blow to the Institute. The late Professor Sen had a heart attack while coming to the Institute on 20 August 1956 and died in hospital the next day. He had been a member of the Institute for six years and a member of the Council for five years. At the time of his death, he was Secretary of the Examinations Committee of the Institute, an office which he had held for a year and a half. He had served the Institute with great devotion and initiative and earned the respect of everybody who came in contact with him. The Council of the Institute recorded its deep sense of sorrow at his sudden passing away in an appropriately worded resolution at its meeting held on 5 October 1956.

(2) The Institute also suffered another grievous loss in the sudden and untimely death on 23 February 1957 of Professor J. B. Saunders, who had joined the Institute as a Professor of Economics on 23 January 1957. The Council mourned his death at its meeting held on 2 March 1957.

17. *Sankhyā*: *The Indian Journal of Statistics*: Parts 3 and 4 of Volume 18 and all the 4 parts of volume 17 of Sankhyā containing in all 40 papers and 2 reports were published during the year. There was a separate issue containing papers on design of experiments. In addition, there were papers on sample surveys, time series analysis, stochastic processes, etc., as well as some important contributions on the Second Five Year Plan of India. Part 1 of volume 18 of the journal was in press at the time of writing this report. There has been a steady increase in the demand for the journal and a number of new subscribers were enrolled during the year.

12. BRANCHES

12.1. Bombay Branch

1. *Membership*: At the close of the year under review, there were 44 associated members, 3 ordinary members and 1 life member of the branch. The names of office-bearers of the branch are given in Appendix 18.

2. *Sample Surveys*: The branch carried out the field work in connexion with the eleventh round of the NSS in Bombay City from August 1956 to February 1957. The

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field work of the Pilot Enquiry into the household purchase of products of factories and cottage and small-scale industries in Bombay was completed during the year. The branch also published a report on the "Survey into the economic conditions of middle class families in Bombay City."

3. *Institute Examinations* : The Statistician's Diploma Examination was conducted at the Bombay Centre in September 1956.

4. The Rt. Hon. John Strachey, M.P., Professor Oscar Lange, Mr. A. Zelinovsky, Mr. A. Polosukhine, Professor J. Neyman, Mr. J. P. Miller, Sir Robert and Lady Hall, Professor and Mrs. Simon Kuznets and Mr. and Mrs. Leo Huberman were among the distinguished visitors to the branch during the year.

5. The activities of the SQC Unit in Bombay have already been described in Section 6.

13.2. Mysore State Branch

1. *Membership* : At the close of the year, there were 29 ordinary members, 2 seasonal members and 2 life members bringing the total membership of the branch to 33. The names of the office-bearers of the branch are given in Appendix 18.

2. *Statistical Surveys* : A pilot sample survey was undertaken on "Job satisfaction among workers in industrial concerns in Bangalore;" the scheme for another pilot sample survey on "Variation of output efficiency during a shift and in different shifts" was drawn up during the period under review.

3. *Institute Examinations* : Statistical Field Survey Certificate Examination was conducted at the Centre in September 1956.

4. *Training classes and lectures* : In response to requests from various industrial establishments, the branch conducted a seven-week course on "Methods of statistics for quality control worker." Lectures were organized on different subjects. Professor J. Neyman gave a talk on "Probability, Statistics and Inductive Behaviour."

13.3. Aligarh Branch

1. The activity of the branch suffered a set-back as a result of the continued ill health of its President. Professor D. P. Mukherjee. Dr. Zakir Hussain, who as first President of the branch had taken active interest in its work, relinquished the office of Vice-Chancellor of the Aligarh University during the year, a fact which affected the activities of the branch to a certain extent. The names of office-bearers are given in Appendix 18.

2. The branch undertook an intensive survey on the process and magnitude of income generation in two villages. A study of under-employment in two villages was also undertaken and a report submitted to the parent body. A survey of local industries in Aligarh was also carried out and a brief report prepared.

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Indian Statistical Institute : Receipts and Payments Account

	To Receipts			Ra. As. P.		
	Ra.	As.	P.	Ra.	As.	P.
1. Opening Balance :						
i) Cash in hand and at Banks with Central Office	36,856	15	8			
ii) With branches and sub-offices	26,774	5	0			
iii) Unadjusted suspense of 1955-56	75,010	1	2			
				1,38,641	5	10
2. Advances recoverable :						
i) From Capital Expenditure account as per last account	1,49,682	4	0			
ii) Educational and house building loan etc. due from staff as per last account	14,984	1	0			
				1,64,666	5	0
3. Membership subscription				4,084	9	0
4. Fee for tuition and training				12,702	5	0
5. Examination fees and other receipts				27,380	13	6
6. Receipt by recovery of expenses incurred for training				4,962	15	8
7. Seminar fees received by IMRUP				600	0	0
8. S.Q.C. membership and training fees including service charges				97,644	6	0
9. Block and Project grants from the Government of India for—						
i) Research, Training and General purposes ..	8,07,200	0	0			
ii) International Statistical Education Centre ..	92,000	0	0			
iii) Statistical Quality Control Sector	1,24,000	0	0			
iv) Electronic Laboratory and Computing machine Sector	2,42,000	0	0			
v) Economic Wing	2,65,500	0	0			
vi) Operational Research Sector (for Planning) ..	3,49,000	0	0			
vii) Industrial and Management Research Unit for Planning	1,74,000	0	0			
viii) Utilisation of the UNTAA (Soviet) equipment ..	2,53,000	0	0			
ix) Multipurpose National Sample Surveys	42,54,500	0	0			
				65,61,200	0	0
Carried over ..				70,11,382	14	10

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(current expenditure) for the year ending 31st March 1967

<i>By Payments</i>		Rs. As. P.		Rs. As. P.	
1.	(i) Salary, dearness allowance, honorarium etc. ..	34,45,569	10 9		
	(ii) Employer's contribution to workers' Provident Fund	1,44,060	7 6		
	(iii) Overtime allowances	1,31,067	13 6		
				27,30,697	15 9
2.	Contribution to Leave Salary Fund			2,50,000	0 0
3.	Contribution to Gratuity Fund			1,50,000	0 0
4.	Travelling allowances			1,70,147	10 3
5.	Visiting Professors, Fellows, Foreign experts and scientists etc.:				
	i) S.Q.C. Sector	23,559	7 0		
	ii) O.R.U. Sector	94,539	13 5		
	iii) UNTAA Sector	34,462	0 6		
	iv) N.S.S. Sector	81,451	11 0		
				2,34,413	0 0
	v) Research and Training Sector (transfer to fund account)	60,000	0 0		
				2,94,413	0 0
6.	Scholarships, stipends and assistance to trainees of the R. & T. School (transfer to fund account) ..			1,50,000	0 0
7.	Disbursement of fellowship allowance to IREC trainees under Colombo Plan			63,307	5 6
8.	Prizes to workers for initiative etc.			24,000	0 0
9.	Machine Tabulation expenses:				
	a) Hire and maintenance of tabulating equipment, key punches and verifiers including freight, transport, electricity charges etc.	7,73,804	5 3		
	b) Cost of cards, cabinets etc.	2,57,683	6 3		
	c) Payments to IBM, BTM, Powers-Mamas and Gokhale Institute of Politics and Economics, Poona for tabulation of N.S.S. data	73,860	16 0		
				11,05,258	11 6
10.	Printing and publication (including paper for printing)			1,01,479	15 0
11.	Society type activities			30,749	2 5
12.	Examination expenses			24,331	1 6
13.	Books and Journals (including cost of binding etc.) ..			75,117	2 1
14.	Translation Unit set up in Japan for planning purposes			24,488	11 0
15.	Workshop, photo and microfilm			18,101	12 3
16.	Laboratory and workshop stores, tools and minor accessories etc.			63,744	14 3
17.	Repairs and replacement of machineries, equipment, accessories, furniture and fittings etc.			86,742	10 3
18.	Stationeries and consumable stores			1,26,336	3 6
19.	Auditor's fees			3,600	0 0
20.	Bank charges and interest			12,844	15 3
21.	Telephone, postage, telegram, advertisement, freight charges etc.			75,709	4 9
				65,23,044	10 3

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Indian Statistical Institute : Receipts and Payments Account

	<i>To Receipts (Contd.)</i>	Rs. As. P.	Rs. As. P.
	B.F.	..	70,11,882 14 10
10. Amount received from the United Nations for study on existing information on population in relation to development planning in India			2,381 0 0
11. Grant received from the Government of India to meet the expenditure for 25th Anniversary celebrations of the Institute			2,00,000 0 0
19. Funds received from the Government of India, Ministry of Finance for disbursement to the trainees at ISEC selected as fellows under the Technical Co-operation Scheme, Colombo Plan			67,180 0 0
13. Miscellaneous receipts:			
a) Donations and contributions	3,386 10 3		
b) Sale proceeds of waste paper, cards etc. ..	3,561 9 3		
			6,958 3 6
14. Receipts from produce of Giridih experimental farm ..			3,690 0 9
15. Deposit accounts			6,988 6 0
16. Outstanding liabilities for goods and services obtained			1,10,640 13 3
17. Temporary loan taken from funded accounts ..			3,40,000 0 0
18. Temporary loan taken from Prof. P. C. Mahalanobis ..			50,000 0 0

Rs. 77,90,721 6 4

6, HASTINGS STREET, CALCUTTA,
The 25th September, 1957.

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(current expenditure) for the year ending 31st March 1957

		Rs.	As.	P.
		BF.	85,23,044	10 3
22.	Other miscellaneous expenses including hot weather contingencies etc.	45,238	3	9
23.	Electricity charges	35,621	0	6
24.	Rent, rates and taxes (including those of field, camp and outstation offices)	1,71,291	3	3
25.	Repairs and maintenance of land and buildings including petty constructions	1,42,117	7	9
26.	Transport	54,307	8	6
27.	Workers' welfare and amenities	1,05,014	14	0
28.	Development at Director's discretion	3,672	8	0
29.	Transport, freight and installation charges of Soviet (UNTAA) equipment	20,183	1	9
30.	Expenditure for 25th Anniversary celebrations of the Institute	1,37,287	9	9
31.	Expenditure on account of experimental farming at Giridih	3,688	10	9
32.	Repayment of outstanding liabilities (as per debits shown in last account)	1,48,584	6	6
33.	Repayment of old deposit (as per last account)	5,514	5	3
34.	Loans to staff for educational and house building purposes etc.	22,241	4	6
35.	Amount under suspense pending final adjustment :			
	a) part payment to contractors and suppliers against work done or goods supplied or ordered, i.e. advances and other advances awaiting adjustment	67,667	12	9
	b) for passage, custom deposits etc. of Visiting Professors and Foreign Experts	48,249	0	3
	c) Advances to small industries experimental unit for operational expenses	25,252	9	3
	i) run directly by I.S.I.			
	ii) run through Prof. N. K. Bose	4,900	0	0
		<hr/>		
36.	Temporary advances to Capital Expenditure :			1,46,000
	a) as per last account	1,49,682	4	0
	less amount adjusted during the year	27,463	12	4
		<hr/>		
	b) fresh advance during the year	1,22,218	7	6
		<hr/>		
				1,72,218
37.	Closing Balance :			
	i) Cash in hand and at Bank with Central Office	26,618	14	11
	ii) With branches and sub-offices	35,731	11	0
		<hr/>		
				62,349
				<hr/>
		Rs.	77,99,721	8 4

Examined and found correct
Sd/- P. C. NANDI & Co.
Chartered Accountants & Auditors.

INDIAN STATISTICAL INSTITUTE

PART 3: APPENDICES

Appendix 1: A brief history of the Institute

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. 260— that was all, when it started in April, 1932. In September 1966, 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 which 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 eager 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^p statistics). In meteorology, he found ample scope for trying out his new-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 Beur 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. 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.

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 (the then 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 society in April 1932. 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 an important 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 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. Examinations for the award of certificates for computers and diploma for statisticians were started in April 1938, and 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 for some time been pleading for a separate statistical section to the Indian Science Congress. These 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.

13. The Institute's research and project work as well as its promotional activities led to world-wide contacts, earned for it international recognition and helped in enlisting 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

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(now Sir) Ronald A. Fisher, who paid his maiden visit in 1938, repeating it in 1946, 1961, 1964 and 1968. Other visits have followed and, except for an unavoidable break during the Second World War, a stream of distinguished foreign scholars, statisticians as well as specialists in other fields of knowledge, 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, G. A. Barnard, R. A. Fisher, Richard Goodwin, J. B. S. Haldane, Sir Robert Hall, Nicholas Kaldor, J. R. N. Stone, John Strachey, F. Yates (UK), Russel L. Ackoff, Samuel Alexander, Paul A. Baran, J. K. Galbraith, Morris H. Hansen, Harold Hotelling, W. Hurwitz, Leon H. Keyserling, Simon Kuznets, Alvin Mayne, John Perry Miller, J. S. Neyman, E. R. Ott, Walter A. Shewhart, Abraham Wald, S. S. Wilks, Norbert Weiner (USA); N. N. Bogolyubov, D. D. Degtyar, V. A. Ditkin, A. I. Eshov, Y. V. Limmik, I. Y. Pissarev, A. I. Polosukhine, M. I. Rubinstein, A. F. Zekinovskiy (USSR); Faiz El Khuri, (Beirut); Nathan Keyfitz (Canada); Wang Szu Hua, Hwang Chien To, Tai Shin Kwang (China); C. Bettelheim (France); Tosiio Kitagawa, Motosaburo Masuyama, R. Minobe (Japan); J. A. Linka, E. Lunenberg and J. Timbergen (Netherlands); Ragnar Frisch (Norway); Q. M. Hussain, M. Ziauddin (Pakistan); Oskar Lange (Poland); H. Wold (Sweden); Arthur Linder (Switzerland); M. C. Athipon P. Kasmaari (Thailand).

15. After the Second World War, the project side of the Institute developed rapidly to meet the increasing need for statistics of the 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. Sri 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 Rs. 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 Institute began to emerge as a national institution. In 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.

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 1966.

19. Through all these years the Institute had been steadily gaining in prestige 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 since 1946 and Chairman since 1954. Several other workers of the Institute enjoy an international reputation and some of the old members of the staff now hold important positions in other places in and outside India. The Institute acted as the host society to the International Statistical Conferences in India in 1961.

20. Since 1949 when Professor Mahalanobis became Honorary Statistical Adviser to the Central Cabinet, the Institute has been more and more closely associated with the Central Statistical Organization (CSO) and other Government agencies in New Delhi. Since 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 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 equipments 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 also 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 it started the earliest courses in this subject in India in 1945-46. A separate SQC Section was established in 1953, which has whole-time units 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 the 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 is 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 have come to the Institute, have also participated in studies and discussions on planning.

24. On the basis of the above work, a "Draft Plan-Frame" was submitted to the Prime Minister in March 1955, which 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 associated with the work of national planning in India.

25. Since its inception, there has been a continuous expansion in diverse directions of the area of the Institute's activities. But all these developments have been prompted by one common purpose, which unifies the varied activities carried on by the different departments of the Institute: the promotion of 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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Appendix 2 : Twenty-fifth Anniversary Celebrations

1. The Indian Statistical Institute completed 25 years of its existence in December 1956. The celebration of this event in a befitting manner was one of the most notable features of the activities of the Institute during the period covered by the present Report (April 1 1956 to March 31 1957).

2. Preparations for the celebrations were taken in hand months before the actual event, starting on 28 March 1956 with a letter addressed by the Director of the Institute to the workers outlining his ideas in regard to the celebration. A Preparatory Committee was formed soon after, and at a meeting of all the workers organized by this Committee and held on 4 April 1956 the Director referred to the 25th Anniversary as a turning point in the history of the Institute. The accent from the very beginning was on the organization of lectures, seminars, demonstrations and exhibitions in connexion with the Anniversary Celebrations designed to explain the history and practice of statistics in particular and in general, the application of science to efforts for national development in India and human welfare all over the world.

3. Such a programme depended for its success on the participation of leading statisticians as well as scholars in other fields of study from different parts of the world, and invitations were issued to many foreign scientists. All this necessitated the provision of adequate funds. One of the very first steps taken in the planning of Anniversary Celebrations was, therefore, the preparation of a budget for a special grant for the purpose and its submission to the Union Government. Sanction was obtained in due time to enable the authorities of the Institute to go ahead with the preparations.

4. The actual celebrations took place over a period of about 3 weeks starting from 17 December 1956, the two main functions being the Inaugural Meeting held on the 17th and the Anniversary Meeting held on the 22nd. A large number of guests were invited to both these meetings.

INAUGURAL MEETING : 17 DECEMBER

5. Sri Chintaman D. Deshmukh, President of the Institute, inaugurated the celebrations at a meeting held on 17 December at 4-30 p.m. in the mango-grove. After the chanting of a vedic hymn, Sri Deshmukh read out to the large gathering, which had assembled on the occasion, the following message received from the Prime Minister, Sri Jawaharlal Nehru :

The Indian Statistical Institute has gained a reputation for itself not only in India but in every country where statistics are studied. It has grown in recent years and has performed important functions in connexion with our planning work. Indeed, it is an essential part now of our planning organization. On the occasion of its Silver Jubilee, I send it all my good wishes.

6. Sri Deshmukh then made a short speech welcoming the guests, particularly those who had come from abroad. He described how the Institute was founded in 1931 as an outcome of the early statistical studies of Professor Mahalanobis, which were started in 1920's. He then mentioned as a curious coincidence the fact that while these early statistical studies were proceeding in Calcutta, Sir John Hubback had initiated the use of random

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sampling to estimate the yield of rice per acre in Orissa. A little later, he (Deshmukh) was attracted by Hubback's method and used it to estimate agricultural production as a Settlement Officer, while Professor Mahalanobis independently used similar methods in his work on crop surveys and was much impressed by Hubback's work. It was some years later, he said, that he came to know of the existence of the Institute and when he joined the Institute's Governing Body and later became its President in 1945, he was able to render some assistance in securing financial help from the Government. Increasing contact with the Government led to the realization by the latter that the Institute should be utilized for the formulation of its policies, particularly in the field of planning.

7. Some of the old workers of the Institute then told the gathering about their experiences as workers. Professor Mahalanobis, starting the series as the oldest worker present, said that the Institute appeared to him to be like a river which flowed on with contributions made by many workers, some of whom like outgoing branches left after a while, others continuing for years. He then referred to what he described as a special feature of the Institute, namely, the fact that the workers shouldered the burden of many other activities besides the scientific work carried on in the Institute. As an instance of these other activities he mentioned the fact that all the buildings of the Institute had been designed by and constructed under the supervision of the workers. He then expressed the view that it was desirable in the larger interest of the country that the Institute should be run as an independent public institution, so that it could continue to exercise the initiative which had so far marked its activities. Professor Mahalanobis emphasized that statistics should be considered not as an end in itself but as a tool for the advancement of science as well as for the advancement of human welfare—a consideration which in the context of Indian conditions endowed them with very special responsibilities. (See Appendices 2A, 2B, 2C, 2D and 2E for full texts of the speeches of Sri Chintaman D. Deshmukh and Professor Mahalanobis).

8. Professor Mahalanobis was followed by Professor K. B. Madhava, (who had played an important part at the time of inception of the Institute), Sri Jaladhar Sarma (who is the oldest living worker next to Professor Mahalanobis), Dr. C. R. Rao (an old student and at present the Head of the Research & Training School), Sri Mohan Lal Ganguly, Sri Nemai Ghosh and Sri H. K. Chaturvedi (all senior workers of the National Sample Survey Section of the Institute), Sri Samar Mitra (Electronics Laboratory), Dr. Ed. Harper (who is in charge of the Institute's Psychometric Research & Service Unit) and Sri Rabi Sen, an industrialist, who was associated with the Statistical Institute in its early days. The meeting came to an end with the singing of the National Anthem, after which light refreshments were served.

ANNIVERSARY MEETING : 22 DECEMBER

1. The Inaugural Meeting on the 17 December was followed by the Anniversary Meeting on 22 December, which also was very largely attended both by the workers of the Institute and by many guests, among whom was His Excellency Mr. M. A. Menahikov, Ambassador of the U.S.S.R. On the 17th, the proceedings started with the singing of a Vedic hymn, after which congratulatory messages received from important organizations and eminent scientists from all over the world including India were read out (see Appendix 2F). Eminent scientists who were present on the occasion were introduced to the audience by Professor Mahalanobis. At the request of the Chairman some of them spoke briefly.

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2. *China*: Mr. Wang Szu-Hua, Deputy Director of the Central Statistical Board and leader of the delegation of four statisticians from the People's Republic of China, conveyed to Indian Statisticians the fraternal greetings of statisticians in his own country. *Japan*: Mr. R. Minobe, Chief of the Statistical Standards Division, Administration Management Agency of Japan, conveyed the good wishes of Japanese statisticians. *Pakistan*: Mr. A. Afzal, Central Statistical Office of Pakistan, conveyed the greetings of the Pakistan Statistical Association. *Switzerland*: Dr. Arthur Linder, Professor of the University of Geneva and the Institute of Technology, Zurich, joined in the expression of good wishes. *Thailand*: Prince M. C. Athipon P. Kaemasri, Director, Government Statistical Services, National Economic Council of Thailand, brought a message of goodwill from his country. *UK*: Sir Ronald A. Fisher, University of Cambridge, conveyed the congratulations of the International Biometric Society on behalf of its President. Dr. Frank Yates, from the Rothamsted Experimental Station, United Kingdom, conveyed the greetings of his colleagues in England. *USA*: Mr. Morris Hansen, U.S.A. Bureau of Census, conveyed the good wishes sent on the occasion by the Director of Census and the President of the American Statistical Association. *USSR*: Academician N. Bogolyubov brought a message of congratulation from the U.S.S.R. Academy of Sciences. Mr. A. I. Ezhov, Chairman, Scientific Methodological Council and Deputy Director, Central Statistical Board, U.S.S.R., conveyed the cordial felicitations of the following organizations in his country: Central Statistical Board, The Moscow Economic and Statistical Institute and the Economic Department of the State University of Moscow.

3. Other scientists present, who then addressed the meeting, were Mr. F. Khuri from the International Statistical Education Centre, Beirut (Lebanon), Mr. E. Lunenberg of the International Statistical Institute (The Hague), and Professor J. S. Neyman of the University of California (USA).

4. In his speech at the Anniversary Meeting, Professor Mahalanobis emphasized that there was a unity of purpose amidst the great diversity of the Institute's activities. The Institute had carried out theoretical researches not for their own sake but with the object of solving practical problems, which applied the basic theme.

5. Recalling the persons, who had exercised a deep, though indirect, influence on the affairs of the Institute, Professor Mahalanobis mentioned the eminent scholar, Sir Brajendra-nath Seal, who had suggested to him as far back as in 1916 that it would be wiser for him to work on statistics instead of continuing his physical researches. It would be difficult, said Professor Mahalanobis, to measure Dr. Seal's influence on the Institute even with the tools of statistics.

6. Professor Mahalanobis then referred to the encouragement received from Rabindranath Tagore at a very critical time during the formative period of the Institute. He mentioned that in 1933 he had received orders for transfer from his post as a professor of Physics in the Presidency College, and that matters had come to a head. He and three or four of his young colleagues (which was the total staff at that time) thought that the best plan would be for him to resign from service and start coaching classes and also to take up agricultural field experiments (using Fisherian design of experiments) on commercial lines and build up the Institute on its own.

7. "It was Rabindranath Tagore", Professor Mahalanobis went on to say, "who gave me complete confidence. I remember, he said, 'Yes, this is the right decision'. He even accompanied me in my search for a plot of land, where experiments could be carried on." He recalled that it was Rabindranath Tagore, from whom he had learnt that in the great past of India, she had opened her doors to guests from all over the world; and in its own humble way, the Institute was trying to follow this example. It would be difficult again, said Professor Mahalanobis, to measure Rabindranath's influence on the Institute.

8. Referring to Sir Ronald Fisher, Professor Mahalanobis said that he during his several visits to the Institute stimulated research in new directions, and in 1939 and again in 1945 he gave his principal support to the Institute's advocacy of the method of sample surveys. Sir Ronald has also always emphasized the importance of the close integration of research, training, and project work, which was the special feature of the Institute.

9. Professor Mahalanobis then mentioned the contribution of the Institute's first President, Sir R. N. Mookerjee, who agreed to accept the office of President at the age of 75, because he felt that India would need more statistics in the future. Sir James Grigg, the Finance Minister in the Government of India in 1935, also helped the Institute to strike roots, when he first sanctioned a research grant of Rs. 5000 for the Institute, which was soon afterwards increased to Rs. 15,000 per year.

10. Professor Mahalanobis next mentioned that in 1943, a considerable part of the work, then being carried on by the Institute, was on the verge of collapse owing to the failure of the Bengal Government to appreciate the value of sample surveys. It was the Honourable H. S. Suhrawardy (at that time the Minister of Civil Supplies and later the Prime Minister of Pakistan), who came to the rescue of the Institute by reviving the grant for the purpose with an imaginative appreciation of the work, which was being done by the Institute.

11. Sri C. D. Deshmukh who became the Institute's President in 1945 at a time of great difficulty had helped in diverse ways, all the details of which, Professor Mahalanobis said, even he himself did not fully know. Finally, he mentioned the support given by Sri Jawaharlal Nehru, Prime Minister, who had an intimate knowledge of the work being done here and without whose support it would not have been possible to carry on at all.

12. Professor Mahalanobis said in conclusion that though he felt a certain amount of anxiety regarding the future, he was confident that there would be nothing to fear, if his colleagues appreciated the inner unity of purpose of the Institute and worked together.

13. In his address from the Chair, Sri C. D. Deshmukh said that in many quarters in this country there was yet no proper recognition of the place that the Indian Statistical Institute occupied in the academic and scientific world. It reminded him of how a philosopher was often not recognized in his own country.

14. Statistics were reputed to be a dry and uninteresting subject, though he could not imagine why it should be so. In essence, it was a science of fact-finding and there was no department of life, in which the formulation of policy or the determination of a course of action did not depend on the ascertainment of relevant facts.

15. Sri Deshmukh observed that ten years ago, there were about 1,000 trained statisticians in India, and the total expenditure on statistics and their application might have been about Rs. 1 crore. At present, the number of workers in the field of Statistics was estimated

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by Professor Mahalanobis to be about 4,000 and the total expenditure Rs. 3 crores. It would not be possible to say whether this figure, which indicated the utilization of statistics, was adequate. He expressed the hope that the Indian Statistical Institute would devote a little time to the compilation of comparative statistics regarding the advancement of the science itself and its utilization by public authorities in other countries. "I think we have every reason to hope that, literally, as India's programme of development expands, there will be no end to the vistas and no roof, so to speak, to the Indian Statistical Institute."

16. Paying a warm tribute to the workers, Sri Deshmukh observed, "I have now been associated with this Institute for 15 years and I have seen the numbers grow and I have had many opportunities of watching the selfless spirit of work manifested by the workers of the Institute."

17. In this connexion, Sri Deshmukh mentioned the "Samvadadhvam", in one issue of which workers had proved by some statistical formula that they were paid for doing no work at all. Describing this as an excess of philanthropy, Sri Deshmukh said that he was certain that they had worked under very difficult conditions in the past.

18. Sri Deshmukh concluded by saying, "We are now on the threshold of a new age—an age in which there is literally no limit to the useful service that this Institute can render and we are confident that with the understanding and sympathy of all those like you, who are here and those who take an interest in the Institute, the Institute will be able to discharge its duties successfully."

Sir Shri Ram then thanked the guests on behalf of the Institute. The meeting terminated with the singing of the National Anthem. All the guests and workers were then treated to light refreshments.

19. *Lectures and Symposia* : A series of lectures and symposia formed an important feature of the Anniversary Celebrations. These were organized in two groups: the Anniversary Lectures Series held under the auspices of the Indian Statistical Institute and the International Statistical Institute.

Altogether 56 lectures were delivered in the first series starting from 18 December 1956 and ending on 4 January 1957.

The lectures, which were held in the lecture-hall of the Research and Training School, drew crowded audience. Judged by the pointed questions asked, the lectures aroused keen interest.

The International Statistical Seminar Series comprised two symposia on the teaching of statistics, one being devoted to the Training of Statisticians and the other to Training Programme of International Statistical Education Centre, Calcutta. (For details of lectures and symposia see Appendix 18).

20. *Exhibitions* : An exhibition, depicting with pictures, charts, models etc. and the activities of different departments of the Institute, proved to be a popular feature of the celebrations. There was a section in the exhibition set up by the Central Statistical Organization with charts specially designed to give a vivid idea of the economic conditions of the country.

The Electronics Laboratory organised a separate exhibition, where visitors were shown electronic machines in actual operation.

There was also a photographic exhibition, all the exhibits being the works of members of the Institute staff.

21. *Entertainments* : With a view to making the celebrations popular with, and securing the active participation in them of, all the workers, an elaborate programme of entertainments was arranged and its execution entrusted to the Institute Club. The highlights of the programme were the staging of a Bengali drama and a recital of Indian music, both by the workers, the annual sports meeting and exhibition matches of table-tennis, badminton, volley ball etc. Other entertainments, which proved to be highly popular, were a performance of Rabindranath's *Rakta Karabi* (Red Oleanders) by Bohurupee, a well-known dramatic group in Bengal and a show of the film, *Pulker Paschali*.

22. *Excursions* : With a view to giving the guests an impression of the Bengal country-side and of the kind of field-work being carried on by the Institute, a visit was arranged to a village, where the National Sample Survey work was in progress. A steamer trip on the Ganga was also arranged for guests, which proved to be very refreshing after hectic days devoted to lectures and discussions.

23. *News Bulletin* : A news-letter was published daily during the celebrations to keep all visitors posted with the day-to-day programme and other information relating to the celebrations.

24. *Feast* : The celebrations were brought to an end by a feast at Baranagar on 19 January 1967, when about 2,000 workers and guests were served with a sumptuous meal at midday in two relays in the mango-grove. The arrangements were in charge of the Institute Club.

25. *Celebrations in Branches* : The branches of the Institute at Mysore and Giridih celebrated the 25th Anniversary in an appropriate manner in February, 1967.

Appendix 2A

SPEECH DELIVERED BY SRI C. D. DESHMUKH ON 17 DECEMBER 1966 ON THE OCCASION OF THE TWENTY-FIFTH ANNIVERSARY OF THE INDIAN STATISTICAL INSTITUTE

Gentlemen,

I am very happy indeed to have this privilege of inaugurating the Silver Jubilee Celebrations of the Indian Statistical Institute. I cannot do better than read at the outset a message which has been to us by the Prime Minister, Sri Jawaharlal Nehru. The message said, "The Indian Statistical Institute has gained a reputation for itself not only in India but in every country where statistics are studied. It has grown in recent years and has performed important function in connection with our planning work. Indeed, it is an essential part now of our planning organisation. On the occasion of its Silver Jubilee, I send it all my good wishes."

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My first duty on the occasion is to welcome all the guests, particularly those who have come to attend this function or to work in the Institute on the occasion from abroad. They will be introduced a little in detail by Professor Mahalanobis. I would only be content with mentioning that there are about 64 of them from 18 different countries, including 4 children and 12 students for the International School of Statistics. I welcome them all, as they are proof positive of what the Prime Minister has said about the standing and status of the Institute in the international world. I myself have been associated with the Institute for about 16 years out of those 26 and with the Director for about 36 years. Both Professor Mahalanobis and I studied at Cambridge, but he had left, when I joined and I met him for the first time in 1920. Even then, I know that apart from his work proper which was teaching physics, he had started taking interest in matters statistical from the meteorological aspect. I believe he wrote a publication in 1922 and for the next three and a half years he was a meteorologist for the State in addition to his duties as Professor of Physics in the Indian Educational Service. His interest by then had branched out into Anthropology as well as the study of data bearing on rainfall and floods. That interest developed between 1926 and 1931 and it was in 1931 that a meeting of some interested in the subject was called under the chairmanship of Shri P. N. Banerjee, the other members being Shri N. R. Sen and Professor Mahalanobis.

A committee was appointed to direct a plan for the establishment of a learned society or an institute for the advancement of statistics in India. Of that, at that time I was not aware, although by a curious coincidence, between 1926-31, I happened to have carried out certain work of the nature of random sampling for agricultural production as a Settlement Officer in the Central Provinces and Berar which is now a part of Madhya Pradesh. I think it was about the same time that the attention of both Professor Mahalanobis and myself was drawn independently to Havock's work on random sampling. I sensed its potentialities, although I am not much of a mathematician and quite early in my career in statistics I was bowled over Bowley.

In any case, a certain amount of work, thousands of experiments were carried out in random sampling and agriculture by me between 1926-31. I met Professor Mahalanobis again and heard of the development of the society I have referred to in 1939 in Simla, when I happened to be Joint Secretary in what was called the Education, Health and Land Department. It was there that the Professor acquainted me with the difficulties he was encountering in running this institution or Institute or laboratory and the attempts, that he had been making to enlist the sympathy and assistance of the Government of India.

In the meanwhile I think the Institute kept itself going by doing a great deal of work, which the Bengal Government were good enough to entrust to it apart from a certain amount of work carried out for commercial and industrial concerns in the nature of survey and so on and so forth. Attempts to enlist the sympathy of the Government continued from 1939 to 1945 and a great deal of rough weather was experienced in those attempts. As Deputy Governor and Governor of the Reserve Bank, I used to visit Calcutta every cold weather for two or three months, and I took the opportunity of joining the Institute's Governing Body at the invitation of the Council.

In 1945, I was asked to be the President and it was in that capacity that I was able to render some assistance to the Institute in getting a settlement with the Education

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Ministry of the Government of India in regard to an annual grant for the Research and Training School, which portion was notionally separated from the rest of the Institute for the purposes so to speak, of attracting a grant. From 1945 to 1950, the Institute carried on with the help and assistance of the Government of India, as also on the basis of certain project work. In between, it was responsible for starting the Quality Control movement in this country in 1948, when Walter Shewhart was invited to visit India in order to acquaint those, who are likely to be interested, in the significance and possibilities of Statistical Quality Control.

Professor Mahalanobis and I came together again in New Delhi in the beginning of 1950, when we discussed the inception of the National Sample Survey, as also the mechanics and the procedure in connexion with the collection of national income statistics. I should say that 1950 marks the end of the struggles of the Institute, because, from that time work came to the Institute, together with recognition in growing volume and the Central Government began to perceive the importance of making greater use of the Institute for the formulation of its policies, not perhaps in the general field of planning so much then, as in the field of policy making.

The idea that the Institute was capable of helping the Government also in regard to planning came towards the end of the First Five Year Plan period and I believe it was in November 1954 that the Prime Minister inaugurated the work, in which foreign experts participated which led to the publication of the by-now well-known Draft Plan Frame. Now, that in brief is the history of the Institute and the scope of its work. A great deal more will be said on this, not only by some of the speakers, who will follow me but also later during the course of the Celebrations. My purpose has been served by inaugurating these Celebrations and by extending a very cordial welcome to all the visitors especially, as I said, the foreign visitors here.

Appendix 2B

SPEECH DELIVERED BY SRI C. D. DESHMUKH ON 22 DECEMBER 1956 ON THE OCCASION OF THE TWENTY-FIFTH ANNIVERSARY OF THE INDIAN STATISTICAL INSTITUTE

Ladies and gentlemen,

I do not think there is anyone here, who would not have felt an uplifting of his heart on listening to the cordial messages that have been delivered on this occasion from all corners of the earth. There is a saying that when people gather at conferences, sometimes they get conference-minded but I am sure you will realize that this is no ordinary conference. It is a gathering of professional men from the highest levels in their respective countries and as true scientists you may be confident that they will not permit themselves to say anything that they do not sincerely feel. Nevertheless, I recall to myself that a philosopher is not often recognized in his own country and I am aware that in many quarters in this country there is yet no proper recognition of the place that the Indian Statistical Institute occupies in the academic and scientific world.

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It is not my intention to ascribe any blame to anyone, because by their very nature statisticians are a dry and uninteresting subject. I cannot imagine why it should be so, because in essence it is the science of fact-finding and there is no department of life, in which the formulation of policy or the determination of a course of action does not depend on the ascertainment of relevant facts.

Ten years ago, there might have been about 1000 trained statisticians in this country, and perhaps the total expenditure on statistics and their application might have been of the order of one crore. According to Professor Mahalanobis, the number of statisticians, officially employed, must now be merely 4,000 and the total expenditure Rs. 3 crores. Now, that by itself is somewhat tantalizing, because, unless one has some measure of comparison, one would not know whether the country is dealing adequately with statistics or not. I am not in a position to substantiate the statement that one would find that in other countries a very much larger percentage of the revenues of public authorities are spent on the utilization of the statistical apparatus and organization.

I hope, sometimes the Indian Statistical Institute will devote a little time to this big business of merely compiling comparative statistics in regard to the advancement of the science and its utilization by public authority in other countries.

In any case, I feel we should all be prepared to conceive that India has now put statistics on its map. I should say that a significant event, which pointed to that, was the utilization of the Indian Statistical Institute for the purposes of formulating some kind of a draft plan. I should not like people to run away with the idea that only a statistician can make a plan. It would be very wrong to postulate any such thing.

The statisticians will depend on enumeration of objectives on the authority. The authorities themselves will subject whatever has been prepared statistically to expert examination by economists and the results of the labours of both economists and statisticians will be examined and scrutinized in the offices of the Government from the administrative and, later, from the political point of view and then only will some kind of proposal emerge, which can be called a plan or a programme of action. I am very happy to be able to inform you that in the processes that led to the formulation of the Second Five Year Plan, there was an almost perfect cooperation between all our relevant internal agencies as well as collaboration by a very large number of devoted and interested scientists from abroad. In these circumstances, I think, we have every reason to hope that literally as India's programme of development expands, there will be no end to the vista, as I said the other day and no roof, so to speak, to the Indian Statistical Institute.

Professor Mahalanobis is not an easy man to work with. He is so interested, so absorbed in his work that he cannot resist any line of advance that promises results for the advancement of the purpose in view and he is not a believer in statistics being a kind of fundamental science. He also does not take a very narrow view of statistics as an applied science. All the time he has one eye on the science and another eye on the application of the science to the solution of the big current problems of the day and he casts his net very widely. Every time he comes back from a foreign tour, I dread to hear of some plan of development. Sometimes it is Quality Control; sometimes it is Production Engineering; sometimes it is Perspective Planning and then it is the Electronics Computer and, since progress in the world also is continuing very fast, the number of ideas he brings back is larger

every year, but I think that as it should be. After all here is a challenge, which workers and colleagues and the practitioners and the teachers of the science can take up. The challenge is one that is easy to understand. It is a fascinating adventure, in the words of the Prime Minister, this work of developing the biggest democracy in the world or one of the biggest democracies in the world and in any case advancing the interest and lifting the living standard of the State—is it one man in five or one man in six—I do not again know what is statistically correct. At any rate that is a large enough human responsibility and, if we have to take a view, I should say that I would rather err with Professor Mahalanobis than be right with somebody else arguing for conservatism and orthodoxy in a matter of this kind. And, therefore, as somebody said the other day, 25 years is at least one third of a man's life and in the life of an institution one does not know what it is; it might be one of the smallest of fractions. Therefore, there is no limit to the assistance that this Institute can give to the authorities of our country. That has been realized by the Central Government. They themselves have offered to the State Government to share the cost of expanding their statistical organization, so that all the information, which is relevant to measuring the execution of the Plan, should be collected and garnered. It should be in the hands of those policy-makers and the supervisors and those finally, who are directly responsible for the execution of individual projects. Indeed, the more plentiful is the systematic collection of facts, easier it becomes to delegate work. Same is the matter in the industrial world. If there is job analysis and in many countries almost every job is analysed, you can find out what the norms for work are and once you know what the norms of work are, you can find out who is doing his best and who is an idler and after all, in scientific jargon, that is the essence of progress in any country, that is to say first to enable people to work and secondly to ensure that, when proper conditions have been established, people do discharge their work. Therefore, as I said, the Central Government has realized this, many State Governments have accepted the offer made by the Central Government and we hope that in course of time the Institute will be able not only to carry out projects for Government but also to help in the broadening and widening of statistical organizations at different physical levels, so that the business of implementing the Plan is watched and measured in an ordinary fashion. As a result of this understanding many of the old conflicts are gradually disappearing. Sometimes, conflict occurs at the scientific level, as for instance, whether the samples taken for random sampling are too small or too large but all these things the scientists learn to leave behind them and, once the basic purposes are realized, then in spite of diversity of work, as Professor Mahalanobis has said, the unity of purpose triumphs and always remains to the fore and those are the conditions in which all statisticians which mean all workers—we, here, have no distinction of posts and we have no hierarchy except for the discharge of functions—can work with the same spirit.

I should like to take this opportunity of paying my tribute again. I did it the other day, the whole of the last meeting of the 17th was a tribute to the workers. I should like to pay a tribute to them again. I have now been associated with this Institute for 15 years and I have seen the numbers grow and I have had many opportunities of watching the selfless spirit of work manifested by the workers of the Institute. Indeed, they have gone to the length of proving in their second issue of 'Samvadithvam' that they are paid for doing no work at all; they have given some statistical formula, by which they have proved somehow that there are so many holidays and there are so many close days and they have statistically proved that they are paid for doing no work. But I regard that as an excess

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of philanthropy. Leaving that apart, I do realize they have worked under very great difficulties and, what is more, sometimes things have appeared very uncertain to them and their future has appeared very gloomy and dark.

I have reasons to hope that those times are over and that we are now on the threshold of a new age—an age in which there is literally no limit to the useful service that this Institute can render and we are confident that with the understanding and sympathy of all those like you, who are here and who take an interest in the Institute, the Institute will be able to discharge its duties successfully.

Appendix 2C

CONCLUDING SPEECH BY SRI C. D. DESHMUKH ON 17 DECEMBER 1966 ON THE OCCASION OF THE TWENTY-FIFTH ANNIVERSARY OF THE INDIAN STATISTICAL INSTITUTE

Ladies and Gentlemen,

This brings the proceedings of this evening to a close and I shall only make a few concluding remarks.

Reference has been made in the course of the speeches to the rapidity of the growth of the Institute in recent years. I do not know if you are aware of the latest example of this rate of growth, which is the construction of two Guest Houses within the space of three weeks, thanks to the energy of the worker in charge, Sri Subodh Das Gupta and the personal supervision of Mrs. Mahalanobis. Many people, who visited the Institute about a month ago and are visiting it again, are astonished at the appearance, as if by the rubbing of Aladdin's lamp of these two Guest Houses.

I hope you have not been bored by the many speeches that you have heard; but were arranged with this object that you should hear of the personal feelings and experiences of the different strata, if I might use the word, of the workers belonging to different periods in the history of this Institute. I am sure, you all have been glad to notice the spirit of camaraderie and the faith and self-confidence which was illustrated by the observation made by the workers.

The history of the Institute falls into several periods: the first one from 1920-31—the period of gestation; the next from 1931-39 was the period of the struggle of infancy; 1939-45 consisted of the disappointments and frustrations of adolescence; 1945-50 were characterized by the hopes of youth; and from 1950, we may say, the Institute has been looking forward to the wider horizons of manhood. With the recognition in principle by Government of the all-India and indeed the international importance of the Institute we are standing on the threshold of a period of endless vistas. I am quite sure that at the rate at which the Institute is growing, it will be able to discharge all the functions that it may take on itself for carrying out its double responsibility or fulfilling its double purpose, to which reference was made by Professor Mahalanobis. I should like to underline what he has said in regard to relations with Government and the importance of

autonomy. What he said would have appealed to me in any case, because in my present capacity as Chairman of the University Grants Commission I have some understanding of the great importance, almost indispensibility, of allowing academic bodies a free hand in regard to the management of their academic work and generally in regard to their day-to-day administration. This is a factor of the utmost importance. If any kind of administrative constraint were to be placed on the Institute, I am quite certain that the results will be very disappointing and self-defeating, in that the Institute will not be able to come up to expectations. One feature, of which the Institute might be justly proud, is the extent to which it has enlisted international cooperation. I am not aware of any other learned body or any other academic institution, which has attracted the help of outside experts to such a large extent as this Institute. There is a continuous give-and-take exchange of visits with consequent enrichment of the work turned out by the Institute.

The Institute is in the peculiarly useful or valuable position of being able to assist Government in ways, in which perhaps no other form of organization can assist it. There is, for instance, the question of study in matters connected with Government's financial and planning policies and yet matters which do not fall either within the category of research or within the category of day-to-day administration. The latter can be carried out by Government's own economic adviser, statistical adviser and others. Research can be carried out both in the Research and Training School of the Institute as well as in the statistical departments of the universities.

But there is a field in-between, where full thought has to be given to the problems of policy, not so much in the sense of day-to-day decisions as in the sense of defining the conditions, under which policies might be implemented and that kind of work can best be carried out by an Institute of this character. I do hope that in the future in addition to work that is carried out in connexion with planning, as for instance, perspective planning, the Institute will be utilized by Government for the purpose, that I have just indicated. I hope that in the course of these Celebrations those, who are interested, will have the opportunity of listening to the observations of most of our other visitors not only from the point of view of friends and sympathisers of the Institute but also experts, who have brought to us their own special fund of experience.

Thank you.

Appendix 2D

SPEECH DELIVERED BY PROFESSOR P. C. MAHALANOBIS
ON 17 DECEMBER 1956 ON THE OCCASION OF THE
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I will start the series of talks about old days, in which my colleagues will join. My mind goes back to the day, on which we started our work; and I have been thinking what I shall tell you today, after 25 years. I shall speak particularly to my fellow-workers.

One thing which is constantly in my mind is that the Institute is somewhat like a river. Men come and work; some continue for a long time; some stay a short time and go away. But this common endeavour of different individuals flows on as the activity of the Institute.

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I am keenly conscious that many individuals with many different interests have built up our Institute. Circumstances have forced us to make the Institute highly self-contained in nearly every thing. This is one special feature. It is not that we are doing only scientific work; the workers of the Institute shoulder the burden of many other things. I am very proud that in this Institute our buildings have been all designed and constructed under our own supervision. We run many things, and this is why I feel very deeply that even those workers, who are not directly concerned with statistics, also belong to this Institute in a very special sense. This is one thought, which I should like to convey to you.

Statistics has a very wide field. It has many aspects and in this Institute it has given us the opportunity for cooperative work in a very broad sense, in the building up literally of this Institute, as witnessed by these buildings, these grounds and, of course, the scientific work.

I am also conscious of the Institute's very rapid growth, which is a matter of congratulation in one sense, but at the same time I also see the dangers of too rapid a growth. There is danger, when we grow too big or too rapidly; our work tends to become rather impersonal and we begin to lose human values which is a great loss—this also has been uppermost in my mind today.

I remember the early days, when we started with one part-time worker. Then we had a small group of four or five. For the first three or four years, I think, the total number did not exceed 10, or may be 12. We had a typist, Jalathar, who is now our oldest worker and who will speak of the early days very shortly. We also had considerable help from outside. Professor K. B. Madhava, for example, played an important part in shaping the policy by insisting that the name should be "Institute" and that we should not be merely a talking society but we should take up research and even training. The idea was that the Institute did not merely mean coming together to read papers but something more, something that would cover a wide field of activities. In this way, we began to have many workers, who perhaps did not publish important papers, but who in a way contributed much that was of value to this Institute. Today I remember Sudhir Banerjee who died in 1952. In our early days the Institute could scarcely have survived without his very wise management of financial and business matters.

In many different ways we have grown up and our responsibilities have increased. Twentyfour years are at our back. In looking forward I feel more and more the need of strengthening the spirit of cooperation and developing some unity of purpose together with, of course, a great deal of diversity in our individual way of doing and looking at things.

I should like to touch very briefly on one aspect of the Institute's relations with Government, which has been under consideration for twenty years. Our President has referred to this. We have continually pressed on Government the need of giving the Institute full freedom and autonomy in internal management. We are a non-government but public institution; and, so far, we have tried to discharge our public responsibilities not as a Government department but as an independent institution. I am myself convinced that this is desirable not so much in the interest of the Institute itself but of the country as a whole. In fact, converting the Institute into a Government department would relieve us of much worry, because things will go on somehow but there would be the danger of

losing the initiative. Therefore, I think it is important in the best interests of the country that we should continue to function as an independent public institution. I am glad to say this has been accepted in principle, and we are hoping that fairly soon it would be recognized through parliamentary action.

But it is the other side of this responsibility, which I should like to impress on my colleagues. If we claim a certain amount of freedom of action, then we must also shoulder a certain amount of responsibility, that is, we must see that our work from within is maintained at a high level of efficiency, and secondly, that we retain our initiative—the initiative to direct our efforts, our united endeavour towards solving either scientific problems or problems of national development, which will be continually facing us in India.

I do believe that our Institute has a special responsibility, because we happen to be located in India. There are many problems which face us in India, which perhaps do not face countries which are more advanced; and, therefore, if we consider statistics not as an end in itself but as a tool for the advancement of science as well as for the advancement of human welfare, then there must be special responsibilities determined by our special needs in India.

I have very much in mind today this aspect of statistics and, therefore, we must never lose the initiative. We must remember that in an under-developed country statistics must have a clearly defined purpose, one aspect of which is scientific advance and the other, human welfare and national development.

This is my appeal to all my fellow-workers at this moment, when we are getting over the first quarter of a century of our activities. It was on 17 December 1931 that we had the meeting, at which it was decided to establish this institution. Let us look forward and shoulder our responsibility to do the best we can to improve our own efficiency of work, and to maintain our initiative in solving problems of national development in future.

Appendix 2E

SPEECH DELIVERED BY PROFESSOR P. C. MAHALANOBIS ON 22 DECEMBER
1956 ON THE OCCASION OF THE TWENTY-FIFTH ANNIVERSARY OF
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Respected President and friends,

I can claim to be the oldest worker of the Institute. As I look back to the last 25 years, or even longer, because we did have a Statistical Laboratory with a small group of workers before the Institute was founded, several thoughts come to my mind.

Firstly, I believe, I can see some unity of purpose in the great diversity of our activities. I may perhaps say that whatever work we did in this Institute have been mainly directed to solving problems at the practical level; but we have found that solving a practical problem continually called for a good deal of theoretical researches. Therefore, we took up theoretical researches not so much for its own sake but to meet real needs of solving practical problems.

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There is unity in this approach. There is no conflict, I think, between scientific research and solving practical problems. Perhaps, we may look upon scientific curiosity itself as an emergence in the human mind of an urge to know more of nature and, through such knowledge, advance the welfare of the human species. If one looks at it in this way, there is no conflict between scientific research and solving practical problems.

Another way of appreciating the unity of the work of the Institute, I think, stems from the deeper physical, social and economic needs of an under-developed country like India.

Some of the early problems, on which we worked, were concerned with rainfall and floods and what remedial measures could be taken. Then came enquiries into rural indebtedness, handloom weavers, agricultural crop surveys, and later on, the collection of social and economic information for this vast country, in which we have ten or perhaps twenty or thirty million persons unemployed or under-employed according to the definition of unemployment we use. These enquiries all stem from the needs of an under-developed country; and still more recently from the needs of planning.

This is how gradually the Institute expanded its activities. Perhaps, the unity as well as the diversity may be appreciated in the vivid contrast between our modern workshop or our unit for electronic computation, which are located in buildings which adjoin *Kalyanasari*, the unit for the study of cottage industries like the *Ambar Charaka* (spinning wheel) and handloom weaving. Both types of activity have the common aim of using science for the promotion of national development. The *Charaka* and the electronic computer working side by side in our Institute make vivid the unity of purpose in the midst of sharp contrasts.

My mind goes back to the problems, which we have taken up for study. All are fundamentally problems of practical importance, but we worked only on such problems, for which we had men to take up the challenge. In the Institute we have never thought in terms of poets to do this or that. We have always thought of men, who could do creative work; and it is round men that the work of the Institute has grown up. I think this is an important feature of the Institute. It is something like a stream of activities of individuals. The Institute started work with only one part-time computer 25 years ago. The Institute has grown gradually like a river gathering tributaries, by opening out branches and sending out men to other agencies. This has given us an inner sense of direction, not in a mechanical way, but through a kind of unity of purpose which is living. I should stress this as an important feature, as I look back. The history of the Institute then is really the response of human beings to the need of solving problems of real life. This, I should say, is our unity of purpose.

I, therefore, turn my mind to the men, with whom I have had the privilege of working. Here also there is a great contrast. If we look today at the flood-lighted building of the Institute we see only the facade. The foundation cannot be seen; neither the roof at the top. As a matter of fact, the foundation and the roof must not be seen. Their fulfilment is in not being visible. In the same way, I am aware, as the oldest worker of the Institute, of the foundation, which has been built by humble men, whose name nobody knows. I recall the many with whom I have worked. Now the Institute has grown so big that I am sorry I have no longer that privilege. But it is the dull, day-to-day routine work of many humble men, which has built the Institute. It is wise to remember this today.

Then there are others who exercised a deep influence, but not in a direct way. They are not visible in the list of papers which we have published. I shall recall some of them to convey to you what I have in mind today. Brojendra Nath Seal, the great Scholar with whom I started doing some statistical work, had an imagination which is still fresh in my mind as something wonderful. He told me that India would need modern statistics, and advised me to work in this subject instead of doing physical research. This was in 1918, 40 years ago. It was his advice and encouragement which set my course. His influence on the Institute is difficult to measure with the tools of statistics.

I should like to name another great personality, Rabindra Nath Tagore, who gave us great encouragement, and who used to visit the Institute frequently. Very soon after the Institute had been established, I recall, we were doing much advisory work in the design of agricultural field experiments. I was professor of Physics in the Presidency College, which is a Government institution in Calcutta; and I learnt that Government intended to promote me and send me out of Calcutta as the principal of a college. This would mean the end of the Institute and statistical work. At that time, we were a small group: Subhendu Bose and Sudhir Banerjee and 3 or 4 others. We were not rich and we were in difficulties. We thought over the matter carefully and felt that the best thing would be, if I resigned from Government service and then we could start coaching classes in the evening and continue our statistical studies. It was Rabindra Nath Tagore who gave me encouragement. I remember, he said, "Yes, this is the right decision". He even went with me to find an old garden house (very near this place), where we could do our agricultural experiments. Again, I do not know how we shall measure his influence. Not only this. It was Rabindra Nath Tagore, who made me realise that in the great days of India she had opened her doors to the whole world and had welcomed guests from abroad. This is something for which we are truly grateful in this Institute, because we also have had the great privilege of having many friends from abroad. I do not know how to measure the help received from them.

I may turn to Sir Ronald Fisher. His influence on this Institute is indeed difficult to measure. It has been not only in stimulating research but also in the support he gave to our advocacy of the sample survey or again to the need and the importance of a close integration of research, training and project work. He gave us support at a very critical stage of our work in 1938; and his influence is something which is deep although it is not visible on the facade.

There have been also some men at the top who have helped the Institute in ways which people do not know. I may mention our first President, Sir Rajendra Nath Mookerjee. When we wanted to start the Institute, I did not know that an attempt had been made earlier to establish a statistical society, which came to nothing because of the lack of confidence and understanding between the Indian and British businessmen. It was only because Sir R. N. Mookerjee agreed to become our President that it was possible to start this Institute on a broad basis and which soon made it possible for the Institute to secure a public status. He was old, 75 or 76; and was retiring from all offices. But he made one exception and became our President. One day he told me, "Well frankly, I do not quite understand all you are saying; but somehow I have a feeling that India will need more and more statistics in future. This is why I am helping you". It was his imaginative understanding which gave us a start.

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I also recall Sir James Grigg, then Finance Member in the Government of India. He came to see the Institute in 1934. We had a grant of Rs. 2,500 a year at that time. All on a sudden he asked me when he was getting away in the car, "Do you want a research grant?" I said, "Yes". He said, "How much?" I could not think of anything more than Rs. 5,000. He immediately sanctioned Rs. 5,000. A little later, even before we started getting the new grant, he increased it to Rs. 15,000 a year, which gave us the opportunity to start a small nucleus of whole-time workers. This gave us the opportunity of striking roots.

I shall mention another name. At a time of great difficulties in Bengal, in 1943, it seemed that the work of the Institute would collapse. We had built up the sample survey of crops after six years of hard work. In 1943, there was a new Agriculture Minister of the Government of Bengal; he did not have any faith in sample surveys; he could not simply understand how by taking observations on one out of 200 fields one could get an estimate of the rate of the rice crop. So he stopped the sample survey. At this time, the Minister of Civil Supplies, the Honourable Mr. H. S. Suhrawardy, later the Prime Minister of Pakistan, came forward to the rescue. He was in need of reliable information on the supply of rice. He showed an imaginative appreciation of the work of the Institute; and he sanctioned the grant. In this way the Institute received help from many unexpected quarters.

I should like also to say a few words about our President whom I have not mentioned before. He became associated with this Institute, I think, in 1940 or 1941 as Vice-President. He became our President at the time of a grave crisis in our affairs in 1945, when we were under great pressure from the Government of India. Since then he has been helping us quietly in many ways, some of which even I never know. This is, I think, all I need say of him.

Finally, I should like to mention Jawaharlal Nehru, our Prime Minister. We have had the privilege of having him as a frequent visitor in this Institute. He has stayed here; and he knows the work of the Institute intimately. He has given us strong support, without which we could not have gone on with our work. Two years ago he came here; and in the Institute he inaugurated the studies on planning for national development. He is one of the men at the top whose name will not appear in our formal history.

When I look to the future two thoughts come to my mind. When we have had individuals to meet the challenge of a new problem we had nothing to fear. Secondly, in this Institute, our best work was done when we could somehow, perhaps not quite consciously, realize the unity of purpose, and could cooperate among ourselves. On the other hand, we have passed through dangerous days of stress and strain, especially after rapid expansion when disruptive tendencies arose. One such crisis had come 8 or 9 years ago. Recently we have been again expanding at a rather alarming rate. So on this day, as I look to the future my mind is not completely at ease—I have some misgivings. The future depends on us—my fellow-workers. If we can realize the unity of purpose and work together, then, I think, there is nothing to fear. This is the thought which is uppermost in my mind today.

One final word. We are fortunate today in having with us colleagues and friends from all over the world, East and West, North and South. I recall an old text of my country from the 'Atharvaveda.'

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Yatra visvam bhavati abhisadam,

which described a civilised country as a place "where the whole world meets and finds its one nest". This text gives me courage and hope; and I salute all our guests and friends from abroad.

Appendix 2F

LECTURES, SEMINARS AND SYMPOSIA DURING THE TWENTY-FIFTH ANNIVERSARY CELEBRATIONS : DECEMBER 1956 TO JANUARY 1957

18 December 1956 :

PROFESSOR T. KITAGAWA (*Japan*) : The logical aspects of successive processes of statistical inference.

SIR RONALD A. FISHER (*UK*) : Statistics in scientific work.

19 December 1956 :

DR. Q. M. HUSSAIN (*Pakistan*) : Recent contributions to design of experiments.

DR. U. S. NAIR : Study of maternity rates.

PROFESSOR T. KITAGAWA (*Japan*) : Application of design of experiments to Japanese engineering.

SIR RONALD A. FISHER (*UK*) : Probability in the sciences.

20 December 1956 :

PROFESSOR V. M. DANDEKAR : Fisherian inference.

SRI N. CHAKRAVARTY : Organization of a State Statistical Bureau.

DR. M. ZIAUDDIN (*Pakistan*) : On symmetric function statistics.

PROFESSOR S. K. TAI (*China*) : 1953 Population census of China.

DR. F. YATES (*UK*) : Statistical aspects of agricultural planning.

PROFESSOR S. H. WANG (*China*) : On the coordination between the industrialization and agricultural cooperation.

SIR RONALD A. FISHER (*UK*) : Probability in the sciences.

PROFESSOR J. S. NEYMAN (*USA*) : Statistics, the servant of all sciences.

21 December 1956 :

DR. B. D. THIKIHAL : Successive sampling and its role in sample surveys.

ACADEMICIAN N. N. BOGOLYUBOV (*USSR*) : Some remarks about the problem of statistical equilibrium.

DR. NATHAN KEYFITZ (*Canada*) : Technical assistance and economic planning.

PROFESSOR A. LINDER (*Switzerland*) : Principles of experimental designs.

MR. E. DA COSTA : Regional distribution of Indian National Income.

DR. V. G. PANSE : Development of statistics in relation to agricultural research, especially plant breeding in India.

22 December 1956 :

MR. N. T. MATHEW : Non-response errors.

DR. A. K. GUPTA : Statistical methods in the work of standardisation.

PROFESSOR J. NEYMAN (*USA*) : Inductive behaviour as the basic concept of philosophy of sciences.

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- PROFESSOR D. R. GADOL: Some aspects of economic planning in India.
DR. A. I. EZHOV (*USSR*): Organisation of the State Statistics in the USSR.
MR. M. HANSEN (*USA*): Application of electronic computers to data processing.
DR. N. S. R. SASTRY: Rural Credit.

24 December 1956:

- DR. B. RAMAMURTI: Statistical system in India.
PROFESSOR K. N. RAJ: The working of the money income multiplier.
PROFESSOR K. IYENGAR: Some present-day problems of low income urban workers in India—a realistic approach.
PROFESSOR D. G. KARVE: Community projects and National planning.
Chairman: SIR RONALD A. FISHER (*UK*): Symposium on Teaching of Statistics and Training of Statisticians. Participants: DR. P. B. PATNAIK, DR. Q. M. HUSSAIN, DR. M. ZIAUDDIN (*Pakistan*), DR. U. S. NAIR, SRI V. M. DANDEKAR, SRI D. Y. Lelo, PROFESSOR V. D. TRAWANI, DR. Q. K. GAYEN, PROFESSOR P. C. MAHALANOBIS, SRI N. T. MATHEW, DR. B. RAMAMURTI, DR. B. D. TRIKHWAL, PROFESSOR T. KITAGAWA (*Japan*).

26 December 1956:

- DR. A. K. GAYEN: Rank analogue of the standard tests of significance. Chairman: SRI A. C. GUHA: Some techniques of decentralised control. Speaker: PROFESSOR J. P. MILLER (*USA*).
Chairman: PROFESSOR A. LINDER (*Switzerland*): Symposium on the teaching of Statistics—Training of the International Statistical Education Centre, Calcutta. Participants: MR. R. MINOBE (*Japan*), MR. FAIZ EL KHURI (*Beirut*), PRINCE ATHIFORN KSEMASRI (*Thailand*), DR. B. RAMAMURTI, DR. NATHAN KEYFITZ (*Ceylon*), DR. P. B. PATNAIK, DR. M. ZIAUDDIN, DR. Q. M. HUSSAIN, MR. A. AFZAL (*Pakistan*), DR. A. MATTHAI, PROFESSOR P. C. MAHALANOBIS, PROFESSOR A. LINDER (*Switzerland*), SRI S. SENGUPTA, SRI S. K. BANERJEE.

27 December 1956:

- DR. C. CHANDRASEKHARAN: Demographic surveys in underdeveloped countries.
MR. D. J. DESMOND (*UK*): Operational research ideas in sampling plans.
MR. A. L. RAICH (*USA*): Some Industrial problems for the mathematical statisticians.

28 December 1956:

- MR. R. P. BHARGAVA: Forest sample surveys.
PROFESSOR A. LINDER (*Switzerland*): Statistical aspects of Salks' vaccine.
DR. P. K. BOSE: Some statistical problems associated with scholastic tests.
DR. M. R. SAHANI: Man and his ancestry through geological age (with lantern slides).

29 December 1956:

- PROFESSOR M. C. CHAKRAVARTI: Teaching of designs through matrix methods.
DR. A. R. KAMAT: On some statistics based on the variate differences.
DR. N. V. A. NARASIMHAN: On the structure of the Indian economy.

31 December 1956:

- DR. V. S. HUZURBAZAR: Statistical inference.
PROFESSOR B. R. SHENOY: Foreign aid and Indian economic development.

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DR. D. N. MAJUMDAR : The mystery of a Himalayan lake—Rupkund expedition
(with lantern slides).

2 January 1957 :

DR. J. N. MUKHERJEE : Scientific approach to planning.
DR. GYANCHAND : Premises of the Marxian view on population—a critique.
PROFESSOR K. P. CHATTOPADHYAYA : National Planning and culture change.
PROFESSOR J. MACLEAN (UK) : Statistics and arithmetic in primary schools.

3 January 1957 :

DR. S. K. BANERJEE : On the applications of statistical methods to medium range
and extended range weather forecasting.
DR. V. K. R. V. RAO : Some problems of long range planning.

4 January 1957 :

DR. U. P. BASU : On the planning of chemical industry.
PROFESSOR P. ROY : The pattern of scientific and industrial research.

5 January 1957 :

DR. N. R. SEN : The statistical theory of isotropic turbulence.

Appendix 2G : Congratulatory Messages

MR. A. M. NESMEYANOV, *President of the Academy of Sciences, USSR* and MR. A. B. TOPCHIEV, *Chief Scientific Secretary of the Academy of Sciences, USSR* :

The Academy of Sciences of the USSR on the day of the 25th Anniversary of the Institute, of which you are the head, conveys its most sincere congratulations to you and to all the workers.

By its outstanding scientific activities and by its important role in the social life of the country, the Indian Statistical Institute has merited high respect far away from the boundaries of India. In this famous epoch of the revival of your country, the Indian Statistical Institute has made an important contribution to the scientific planning of the development of Indian economy and national welfare.

The broad scientific ties of the Institute with scientists of different countries and the scientists of the USSR in particular have become glorious traditions. Such scientific ties and personal contacts among scientists are of great value and we hope they will develop and strengthen in the future.

The Academy of Sciences of the USSR wishes new success to the Indian Statistical Institute which will enrich the treasures of national and world culture.

MR. RYLABUSHEIN, *Director of Statistics, Institute of Economics, Academy of Sciences, USSR* :

The Statistical Section of the Institute of Economics of the Academy of Sciences of USSR sends you and your colleagues warm greetings for the Jubilee of the Institute and wishes you and your colleagues new creative successes in the field of Statistical theory and its applications.

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MR V. OVSIENKO, *Rector, Moscow Economics and Statistics Institute :*

In connexion with the Twenty-fifth Anniversary of the Indian Statistical Institute, Moscow Economics and Statistics Institute send its best wishes for development of Statistical work towards higher success and better life of the Indian people.

PROFESSOR M. I. RUBINSTEIN and MADAME RUBINSTEIN, *Institute of Economics, Academy of Sciences, USSR :*

Congratulate significant date 25 Anniversary Indian Statistical Institute wish further success your research relating Indian Economic Development best greetings to Rani and all Friends.

MR. EZHOV, *Chairman of the Council of Methodology and Deputy Director of the Central Statistical Bureau, USSR :*

On behalf of the Council of Scientific Methodology under the Central Statistical Bureau USSR and personally send greetings and congratulate you and your colleagues for the Jubilee of the 25th Anniversary of the Indian Statistical Institute. The many-sided activities of the Institute have already acquired world-wide recognition and appreciation.

The great work conducted by the Institute under your guidance particularly in the sphere of application of sampling methods is studied with interest in many countries. Great significance lies in the fruitful training of highly qualified statisticians as well in the sphere of exchange of experience and strengthening of scientific collaboration among the statisticians of many lands including the collaboration among statisticians of India and those of the USSR. The Soviet Statisticians are in deep sympathy with the activities of the Institute directed to influence the development of the national economy and raising of the material and cultural standards of the people of India. The Soviet Statisticians are glad at heart at the successes achieved by the Institute in this task. The Council of Scientific Methodology sends heartfelt greetings to your colleagues and you and wish you greater success in improving statistical methodology and practical application of statistics towards the welfare of the great Indian nation for peace and progress of the whole world.

MR. D. DEGTYAR, *Phnom Penh, USSR :*

I am very glad to have an opportunity to convey my congratulations to you and through you to all the staff of the Statistical Institute with the 25th Anniversary of the Institute.

I have had the pleasure to work in your Institute and to observe with the great satisfaction the great work which is being conducted by the Statistical Institute in the field of Planning of New India's economic development as well as in the strengthening of the contacts between the scientists of various countries and especially between the scientists of India and the Soviet Union.

Staying at the present time in the Kingdom of Cambodia I wish with all my heart successes in the further fruitful work to the Statistical Institute on the day of its anniversary, in the work directed to the development of your country on the way of progress and strengthening of economic independence.

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ACADEMICIAN K. OSTROVITYANOV, *Vice-President, USSR Academy of Sciences :*

Congratulate you and staff of Indian Statistical Institute on occasion remarkable date of 25th Anniversary of the Institute. Under your guidance Indian Statistical Institute has become one of world's largest research centres in the field of statistics. For the last few years the Institute has effected extensive and important research into economics and applications in prospective planning of peoples' economy of India. The Institute has become place of current meetings, fruitful discussions and cooperative work of Statisticians and Economists of different countries. The works done serve vivid example of possibilities for international cooperation in social and economic sciences. I wish Indian Statistical Institute further successes in the fruitful research and achievements of Indian Scientists for further progress of economy of your country and rise of living standard of Indian People.

PROFESSOR V. STAROVSKY, *Director of the Central Statistical Bureau, USSR :*

On behalf of the Central Statistical Bureau, USSR and of all the workers of the organs under the Statisticians' Union (Government) of USSR and on my own part, I hereby send greetings to you and your colleagues and the statistical workers of India on the occasion of the 25th Anniversary of the Statistical Institute for the excellent work in both the spheres of theory and practice of statistics conducted under your guidance by the Indian Statistical Institute and particularly for the famous National Sample Survey undertaken for the welfare of the people of India and for the training of highly qualified statisticians. Such extensive activity of the Institute is well-known among wide circles of Soviet Statisticians exciting their admiration and sympathy for the achievements of the Institute. Wish you greater successes in your fruitful scientific and practical work directed to the welfare of the people of the Indian Republic, and also heartily wish for further strengthening of the bonds of friendship and collaboration among the statisticians of India and USSR for peace and progress of the world.

MR. LAPTEV, *Director of the Institute of Economics, Academy of Sciences, USSR :*

The Director of the Institute of Economy of the Academy of Sciences USSR sends warm greetings to you and your colleagues on the occasion of the Jubilee of the Institute. The Directorate wishes all the members of the Institute and you personally further creative successes in work.

PROFESSOR I. UDALTOV, *Dean, Economic Faculty, Moscow State University :*

The Economic Faculty of the Moscow State University takes the pleasure of sending you and the Institute under your guidance heartiest congratulations on the 25th anniversary of the Institute.

YUGOSLAV STATISTICAL SOCIETY :

Please accept best wishes, occasion 25th Anniversary Indian Statistical Institute.

MR. YOU POH SENG, *University of Malaya :*

I am sorry to miss this further opportunity to revisit the Institute, where I had had some very pleasant memories from my previous visits. I do, however, offer my sincerest

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congratulations to the Institute and to all connected with it, and to you especially, on this occasion of its 25th Anniversary, and I wish every success to the celebrations and to the symposium, which is scheduled to follow this celebration.

MR W. R. LEONARD, *Director, Statistical Office, United Nations, New York :*

I should have very much welcomed the opportunity to be present. The Institute has had a very distinguished history and in recent years is playing an ever increasing role in Indian affairs as well as in International affairs. I wish the Institute continue an expanding success.

MR. R. F. FOWLER, *Ministry of Labour and National Service, London :*

My warmest congratulations on the 25th Anniversary of the Institute, and my best wishes for the next 25 years.

DR. J. D. N. DE FREMERY, *Secretary, Vereniging Voor Statistiek, The Hague :*

Wishing a successful meeting at your Anniversary Celebration and the best result for your work in the future.

MR. HERBERT MARSHALL, *Dominion Statistician, Dominion Bureau of Statistics, Ottawa, Canada :*

We shall be thinking of your meeting in December. Wishing we could have been there and hoping that Anniversary will be eminently successful, as, I am sure, it will.

PROFESSOR CHARLES BETTELHEIM, *Professor of Economics, Ecole Pratique des Hautes Etudes, Sorbonne, France :*

On the occasion of the twenty-fifth Anniversary of the Indian Statistical Institute I am sending to you my best wishes for its future development and for the workers of the Institute.

Having been associated with the activity of the Indian Statistical Institute during nearly three years, I know how much valuable work is being done there in the most various fields and not only in the field of statistics. I know what important part the Indian Statistical Institute is playing also in the field of international cultural and intellectual relations.

I wish to the Indian Statistical Institute, with its already long past behind it, a still more fruitful future.

PROFESSOR DARMOIS, *University of Paris :*

I want to state here that my spirit will be present with you on the 17th December 1956 to felicitate you and rejoice over the magnificent creation which you have achieved, not only of an Institute flourishing on its results, but also of an excellent school of statisticians.

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Mr. C. J. MARTIN, *The East African Statistical Department, Kenya* :

May I send my sincere best wishes for your Anniversary Celebrations and congratulate you on the great achievements, which the Indian Statistical Institute have made in the 25 years of activity !

SRI G. L. NANDA, *Minister for Irrigation and Power, Government of India* :

Kindly convey to the workers of the Institute my deep appreciation of the work done by them; especially that connected with the formulation of the Second Five Year Plan.

SRI AJIT PRASAD JAIN, *Minister for Food and Agriculture, Government of India* :

I am glad to note that the 25th Anniversary of the Indian Statistical Institute is going to be celebrated this month. Your Institute has made a valuable contribution to the statistical work in India.

I wish your celebrations success.

Messages of greetings and good wishes were also received from Mr. M. H. Campion, Director of the Central Statistical Office, London; Dr. D. Ensminger, Ford Foundation, New Delhi; Mrs. Karin Kock, Head of the Central Bureau of Statistics, Sweden; Mr. B. A. Liu, Chief of Statistical Division, Department of Social Sciences, UNESCO; Mr. W. F. Ogburn, Indian School of International Studies, New Delhi; Professor E. S. Pearson, Royal Statistical Society and University College, London and Mr. G. E. Wood, Census and Statistics Department, Wellington.

The Pakistan Statistical Association sent heartiest felicitations and referred to the Indian Statistical Institute as occupying a unique position in the East and an international status in Statistics. Other congratulatory messages were received from Sri G. B. Pant, Minister of Home Affairs, Government of India; Sri J. J. Anjaria, Chief of the Resources, Economic Survey and Finance Division, Planning Commission, New Delhi; Professor Radhakamal Mukherjee, Vice-Chancellor, University of Lucknow; Dr. R. Balakrishna, Professor of Economics, University of Madras; Professor K. N. Bagchi, Principal, National Medical College, Calcutta on behalf of Indian Science Congress Association and National Medical Institute; Sri S. Subramaniam, Joint Director, Central Statistical Organization, New Delhi; Professor V. R. Pillai, University College, Trivandrum and Sri M. Verma, University Training College, Nagpur.

Appendix 3: List of Papers completed during 1956-57

A. Theoretical Statistics

A.1 SUMMARY OF RESEARCH WORK IN THEORETICAL STATISTICS

(The numbers in bracket are those of papers listed in Section A-2)

Probability Theory (7, 21, 22): It is shown that the Fourier transform of a finite probability distribution, which is an integral function, cannot be without zeros in the entire complex plane. From this, it follows as a corollary that a random variable following a proper infinitely divisible law cannot be bounded.

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Given a probability space (X, S, μ) and a sequence of random vectors ξ_1, ξ_2, \dots on it, such that the induced measures $\mu_{\xi_1}^{-1}, \mu_{\xi_2}^{-1}, \dots$ converge weakly to a measure P , it is proved that there is a random vector ξ , which is such that $P = \mu_{\xi}^{-1}$.

It is proved that any discrete stochastic process can be generated from a rectangular variable. No independent family of proper random variables, however, can be obtained from the rectangular variable, if the family is uncountable.

Characterization theorem (6): A characterization of the normal distribution is obtained as a consequence of the linearity of multiple regression and homocedasticity of the conditional distribution, when all the variables concerned are interconnected by a linear structural relation.

Sequential Analysis (1): It has been shown that the fundamental identity of sequential analysis is a special case of a formula for the probability that the sampling terminates at some finite stage. The formula is valid for any given sampling rule and yields simple proofs of known results and also some new ones, e.g., upper and lower bounds for the probability of eventual termination of a random walk in the case, when there is one fixed barrier and a drift away from the barrier.

Multivariate analysis (14, 15): In Biometric work, functions of characters representing size and shape of an organism have been found to be extremely good discriminators between species, types and so on. New definitions have been provided for size and shape factors, which are used in the classification of groups of persons living in different states of India. A size factor is defined as one which, when its value is increased by a unit amount, produces on the average desired amounts of increase in the individual characters.

A shape factor on the other hand increases the magnitude of some of the characters and decreases the others.

New techniques have been provided for comparing growth curves under different conditions. By a suitable transformation of the time axis, which can be computed from the *observed data themselves*, the essential comparison between groups of growth curves can be made to depend on a linear rate of growth and an exact test of significance used. The adequacy of such an analysis can also be examined by a suitable test of significance.

Design of Experiments (2, 3, 4, 5, 16, 17): An expression for the efficiency of a general two-way design is obtained in terms of the association matrix and the optimality of the balanced incomplete block designs is established.

Simplified proofs of some theorems on optimal designs are given. A set of necessary and sufficient conditions, which characterise the matrix $A'A$, where A is the design matrix, for an optimal design is derived. The criterion of optimality is based on considerations of bounds on power of testing a certain linear hypothesis or estimation of some parametric function with maximum precision or simplified analysis.

A new class of designs are introduced for fitting response surfaces. These designs have the property that the confidence interval for the optimum point obtained by fitting a lower degree polynomial remains unaffected by the fact that a certain higher degree polynomial would give an adequate fit to the response surface. Other designs are con-

struted to explore the response surface in the near stationary region. Some of these designs could be used in stages.

Block designs for fractional replicates for 2×3^m , 3×2^m , $3^m \times 2^m$ experiments have been constructed, using certain properties of orthogonal arrays and a theorem previously given by C. R. Rao. It has been shown that incomplete blocks may be used to have designs for the fractional replicates of factorial or partially factorial experiments.

Estimation (8, 18, 13): The investigation on the efficiency of ratio estimates and two-moments estimates, mentioned in the previous report, has been extended to fairly general class of discrete distributions. Expressions for bias in these estimates to order $1/n$ (n being the sample size) are derived. Computational methods for determining maximum likelihood estimates in these cases are developed, which require a table of values of the distribution for various values of the parameter at sufficiently close intervals. The standard error of this estimate can also be approximately evaluated by using this table.

For the same general class of discrete distribution an explicit expression for the UMVUE of the parameter has been derived which has been tabulated for small sample sizes in the particular case of Poisson distribution truncated at the origin.

Sample Surveys (9, 10, 11, 12, 20): Different types of ratio estimates, based on estimates obtained from n independent and interpenetrating sub-samples, are examined from the point of view of bias and mean square error. A correction for the bias in ratio estimates is proposed, which increases the precision of the estimates in many practical cases.

A generalised unbiased ratio estimator is considered and selection procedures providing such estimators are suggested for a variety of sampling designs.

As an extension of the *ppe* sampling designs new design are suggested, which gives highly efficient estimates, even when the variate y under enquiry is approximately linear in the auxiliary variate x .

A.2. PAPERS

1. BHADUR, RAJESH RAO: A note on the fundamental identity of sequential analysis (submitted to *Ann. Math. Stat.*)
2. CHAKRAVARTI, INDRA MOHAN: Simplified proofs of some results in the theory of optimal designs (submitted to *Sankhyā*).
3. ——— Fitting response surfaces (submitted to *Sankhyā*).
4. ——— Block designs for fractional replicates of asymmetrical factorial experiments (submitted to *Sankhyā*).
5. ——— Contributions to the design and analysis of factorial experiments (a thesis submitted to Calcutta University for D.Phil degree).
6. LARA, RADHA GOVINDA: On some characterisation problems connected with linear structural relations (*Ann. Math. Stat.* in press).
7. ——— On a property of Fourier transforms of finite probability distributions (submitted to *Proc. Amer. Math. Soc.*).
8. MITRA, SUJIT KUMAR and J. ROY: Unbiased minimum variance estimation in a class of discrete distributions (in press).

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9. MURTHY, M. N. and N. S. NANJAMMA: Almost unbiased ratio estimates based on interpenetrating sub-sample estimates (submitted to *Sankhyā*).
10. ——— N. S. NANJAMMA and V. K. SETHI: Some sampling systems providing unbiased ratio estimates (submitted to *Sankhyā*).
11. NANJAMMA, N. S. and M. N. MURTHY: Almost unbiased ratio estimate based on interpenetrating sub-sample estimates (submitted to *Sankhyā*).
12. ——— MURTHY M. N. and V. K. SETHI: Some sampling systems providing unbiased ratio estimates (submitted to *Sankhyā*).
13. PATIL, G. P.: On problems of estimation in a class of discrete distributions (a thesis submitted for the Associateship of the Indian Statistical Institute).
14. RAO, C. RADHAKRISHNA: Bengal Anthropometric Survey, 1945 Part II: Statistical analysis (in press, *Sankhyā*).
15. ——— Statistical methods for the comparison of growth curves (submitted to *Biometrics*).
16. RAMAKRISHNA, C. S.: Some contributions to the theory of designs involving only two replications (Thesis submitted for the Associateship of the Indian Statistical Institute).
17. ROY, JOGABHATA: On the efficiency factor of incomplete blocks designs (submitted to *Sankhyā*).
18. ——— and S. K. MITRA: Unbiased minimum variance estimation in a class of discrete distributions (in press).
19. ROY CROWDHURI, D. K.: On some extensions of pps sampling (a thesis submitted for the Associateship of the Indian Statistical Institute).
20. SETHI, V. K., N. S. NANJAMMA and M. N. MURTHY: Some sampling systems providing unbiased ratio estimates (submitted to *Sankhyā*).
21. VARADARAJAN, V. S.: On a problem in measure-spaces (submitted to *Ann. Math. Stat.*).
22. ——— On an existence theorem in probability spaces (submitted to the *Academy of Sciences, Moscow*).

B. Applied Statistics

B.1. BIOMETRIC STUDIES

1. DAS, B. C.: Differential rate of survival of the spawn of economic fish as a function of water treatments. (Communicated to the Indian Science Congress, January 16, 1957, Physiology Section.)
2. ROY, S. K.: Studies on the activities of earthworms. (Communicated to the Indian Science Congress, January 1957).

B.2. PSYCHOMETRIC STUDIES

1. CHATTERJEE, S. : Standardisation of Iowa Mathematics aptitude test under Indian conditions. (Communicated to Psychology and Educational Sciences Section, Indian Science Congress Association, Jan, 1957).
2. DAS, RHEA S. : Report on the IMRUP personnel selection program (rotaprinted).
3. ——— : A methodological analysis of interview data. (Communicated to Psychology and Educational Sciences Section, Indian Science Congress Association, January 1957).
4. ——— : The interview in personnel selection (rotaprinted).
5. ——— : A syllabus for psychometrics for use in India (rotaprinted).
6. ——— (with S. K. MITRA) : A report on the evaluation of the NSS (operations) training and discussion conference (rotaprinted).
7. DASGUPTA, B. : A proposed weighting and scoring method in performance tests. (Communicated to Psychology and Educational Sciences Section, Indian Science Congress Association, January 1957).
8. ——— (with S. P. Sangal) : Explanation of psychometric research and service chart showing the Davis difficulty and discrimination indices for item analysis and instructions for its use.
9. ——— : Some aspects of scaling in the two-stage selection process. (Communicated to Statistics Section, Indian Science Congress Association, January 1957).
10. HARPER, A. EDWIN, Jr. : Recent advances in psychometry, Vidya Bhawan Society Silver Jubilee Vol. (in press).
11. ——— : Brief summary of studies concerning the validity of the Vellore Christian Medical College selection methods. (Confidential report to the College Board).
12. ——— (with T. K. SEN) : Revision of Diederich's Test of critical analysis of Reading and Writing with accompanying notes (rotaprinted).
13. ——— : Booklet on methods of hand and machine scoring of tests (revised edition) (rotaprinted).
14. MITRA, SHYB K. with SIKES, D. W. : Intra-individual variability as related to test score and item. (Educational and Psychological Measurement, Vol. 16, No. 1, 1956, pp. 3-12).
15. ——— (with R. S. RHEA) : Report on the evaluation of the NSS Operations training and discussion conference, July 1956 (rotaprinted).
16. ——— PRSU Technical Report on RTS Short-term trainees selection test, March 1956.
17. MUKHERJEE, S. : Empirical data on the accuracy of Jenkins' short formula for estimating sigma.
18. SANGAL, S. P. : Explanation of Psychometric Research and Service Chart showing the Davis Difficulty and Discrimination Indices for item analysis, and instructions for its use.
19. SEN, TAPAS KUMAR : An empirical study of different methods of estimating test reliability.

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Appendix 4: Scientific Inquiries (Psychometric units)

- A. Inquiries which have led to the collection and/or analysis of data according to schemes developed in consultation with staff members of PRSU.
- DURGAMAND SINHA, *Patina University*: Item analysis methods and selection of items for a non-verbal test of intelligence.
- N. SINGAR, *Utkal University*: The specificity of trait aggression in a questionnaire.
- H. S. GILL, *East Punjab University*: Research design for the validation of some hypotheses concerning the Roschach test.
- S. PATHAK, *Patina University*: Analysis of data on attitudes towards marriage.
- N. C. S. RAO, *Jabalpur*: Factor analysis of attitude scale items to test some of Eysenck's factors.
- MRS. LINA RAY, *Calcutta University*: Analysis of data from a test of English literary aptitude.
- B. DE, *L.S. College, Bihar University*: Analysis of symbol association data collected from normal, anxiety and psychotic patients.
- A. N. DEB, *Ravenshaw College, Cuttack*: Beliefs in the causes and treatment of crime.
- PREM SHANKAR, *Department of Psychology, Lucknow University*: Measuring change of attitudes in community project area.
- S. S. MUKHERJEE, *Calcutta University*: Study of juvenile delinquency in Calcutta.
- G. B. KAPAT, *Department of Education, Calcutta University*: Statistical treatment of data for standardisation and validation of a scholastic aptitude test in Bengal for 5th grade school children in Bengal.
- V. C. RAMBO, *Mangeli and Vellore*: Statistical analysis of data on ocular convergence in India and Europe.
- ANGLO-INDIAN SURVEY COMMITTEE: Problems connected with a socio-economic survey of the Anglo-Indian community in Calcutta.
- B. Other inquiries in which technical advice has been given by PRSU.
- DURGAMAND SINHA, *Patina University*: (i) Measurement of anxiety with questionnaires.
- (ii) Reliability and validity problems in the measurement of leadership in NSS cadets with verbal group tests.
- B. C. ASTHANA, *Aligarh University*: Scaling of differently weighted papers in an examination.
- SRI OJHA, *Delhi*: Research design for the study of validity of the Children's Apperception Test.
- RADHANATH RATH, *Utkal University*: Attitude scale construction.
- B. D. BHATTIA, *College of Nursing, Delhi*: The problem of reliability and validity in a measurement of responsiveness in school children.

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- MISS P. SHROFURI, *Central Institute of Education, Delhi*: Effect of childrearing practices on the personality of young children as revealed through the medium of doll play.
- BISWANATH MUKHERJEE, *Institute of Child Development, Ahmedabad*: Research design for the study of the stability of perceptual attitudes and its relation to certain personality factors.
- A. N. SEN, *National Tobacco Co*: (i) Problems of classification and placement.
(ii) Market research.
- B. DE, *L. S. College, Bihar University*: Development of a selection battery for police inspectors.
- S. JALOTA, *Banaras Hindu University*: Analysis and scaling of work association data.
- A. K. PAL, *Calcutta University*: Measurement of the criminal personality.
- C. T. PHILLIP, *All India Radio*: Effect of radio on the cultural pattern of the country.
- S. P. SUNDAR RAO, *Christian Medical College, Vellore*: Health questionnaire analysis.
- SRINIVAS BHATTACHARYA, *David Hare Training College, Calcutta*: Construction and analysis of interest tests.

Appendix 5 : Workers admitted to the degree of Doctor of Philosophy.

1. R. G. LAHA (RTS): Characterization of Probability distribution and statistics from suitable stochastic relations.
2. A. MATHEAI (RTS): Some techniques of planning sampling investigations in Statistical Quality Control and Sample Surveys.
3. J. ROY (RTS): On some problems in Multivariate analysis.
Workers who submitted dissertations for D. Phil degree or AISI (Association of the Indian Statistical Institute)
 1. I. CHAKRAVARTI (RTS) for the D. Phil degree: Contributions to the Design and analysis of factorial experiments.
 2. G. HARIHARAN (SQC) for the AISI: Report on the professional work in statistics carried out by him as a member of the SQC Unit.
 3. G. P. PATIL (RTS) for the AISI: On some problems of estimation in a class of discrete distributions.
 4. D. K. ROY CHOUDHURY (RTS) for the AISI: On some extensions of pps sampling.
 5. C. S. RAMAKRISHNAN (RTS) for the AISI: Dual of a two-associate PBIB design and contributions to designs involving only two replications, together with a list of all such designs.

Appendix 6 : International Statistical Education Centre (ISEC)

List of Trainees

Tenā Term : July 1956 to April 1957

Burma : 1. Kyaw Htay, 2. Maung Maung.

Ceylon : 3. K. N. W. Upali Godammuna, 4. T. C. Perreira Gunnaratne.

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Japan : 16. Teruo Nomura, 16. Hiroshi Sukegawa, 17. Yuichi Yoshioka, 18. Tetsuo Oguma.

Pakistan : 19. Asad Zaman, 20. Md. Auqil Seyed, 21. Md. Ataur Rahman, 22. Equb Ali Khan.

Philippines : 23. Abadeso P. Gillera, 24. Antonio S. Alfonso.

Singapore : 25. Chua Yew Keng, 26. Miss Sally Yeo.

Thailand : Virool Boonyasombut, 28. Miss Suwatana Sukamarn.

India : 5. Asit Ranjan Choudhuri, 6. Prem Lal Gupta, 7. K. Krishnan Nair, 8. Aranjoo Anthony, 9. M. Sankaranarayanan Pillai, 10. Sudhir Kumar Banerjee, 11. Sudhir Kumar Chatterjee, 12. N. B. Bagchi, 13. Gauri Sankar Chatterjee, 14. Dibyendu Kumar Mitra.

Appendix 7 : List of successful candidates in professional examinations

Statisticians' Diploma Examination : September, 1966

A. General Papers

Paper I (Theoretical) : Avelino Jose Romandus Gonsalves (B2), Narayan Mahabaleswar Palekar (B6), Ramesh Lakshman Kamat (B9), Sashikant Kashinath Gadgil (B10), Meghasham Bhaskar Usagaunkar (B11), Vasudeo V. Ghalasai (B17), Jogdish Jha (C1), Sukumar Chakravarti (C10), Nirmal Kanti Das Gupta (C11), Nirmalendu Bhowmik (C23), Sukhendu Nath (C24), Tapaswari Kumar Trivedi (D1), Avtar Singh Chawla (D2), Y. Shiva Rao (D12), Krishan Gopal (D14), Gopal Dev Ahluwalia (D16), Sudhindra Nath Ganguly (D22), Surendra Kumar (D26), S. Harihara Aiyar (D34), Brij Mohan Mahajan (D27), Venkata Subramanian Radhakrishnan (M2), Arun Prabhakar Kulkarni (P6).

Paper II (Theoretical) : Shankar Shripad Telang (B6), Jagdish Jha (C1), Ela Romola Mukherjee (C3), Kalyan Das Gupta (C8), Prakash Chandra Kundu (C22), Nirmalendu Bhowmik (C23), Sukhendu Nath De (C24), Shankar Bhaduri (C25), Manoj Chatterjee (C27), Ved Prakash Agarwal (D3), Dhara Puram Sundaresaiyar Ramaratnam (D27), Rajeswar Dayal Saxena (D28), Balaram Kohli (D48), Jugal Kishore Sharma (L1).

Paper VI (Practical) : Dipak Chakravarti (C9), Gour Gopal Rudra (C15), Gopal Dev Ahluwalia (D16), Shriram Krishna Karandikar (P5), Arun Prabhakar Kulkarni (P6).

Paper VII (Practical) : Shankar Bhaduri (C26).

B. Special Papers

Papers IV and V (Theoretical)

(1) *Sample Survey (Applied)* : Sriah Chandra Baswria (C7), Amalendu Sengupta (C13), Nirmalendu Bhowmik (C23), Tilak Raj Talwar (D26), Dev Raj Chawla (D32), Bharat Bhuvan Bohl (D42).

(2) *Sample Survey (Theoretical)* : Ved Prakash Agarwal (D3), S. Harihara Iyer (D34), Jugal Kishore Sharma (L1), Jagdish Narayan Srivastava (L4).

(3) *Economic Statistics* : Tilak Raj Talwar (D26).

(4) *Statistical Quality Control* : Sukumar Chakravarti (C10), Nirmal Kanti Dasgupta (C11), Amalendu Sengupta (C13), Samir Ranjan Guha Roy (C18), Nirmalendu Bhowmik (C23), Seehi Kant Mathure, Gopal Dev Ahluwalia (D16).

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(6) *Design of Experiment (Applied)* : Narindar Kumar Sahni (D18), Jagdish Kumar (D36), Brij Mohan Mahajan (D47), Jugal Kishore Sharma (L1).

(6) *Mathematical Theory of Sampling Distribution* : Venkata Subramanian Radhakrishnan (M2), Arvind Parasuram Joag (P14).

Papers VIII and IX (Practical)

(1) *Sample Survey (Applied)* : Kalyan Dasgupta (C8).

(2) *Sample Survey (Theoretical)* : Ved Prakash Agarwal (D3), Niranjan Singh (D28), S. Harihara Iyer (D34), Nurani Parameswara Ayyar Mahadevan (M6).

(3) *Statistical Quality Control* : Sukumar Chakravarti (C10), Saahi Kant Mathure (B7), Vasudeo V. Ghalssai (B17), Gopal Dev Ahluwalia (D18).

(4) *Design of Experiment (Applied)* : Avtar Singh Chawla (D2), Niranjan Singh (D28), Tarun Kumar Gupta (D46).

(5) *Mathematical Theory of Sampling Distribution* : Venkata Subramanian Radhakrishnan (M2).

Computer's Certificate Examination : September, 1966

Part IA, Sec. I : Kunja Behari Ghosh (C1), Nirmalendu Basu Choudhury (C4), Amiya Kishore Dasgupta (C6), Akhilendu Dutta (C7), Nirmal Krishna Choudhury (C10), Madhav Munshi (C11), Sudhansu Bhushan Das (C12), Sanat Kumar Banerjee (C14), Manindra Chandra Basu (C16), Chittaranjan Chatterjee (C16), Amal Kanti Bhattacharyya (C20), Tuskar Kanti Banerjee (C25), Ranjan Kumar Bhattacharyya (C30), Kamalendra Nath Duttarai (C31), Chunilal Basu Chowdhury (C32), Raj Kumar Nandy (C33), Amarendra Nath Ghosh (C38), Samar Krishna Basu (C46), Amiya Bhushan Chakravarti (C49), Animesh Chakravarti (C64), Ramchandra Mitra (C87), Amal Kumar Banerjee (C71), Biman Chandra Mitra (C73), Amiya Kumar Sinha (C79), Dulal Kanti Choudhury (C80), Sambhu Nath Bhattacharjee (C83), Syamal Kumar Sen (C88), Amal Roy Choudhury (C87), Patit Paban Banerjee (C91), Parosh Nath Bhattacharjee (C97), Nirmal Kumar Choudhury (C99), Nagendra Chakravarti (C114), Nirmal Chakravarti (C117), Nirendra Nath Sarkar (C119), Asoke Kumar Choudhury (C121), Devendra Kumar Dobnath (C122), Dilip Kumar Ghosh (C130), Sachi Ranjan Ganguly (C133), Subhransu Bhattacharyya (C134), Tapan Dasgupta (C135), Anil Kumar Singha (C138), Ananta Mohan Dey (C154), Sudhindra Sarkar (C155), Ranjit Chakravarti (C161), Parimal Mukherjee (C163), Keshab Chandra Das (C166), Balai Chandra Das (C167), Niraj Kanti Das (C169), Narayan Chandra Sen (C173), Sisir Kumar Ghosh (C176), Arun Kumar Das (C180), Marud Baran Chakravarti (C184), Mrinal Kanti Chatterjee (C187), Madhusudan Dutta (C192), Santosh Chandra Kundu (C198), Shanti Priya Bhowmik (C200), Anil Kumar Sengupta (C203), Haridas Roy (C204), Bharati Chakravarti (C207), Shib Ranjan Banerjee (C211), Arun Sanyal (C214), Jyotirmoy Basak (C215), Ramesh Chandra Joirath (D3), Dinabandhu Das (G8), Md. Muslim (G13), Giridhar Chatterjee (G14), Khanweldar Madhusudan Ramachandra (P4).

Part IA, Sec. II : Akhilendu Dutta (C7), Mrinal Kanti Roy (C9), Nirmal Krishna Choudhury (C10), Madhav Munshi (C11), Manindra Chandra Basu (C15), Amal Kanti Bhattacharyya (C20), Tuskar Kanti Banerjee (C25), Anil Kumar Bhattacharyya (C27),

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Hari Bhusan Dutta (C28), Chunilal Basu Chowdhury (C32), Samarendra Barua (C47), Pranabananda Bhaduri (C50), Ramchandra Mitra (C67), Syamal Kumar Sen (C86), Parash Nath Bhattacharjee (C97), Nirmal Kumar Choudhury (C99), Mrinal Kanti Sarkar (C107), Sourindra Nath Pal (C108), Sushil Kumar Tapadar (C116), Nirendra Nath Sarkar (C119), Keshab Chandra Banerjee (C120), Asoke Kumar Choudhury (C121), Devendra Kumar Debnath (C122), Nagendra Nath Das (C129), Ajit Kumar Sengupta (C137), Arun Prosad Sinha (C148), Tarani Kanti Palrai (C147), Monoranjan Das (C150), Narayan Chandra Sen (C173), Ajoy Kumar Sarkar (C186), Animesh Singhaw (C201), Kalidas Neogy (C205), Sanat Kumar Das (C209), Debabrata Bardhan (G1), Syed Resalat Kussain (G2), Sakti Kumar Chowdhury (G6), Md. Muslim (G13), Hari Narayan Joshi (P2), Khawelkar Madhusudan Ramachandra (P4).

Part IB, Sec. I : Madhab Munshi (C11), Ranajit Kumar Naha (C62), Pranab Kumar Mitra (C63), Sankar Bhaduri (C85), Nirendra Nath Sankar (C119), Nirmalananda Banerjee (C126), Sanat Kumar Das (C209).

Part IB, Sec. II : Amiya Kishore Dasgupta (C6), Madhab Munshi (C11), Tushar Kanti Banerjee (C25), Radhasayam Nath (C36), Subir Kumar Roy (C37), Amarendra Nath Ghosh (C38), Subodh Kumar Pal (C39), Lakshmi Narayan Das (C42), Nihar Ranjan Saha (C45), Sanat Kumar Bhoose (C48), Pranabananda Bhaduri (C50), Loknath Mukherjee (C51), Ranajit Kumar Naha (C62), Asoke Dasgupta (C68), Monoj Chatterjee (C69), Kartik Chandra Bhattacharjee (C60), Biswapati Mukherjee (C72), Dulal Kanti Choudhury (C80), Sambhu Nath Bhattacharjee (C83), Prafulla Kumar Basak (C84), Tinkari Pal (C100), Arun Kumar Mitra (C101), Manik Ratan Acharyya (C106), Sibakar Ghosh (C115), Sushil Kumar Tapadar (C116), Amalendu Sengupta (C126), Rabindra Kumar Chakravarti (C127), Prasanta Kumar Sinha (C128), Nagendra Nath Das (C129), Arun Chandra Chakravarti (C131), Probhas Mukherjee (C132), Ajit Kumar Sengupta (C137), Praneesh Chandra Kar (C140), Biswadhan Chattopadhyaya (C151), Parimal Mukherjee (C163), Keshab Chandra Das (C166), Bimalendu Mahalanobis (C175), Mihir Kumar Rakshit (C178), Rabindra Nath Mukherjee (C183), Ajoy Kumar Sarkar (C186), Sriish Chandra Basurai (C195), Sukha Sinchan Roy (C196), Kalidas Neogy (C205), Sanat Kumar Das (C209), Bimal Jyoti Sanyal (C212), Sharat Kumar Mitra (G4), Subodh Kumar Palit (G17), Md. Yusuf Ansari (G23), Hari Narayan Joshi (P2).

Part IC, Sec. I : Benoyendra Goswami (C35), Ranajit Kumar Naha (C62), Sukhendu Maitra (C66), Anu Ranjan Mukherjee (C61), Subhendara Sekhar Das (C66), Nirmalananda Banerjee (C126), Rabindra Kumar Chakravarti (C127), Ajit Kumar Sengupta (C137), Arun Kanti Ghosal (C210).

Part IC, Sec. II : Benoyendra Goswami (C35), Nihar Ranjan Saha (C45), Sanat Kumar Bhoose (C48), Pranab Kumar Mitra (C63), Asoke Dasgupta (C68), Monoj Chatterjee (C69), Dhruba Ranjan Chakravarti (C102), Manik Ratan Acharyya (C106), Nirmal Chakravarti (C117), Nirmalananda Banerjee (C126), Rabindra Kumar Chakravarti (C127), Prasanta Kumar Sinha (C128), Tapan Dasgupta (C135), Ajit Kumar Sengupta (C137), Biswadhan Chattopadhyaya (C151), Gaur Chandra Mukherjee (2152), Swaraj Kanta Pal (C159), Kulada Ranjan Biswas (C170), Badal Basu Mullick (C194), Sriish Chandra Basurai (C195), Arun Kanti Ghosal (C210), Kalidas Chatterjee (C216).

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Statistical Field Survey Certificate Examination : September, 1956

Part I, Sec. A : Venkataraman Srinivasarao (B8), Chitta Ranjan Saha Roy (C13), Bharat Bhushan Behl (D4), Shyamal Aggarwal (D5), Pyare Lal Sharma (D6), Surinder Singh Kapoor (D12), Basudeb Prasad (G2), Ramachandra Prasad (G7), Thakur Indradeo Sharma (G9), Narinder Singh Sachar (L3), Sidhanand Nathani (L5).

Part I, Sec. B : Sudhi Ranjan Dasgupta (C6), Bharat Bhushan Behl (D4), Shyamal Aggarwal (D5), Pyare Lal Sharma (D6), Balbir Singh Bakshi (D11), Md. Muslim (G4), Narinder Singh Sachar (L3), Sidhanand Nathani (L5).

Part I, Sec. C : Lalit Mohan Chatterjee (C3), Bharat Bhushan Behl (D4), Shyamal Aggarwal (D5), Pyare Lal Sharma (D6), Ranjit Mukherjee (G5), Thakur Indradeo Sharma (G9), Narinder Singh Sachar (L3), Sidhanand Nathani (L5), Dori Lal Pachauri (L14).

Part II, Sec. A : Kamalendra Nath Duttarai (C6), Jahar Lal Ghosh (C14), K. Venugopal (D3), Adisubramanya (B4), J. R. Doraiswamy Iyer (B5), Pyare Lal Sharma (D6), Sidhanand Nathani (L5).

Part II, Sec. B : K. Venugopal (D3), Sidhanand Nathani (L5).

Appendix 8 : NSS Draft Reports and Working Papers

DRAFT REPORTS

1. NSS No. 13 : Tables with Notes on the fourth round (April-September 1952)
Vols. 1 and 2.
2. " 14 : Some characteristics of the economically active population.
3. " 15 : Report on sample-survey of Employment and Unemployment (May-November 1955).
4. " 16 : A Technical note on Age Grouping (4/R, West Bengal Sp. Study, 1954 E and ESP Study, h-h. comparative, 1955).
5. " 17 : A Report on Small Scale Transport Operation 7th round (October 1953-March 1954).
6. " 18 : Sample Verification of Livestock Census, 1956.
7. " 19 : Pattern of Consumer Expenditure, 2nd to 7th rounds. (April 1951-March 1954)
8. " 20 : Small Scale Manufacture (October 1953-March 1954, Schedule 2.2, 7/R).
9. " 21 : Small Scale Manufacturing Establishments (9/R), May-November 1955.
10. " 22 : Notes on Investigators' Time Records (8/R), July 1954-April 1955.

WORKING PAPERS

1. A note on the nature of the basic data on large industrial establishments in India.
2. Evaluation of the N.S.S. 11th round Training and discussion conference of July 1956.
3. Growth of urban Delhi.

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Appendix 9 : Studies under Research Unit, NSS

1. DESIGN UNIT : *Sampling Design* : (i) Almost unbiased ratio estimates based on inter-penetrating subsample estimates. (ii) Some sampling systems providing unbiased ratio estimates. (iii) Ordered and unordered estimators in sampling without replacement. (iv) Some experiments in the designing of crop acreage surveys. (v) Balanced systematic sampling. (vi) Some aspects of sampling theory and practice.
2. ROY J. : *Review of old data* : Note on inconsistent entries, non-entries etc. relating to employment and unemployment enquiry (sch. 10, 9th round, bls. 9 and 10).
- 2.1. HALDER, S. : Note on occupational distribution of W. Bengal urban population (sch. 10, 9th round, W. Bengal urban, subsamples 1 and 2).
- 2.2. BANERJEE, S. : (i) Quantitative estimates of consumption of cereals (7th round, rural, SS-1 and 2). (ii) Some estimates of sampling error in consumer expenditure estimates. (iii) Note on data on consumer expenditure and reference period.
- 2.3. DEY, B. : (i) Quantitative estimates of consumption of cereals (5-8th rounds, rural SS-1 and 2). (ii) Mistakes in the nature of omission and commission in Employment and Unemployment Enquiry (sch. 10, 9th round, bl. 13).
- 2.4. BANERJEE, U. N. : A note on reliability of gross profit estimate from household trade schedule. (sch. 2.4, 7th round, rural). (ii) Notes relating to (a) household trade concept and definition, (b) blank schedules and blank entries—extent of non-response, (c) wholesale trade, (d) retail trade, (e) gross value of purchase in rural retail trade (sch. 2.4, 7th round, rural, pilot SS-1).
- 2.5. BHATTACHARYA, S. : (i) A note on handloom weaving industry in W. Bengal and Madras with special reference to cost in relation to receipts (sch. 2.2, 7th round, rural, SS-1 and 2). (ii) A note on comparison of certain estimates as compiled from NSS household manufacture enquiry (sch. 2.2, 7th round, SS-1 and 2) and as given in the Economic Survey of Small Industries of Calcutta for 1952-53 undertaken by West Bengal State Statistical Bureau.
- 2.6. BHATTACHARYA, S. : A note on some primary aspects of Sample Survey of Manufacturing Industries (Source material : Survey of Company Finance published in the Reserve Bank of India Bulletin in July, 1955).
3. BANERJEE, U. N. : *Review of current data* : Notes in the nature of queries, clarifications and suggestions for drawing the attention of the Field, based on scrutiny of data in agr. labour enquiry. (sch. 10.1, 11th round, rural SS-1 and 6).
- 3.1. BANERJEE, S. : Scrutiny notes in connection with consumer expenditure enquiry (sch. 1.1, 11th round, rural).
4. MITRA, C. : *Field Studies* : (i) Analysis and Report on Pilot Survey No. 1 (A study designed to have an idea of response error and means to control it. (ii) Analysis and Report on Pilot Survey No. 3 (A study on nature and extent of response discrepancies to the same set of questions put by different interviewers within a short time interval through detailed and condensed schedules).

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- 4.1. BANERJEE, U. N. : A study of investigator's time-record (on the basis of data provided in pilot survey No. 2 conducted in 30 villages of Hooghly District in West Bengal).
5. GHOSH, N. C. : *Special Studies* : A note on per capita cloth consumption in India in 1953-54.
- 5.1. BANERJEE, U. N. : A note on validity of age data (on the basis of data collected in pilot survey No. 2).
- 5.2. HALDER S. : A note on comparison of basic materials for NSS sampling frame (tehsils) with published census data—for Assam.
- 5.3. DEY, B. : A note on comparison of basic materials for NSS sampling frame (tehsils) with published census data—for Orissa.
- 5.4. BANERJEE, U. N. : A note on comparison of basic materials for NSS sampling frame (tehsils) with published census data—for West Bengal.

Appendix 10 : Studies under Operational Unit

1. *Experiments on land utilization surveys in cadastrally unsurveyed areas, Giridih (August-October 1956)* : Experiments on 'line sampling' in land utilization surveys without making use of the village cadastral survey maps were carried out at Giridih. The investigator was required to locate sample points at random over an area of 225 square miles guided duly by a magnetic compass and a Survey of India map drawn to a small scale. At each point he was required to enumerate line units of varying length. Similar experiments on a larger scale covering 4000 square miles were subsequently completed in the district of Hazaribagh. A number of studies was also undertaken to locate random points and enumerate line units within villages, for which no maps are available, either showing the plot boundary or showing the village boundary. On the whole, the result of their studies were encouraging.
2. A study of the distribution of harvestable fields on different days of the crop season was undertaken during August-October 1956 in three centres of West Bengal. Unusual rains, however, partly affected the quality of data collected.
3. *Special crop-cutting experiments* : Sample cuts of various shapes and sizes were tried out in Giridih on Aman paddy. The experiment on the estimation of paddy yield by progressive harvesting was continued from the previous year.
4. A small experiment was carried out in two centres to study the weight of field enumeration and variability for certain selected items of household consumption using varying lengths of reference periods.
5. *Experiments with 'motorized units' for conducting crop-cutting experiments* : The entire district of Birbhum in West Bengal was covered by the survey, in which the investigation was conducted by three teams, the first working on foot and covering 12 villages in a month and the third working with a motor car and covering 24 villages in a fortnight. The results of the survey are likely to be of interest for planning future programmes.
6. *Miscellaneous surveys* : Various other surveys were conducted by the special unit and mention may be made of the following : A revisit of 410 households in Calcutta

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covered in an earlier survey (April-September 1962) was organized with an aim to study the change in consumption pattern. Only 260 of the households could be traced in the revisit. Another study was made again in Calcutta to find out how the information (on consumer expenditure) collected varies, when different persons in the household happen to be the respondents. A similar study was made in respect of opinion on certain items of common interest to find out how opinions vary between informants in the same household. Finally, a study was made on the basis of past data to find out whether the crop yield rate had any relation with the distance of the plot from the nearest road. In case there was no association, a cheaper crop-cutting survey would be possible by using plots adjoining roads.

Appendix 11 : Other projects and Studies

1. *Experiments on different methods of paddy cultivation* : Ten experiments were conducted in Girdih on *Aus* and *Aman* crops to study the effects of different methods of paddy cultivation. In particular, interactions between spacing and number of seedlings per hold and the effects of different kinds of fertilizers were observed in these experiments.
2. *Progressive Maturity of Winter Paddy* : Another experiment in Girdih related to a study of progressive maturity of *Aman* paddy transplanted according to the Japanese method. Altogether 3000 samples were collected and the analysis is in progress.
3. *Effect of manure on sugarcane* : A third experiment in Girdih related to a study of the effect of manure on different methods of sugarcane cultivation. The experiment incorporated observations on the ratios between weights of sugarcane and juice, bagasse and gur for crops grown by different methods of cultivation.
4. *Family Planning survey* : A preliminary survey was undertaken in 49 census blocks of Calcutta to study family planning. Married persons in 8000 households were interrogated.
5. *Special health survey* : A somewhat similar survey related to the study of benefits of hospital services in West Bengal. The survey involved contacting a sample of ex-patients of hospitals.
6. *Experimental study of trading in West Bengal* : This survey was started in January 1967 with the object of studying the level and character of trading activity in urban West Bengal and incidentally improving the trade schedule in NSS general enquiry. This was a fairly large survey involving 10 investigators under two inspectors.
7. *Survey with pre-coded schedule and mark-sensing cards* : A pilot survey was carried out during winter 1967 with pre-coded schedules. The figures, which related to four villages, were then transferred to mark-sensing cards.
8. *Verification of census enumeration work* : A complete enumeration of population in census slips was taken up in the middle of November 1966. The same operation was repeated in another winter in the same area, as soon as the work of the first worker was completed. In all three census blocks were covered in the study and the analysis of data is nearly over.
9. *Special enquiry on consumption* : A special study on consumption in Calcutta was initiated from January 1967. The work, which concerns study of different biases, is continuing.

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Appendix 12 : Working Papers on Planning, 1956-57

57. ROY, AJIT and BANERJEE, NRIFFIN : Monopolies and concentration of economic power—Part I. (24 April 1956).
58. UPADHYAYA, P. K. : Measurement of the density of Railway Passenger Traffic. (28 May 1956).
59. SENOUPTA, S. S. : Rates of utilization in selected manufacturing industries. (18 June 1956).
60. NARASIMHAM, G. V. L. : A note on the utility of Cobb-Douglas type of production function for Indian Manufacturing Industries. (28 June 1956).
61. ROY, AJIT : Indian Labour during First Five-Year Plan. (2 July 1956).
62. BETTELHEIM, CH. : The technological choices and the aim of economic planning long-term planning : Paper No. 1. (9 July 1956).
63. CHATTERJEE, N. K. : Shipping foreign and exchange. (12 July 1956).
64. SHARMA, I. R. K. : Relation between investment and production of cement and steel in some selected countries. (14 July 1956).
65. CHATTERJEE, N. K. : Non-essential imports and foreign exchange. (15 July 1956).
66. SENOUPTA S. S., CHAKRAVARTY, A. and AGRAWAL, V. K. : A note on forecasting net product of 1953-54. (17 July 1956).
67. SENOUPTA, S. S. : A model for periodical planning. (20 July 1956).
68. BETTELHEIM, CH. : Basic data needed for solving the problems of investment allocation and of technological choices : long-term planning : Paper No. 2. (21 July 1956).
69. ——— : The allocation of investments : long-term planning ; Paper No. 3. (23 July 1956)
70. ——— : The problem of technological choices : long-term planning : Paper No. 4. (26 July 1956).
71. ——— : Employment problems and economic growth long-term planning : Paper No. 5. (27 July 1956).
72. ——— : Modernization and Rationalization investments : long-term planning : Paper No. 6. (28 July 1956).
73. ——— : Some basic long-term planning problems—general conclusions : long-term planning : Paper No. 7. (30 July 1956).
74. NAQVI, K. A. : The problems of the elaboration of the provisional project of a long-term plan of India: Paper No. 8. (31 July 1956).
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Appendix 13 : Machine Tabulation Unit

1. Strength of Tabulation Equipments at different centres

machine	Baranagar			Girdih	Delh		total
	Hol- kerith	IBM	Russian Power- Sama	Hol- kerith	Hol- kerith	IBM	
	April to September 1956						
accounting machine	5	5	-	2	1	1	15
statistical machine	-	2	-	-	-	-	2
sorter	5	5	-	2	2	1	20
calculating punch	-	2	-	1	1	-	5
collator	-	2	-	1	-	-	5
reproducer, gang punch & summary punch	6	6	-	3	2	1	20
	October 1956 to March 1957						
accounting machine	6	5	2	2	1	2	20
statistical machine	-	2	-	-	-	-	2
sorter	6	3	4	2	4	2	29
calculating punch	-	3	-	1	1	-	6
collator	-	2	-	1	1	-	4
reproducer, gang punch & summary punch	6	6	2	2	4	2	24

2. *The Output* : The per hour output from tabulating units recorded an increase from 1.39 to 2.11 thousands. The total card passage through all the tabulating units and ESM's during the year was 42660 thousands and 5623 thousands respectively. The tabulating output as recorded is the highest since the inception of machine tabulation unit.

3. Cardstores were located at Baranagar, Giridih and Delhi with 400 lakhs of cards stored in cabinets with 50 and 25 drawers each. This constitutes the punched cards of 2nd to 11th rounds of NSS and related surveys.

Appendix 14 : Library

1. The Central Library was concentrated in the main premises at 203 Barraekpore Trunk Road after almost complete transfer of material and personnel from 204 Barraekpore Trunk Road, where it had been partially accommodated. The Library now contains about 60,000 books and monographs besides a large collection of special material. Service centres were maintained as before at the City Office at 9B Esplanade East, Calcutta, and at Giridih.

2. *Books* : The Library acquired 2873 volumes of books against 2717 last year. Of these 824 were received as gifts and 97 in exchange. In addition to these 683 volumes from the late J. C. Sinha's collection, which was purchased year before last, were integrated into the Library stock. The total addition to the book stock was thus 3566 volumes. The arrears of volumes awaiting processing at the end of the year was over 1700. This was mainly due to the loss of three trained and experienced workers through resignation and transfer from the processing unit, which has been lying practically in deadlock since the month of December 1956.

3. *Periodicals* : The Library received 1297 periodicals and annuals against 1190 last year. Of these 296 periodicals were subscribed to, 402 were received as gifts and 599 were received on exchange basis. This necessitated the registration and processing of 9750 serial pieces during the year, an increase of 10 per cent over the previous year. The Library subscribed to 39 new journals and entered into exchange arrangements with 7 new Indian and 19 foreign agencies, among which were 3 each in Japan and USA, 2 each in China, Netherlands and Pakistan, and 1 each in Bulgaria, Hungary, Indonesia, Italy, Malaya, Poland and USSR.

4. *Special gifts* : The most notable one was a generous gift of books and periodicals on Industrial Management valued at \$ 2750 from the United States Technical Cooperation Mission in India, which was thankfully received by the Library.

For the third year in succession 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.

A large number of available volumes and issues of 'Wheat Studies' and several monographs of War and Peace Pamphlets, Fats and Oil studies and Grain economics were thankfully received from the Food Research Institute of the Stanford University, California.

The Library also thankfully accepted a generous gift from the Bengal Chamber of Commerce, Calcutta, comprising back volumes of several valuable periodicals, official publications, newspapers, directories, etc.

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5. *Bibliographical Services*: The Library compiled three reading lists from materials available in the Library on Linear Programming, Automation and Operational Research in railway transportation.

The Library continued to issue the Weekly List of Selected Periodicals and the issue of the Index to Current Periodicals has been received since the month of August 1966. The issue of the Monthly Bulletin of New Acquisitions had to be kept suspended since the month of December 1966 in the absence of normal functioning of the processing unit for want of technical staff.

6. *Service and Circulation*: The number of persons using the Library at the end of the year was 996 against 768 last year. The total number of books, journals and other materials issued was 46271 against 38055 last year, of which 10214 were issued from the Lending Section and 36067 from the Reference Section, the number of bound volumes of periodicals, which are issued for reference only, being 14380. The total number of requests received was 54180, so that nearly 14.5 per cent of the requests could not be fulfilled, against 11.5 per cent last year. The rise in the number of unfulfilled requests was mainly due to the increased demand for text books from the increased number of students.

7. *Circulating Library*: The number of workers availing themselves of this Library was 764. There was new acquisition of 704 Bengali, 110 English, 72 Hindi and 43 Oriya books, bringing the total to 7510 volumes. Stocks were rotated amongst the branches of the Library. The frequency of rotation was less than in previous years owing to the duplication of the more popular books, for which there was great demand at different branches. The number of books issued from Baranagar and Giridih were 16989 and 4204 respectively.

8. *News Clippings*: The systematic processing and indexing of relevant topics relating to statistics and planning in India, which appeared in important dailies and periodicals, was continued. Clippings were gathered from 5 dailies of Calcutta and the outtings received through the All-India Press Cutting Service, which covered more than 100 dailies and periodicals all over India. The number of clippings processed and properly indexed during the year was 8971, bringing the total number of clippings indexed so far to 20670. Articles indexed from newspapers including supplement copies numbered 1768. The indexing of articles from periodicals had to be discontinued since September 1966 for shortage of staff and the number of such articles indexed was only 377.

9. *Translation*: Several requests were received and complied with for English translation of various matters in other foreign languages, specially Russian, German and French, covering more than 300,000 words, which mostly related to economics of planning.

A Russian language class was conducted under the auspices of the Library for training up personnel to assist in translation work. Five students from different sections completed the primary course.

10. *Special Collections*: Systematic processing of the Russian books received in the Library was taken up and a classified inventory of the same containing about 500 items has been prepared.

Organization of the photo-duplicated material in the Library which required special cataloguing procedure was also taken up. The present stock comprises 228 reels of microfilm running over 2000 feet containing 21,065 exposures and 5840 pages of paper prints.

11. *Records Unit* : The Project Unit has mostly attached miscellaneous files and papers to the existing classified ones and has also arranged, classified, indexed on the 'Kardex' and made easy for reference 251 files, bringing the total number of files thus arranged to 12890 (against 12439). The Unit has received Duplicate Schedules of NSS 4th to 8th Rounds, RTS Examination papers and Crop Survey Records from Giridih for classification and processing.

In the Map Unit, 2863 West Bengal Cadastral Survey (Coloured), 1,58,800 East Pakistan Cadastral Survey, 78 Districts of East Pakistan and West Bengal and 2023 East Pakistan P.S. maps, totalling 1,83,744 (against 90,668), maps have been finally processed and shelved during the year through serial sorting and numbering, thus bringing the total number of all maps to 2,54,432 sheets. The number of maps issued to Field Branch and other unit was 29,137.

12. *Photographic Unit* : Major work on documentary reproduction consisted of 4501 frames of microfilm, 4533 paper prints from microfilm and 3491 photostats. The Photographic Unit also took 1890 still photographs of individuals, groups and important functions at the Institute as well as 3100 feet of motion picture, more than half of which was in colour. In addition to these 3004 bromide enlargements were made. Other types of work included the preparation of acre-plates, slides, photo-reproductions, hand-finished reproductions, etc. Requests from other Institutions for documentary reproduction were also complied with by supplying microfilms, photoprints and photostats. The Photographic Unit also gave training in photography to some of the Field Branch workers.

Appendix 15 : Brief Report on Visit to Japan and China : 1956

In June 1956, a team comprised of Pitambar Pant, Private Secretary to the Chairman, Planning Commission and Joint Secretary, Indian Statistical Institute, R. Natarajan, Director, IMRUP, Indian Statistical Institute and M. Mukherjee, Deputy Director, Central Statistical Organization was deputed by the Government of India to accompany Professor P. C. Mahalanobis to study planning and economic development in China and Japan.

Professor Mahalanobis, who was to have led the team and who was expected to join it in Japan on his way back from the USA, unfortunately fell ill in the USA and was advised to return to India, cancelling his projected visit to Japan and China. In his absence, Pitambar Pant acted as the leader of the team.

The team left Calcutta on 10 June 1956 and returned to Calcutta on 19 August 1956. It spent about a month each in Japan and China.

Visit to Japan

The chief interest of the team in Japan was the study of economic development in Japan, covering aspects such as :—

- (a) organization of small scale production and its relationship to large scale factories;
- (b) the development of machine-building and basic industries and expansion of capital goods;
- (c) industrial management with special reference to productivity;

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- (d) salary and wage structure in industries and other occupations;
- (e) arrangements for scientific and technical training;
- (f) growth and structure of capital formation in relation to the expansion of national economy and increase of national income.

The Indian Ambassador in Tokyo had intimated the Ministry of Foreign Affairs, Japan of the purpose of the visit of the team and had requested that appropriate advice and facilities be given to the team to enable it to make the best use of its time in Japan. The Ministry of Foreign Affairs entrusted Asia Kyokai (Society for Economic Cooperation in Asia) with the task of rendering advice and assistance to the team in drawing up its programme of discussions and visit. The services of Mr. Teru Sasaki, a member of the Technical Cooperation Division of the Society, were made available to the team. The members of the team were grateful to the authorities in Japan for the facilities provided to the team to have discussions with officials and non-officials, visit institutions and places of interest and collect material and establish valuable contacts. The team spent most of the time in Tokyo but were able to find a week or so for visiting industrial establishments and other institutions of interest in Osaka and Kyoto.

Within a short time of their visit in Japan, the team realized that there was a great deal of valuable material bearing on the subjects under study, but most of this material was in the Japanese language and had not been translated into English. It was obvious that in order to be able to make full use of the knowledge and experience available in Japan, it would be necessary to organize systematically the translation into English of material selected after suitable screening in consultation with Japanese experts familiar with any particular field. The team felt convinced that brief, sporadic visits of teams of experts from India to Japan to study developments in particular fields, for example small-scale industries, would in the long run be more costly and less productive of results than the organization on a continuing basis of a Unit for the translation and interpretation of selected Japanese material in different fields of interest, if such a Unit could be established in Japan under the auspices of some good institution, which should be in a position to mobilize and enlist the full cooperation of government officials, industrialists and businessmen and individual scholars.

As a result of several discussions with officials in government departments, visits to universities, research organizations, industrial enterprises and associations and with the help of an *ad hoc* unit set up with Mr. Teru Sasaki as its leader, the team was able to collect about five hundred valuable publications, notes, memoranda, books etc., in both printed and cyclostyled forms. A list of these documents was prepared and on the advice of experts, a tentative selection was made of material, that would be worthwhile to translate from Japanese to English language for the use of planning organizations in India.

The question of establishing a Japan Reference and Translation Unit was discussed informally with several officials, individual scholars, businessmen and industrialists in Japan and the suggestion seemed to find favour with them. The matter was discussed with the Indian Ambassador and he gave enthusiastic support to the idea. Subsequently, the Asia Kyokai was discussed with the Board of Directors of that Society. The Board expressed its appreciation of the proposal, found that the function proposed was in accordance with the Society's own responsibilities and agreed to establish a Reference and Translation Unit, if Government of India so desired.

The Cabinet Secretariat was approached with a request to give approval to the project and to sanction an amount of Rupees five thousand per month for the expenses of the Unit. Necessary sanction was received, even while the team was in Japan.

The Translation and Reference Unit was established in Asia Kyokai on a regular basis from July 1956 and has been functioning ever since. There is an influential committee to advise the Unit in the selection of material for translation. The representation in the Committee is on a wide basis; the members are drawn from among university scholars, government officials, industrialists and businessmen. A number of translators are engaged either on a whole time basis or on a specific contract. Although progress in the beginning was somewhat slow as the organization of work necessarily took time, the Unit has been doing satisfactory work during the last several months. A large number of documents have been translated and copies of the translated material, including charts and graphs are available in the Institute's library in Calcutta and New Delhi. Several very valuable publications in the field of small-scale industries, productivity of machine industry, capital accumulation, planning, structure of wages and salaries, agricultural extension, technological coefficient etc., have been acquired and are being utilized in planning studies.

Even when the material already selected has been translated, the need for the Unit will remain, as there will be always new and interesting publications that may be expected to become available. Requirements of data change from time to time and there is a continuing need for getting comparative information from other countries, properly collected and digested under the supervision of experts, on subjects covering different fields and of interest in our planning studies.

Visit to China

The team left Japan on 8 July and reached Canton the next day. One of the Directors of the State Planning Commission, Mr. Yung Lung-Kwei had come down all the way from Peking to Canton to receive the team. For the entire period of its stay in China, Mr. Yung Lung-Kwei looked after the team and earned the admiration and gratitude of the team for his quiet efficiency, great ability and friendliness. After a stay of two days in Canton, the team left by train from Peking, halting for a few hours at Wuhan on the way. Both at Canton and Wuhan, the members of the team met officials of the planning and statistical organisations and visited institutions and sites of interest. In Peking, where the team spent most of its time, it held a series of discussions with officials of the Planning Commission, Central Statistical Board, and other Government departments and visited factories, universities, training institutions and other places of interest. As there were already at that time separate delegations from India visiting China for the study of cooperatives and agricultural planning, the team concentrated attention on the following main subjects:

- (a) Planning machinery and organization and techniques of Planning;
- (b) National income and its distribution;
- (c) Scope and organization of state trading.
- (d) Relationship between the public and the private sectors;
- (e) Problem of crafts and attitude to cottage industry;
- (f) Problem of unemployment;
- (g) Policy and programme regarding heavy machine-building industry;
- (h) Problem of organization and management of public enterprises;

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- (i) Role of scientific research in relation to planning ;
- (j) Structure of wages and salaries.

A detailed statement setting out the points for discussion and for collection of data had been sent in advance to the State Planning Commission in China. The Commission had taken great pains to draw up a very full programme of discussions and visits for the entire period of the team's stay in China. Discussions were held every morning from 9 a.m. to 1 p.m. in the office of the State Planning Commission and most often there was another equally long session in the afternoon. On every topic of interest to the team, as indicated in advance by the team, an expert gave a talk, at the end of which questions were invited and answers given. Services of able interpreters were available and it was possible to take down very detailed notes. All the experts were evidently very well prepared and often had written notes with them.

The visit was all too brief to enable much travel in a vast country like China. Most of the time was spent in discussions at Peking; but visits outside Peking were not altogether neglected. The team made a flying visit to the industrial areas in the North and in this visit were included Shen-yang, Anshan and Chang-chun. Apart from visiting the famous iron and steel works of Anshan, the new truck factory at Chang-chun and a number of industrial enterprises in Shen-yang, this visit gave an opportunity to the team to see the work of planning and statistical organizations at the provincial and municipal levels. Another interesting trip was to Shanghai to study the conditions of industries still in the private sector. One of the members of the team, Sri R. Natarajan, who was making a special study of industrial enterprises and labour relations, was able to visit some other industrial cities and also make a somewhat longer stay in Shanghai.

Towards the end of their stay in China, the members of the team were invited to meet Premier Chou-en-lai and dine with him on 14 August 1956 at the sea-side resort of Pei Tai Ho. The meeting lasted nearly two hours and provided the team with a unique opportunity of discussion with Premier Chou-en-lai some of the major problems of economic development in China. The distinguished Director of the Central Statistical Board and one of the Vice-Chairmen of the State Planning Commission, Mr. Hsiu Mou Chiao and the Counsellor, Indian Embassy Sri Bahadur Singh were among those who were present on the occasion.

At the request of the State Planning Commission, the members of the team delivered a few lectures at the Planning Commission premises. Pitambar Pant spoke on Planning in India. R. Natarajan talked about Industries in India and M. Mukherjee spoke on the Statistical set-up in India. M. Mukherjee gave another talk to a small group of technical workers on the method of estimation of national income in India and the logical basis of income estimation work in the West and in the East.

The team received every cooperation and assistance in its work and the warmth of friendship and the unobtrusive hospitality of the Chinese hosts left a deep impression on the members of the team.

The Indian Ambassador and the Counsellor took great interest in the team's work and their advice and guidance was of great value to the team. Of great assistance to the team was the ungrudging help given by Sri Paranjapo of the Embassy whose mastery of of Chinese language made it possible for the team to have a large amount of material translated from Chinese into English in record time.

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The visit to China was highly educative. The team was able to get a good understanding of many aspects of development in China and was able to collect a large amount of very valuable information. The team was greatly impressed by the rapid advance in almost every field of activity in China and the purposefulness and determination, with which economic and social transformation was being attempted and being realised.

On the return of the team to India, arrangements were made to set up a small unit in Calcutta and New Delhi on a part-time basis to translate selected Chinese documents of value for planning studies. It is a matter of satisfaction that the Indian Statistical Institute has been able to develop a nucleus of a Reference and Research Unit, which will bring together, translate and analyse material of significance and value from the Chinese and Japanese sources. The existence of a very good library, copying, photostat, etc., facilities in the Institute and its wide contacts, make the task feasible.

A number of notes on various aspects have been prepared for reference. A part of the material has been put together in two reports :

1. Planning in China: Approach, Organization and Method by Pitambar Pant.
2. Industrial Planning and Growth in China by R. Natarajan.

Appendix 16: Members of the Council, 1956-57

President : Sri Chintaman D. Deehmukh.

Vice-Presidents : Dr. P. N. Banerjee, Prof. S. N. Bose, Prof. D. R. Gadgil, Sir Shri Ram.

Chairman : Sir D. N. Mitra.

Vice-Chairmen : Dr. S. K. Banerji, Sri K. P. Goenka, Sri S. C. Ray, Prof. N. R. Sen.

Treasurer : Dr. Satya Churn Law.

Secretary : Prof. P. C. Mahalanobis.

Joint Secretaries : Sri Nihar Chandra Chakravarti, Sri Pitambar Pant, Sri S. C. Sen.

Members : Srimati Chameli Bose, Prof. K. N. Chakravarti, Sri V. M. Dandekar, Sri Mohanlal Ganguly, Prof. H. Ghosh, Sri N. C. Ghosh, Dr. Q. M. Husain, Prof. D. G. Karve, Prof. K. B. Madhava, Srimati Nirmla Kumari Mahalanobis, Sri N. T. Mathew, Sri D. N. Mukherjee, Sri Moni Mohan Mukherjee, Dr. U. S. Nair, Sri R. Natarajan, Dr. B. Ramamurti, Dr. C. B. Rao, Dr. N. Sundararama Sastry, Sri Sadasiv Sengupta, Sri N. Chakravarti.

Appendix 17: Governing Body of the Research and Training School, 1956-57

Sir D. N. Mitra (*Chairman, ex-officio*), Prof. P. C. Mahalanobis (*Secretary, ex-officio*), Sri P. A. Gopalkrishnan, Sri Bali Ram Bhagat (*Representatives of the Government of India*), Dr. N. S. R. Sastry (*Reserve Bank of India*), Dr. U. Srivaraman Nair (*Inter-University Board*), Mr. George Barrell (*Associated Chamber of Commerce*), Sri D. N. Mukherjee (*Federation of Indian Chambers of Commerce & Industry*), Dr. V. G. Panse (*National Institute of Sciences*), Dr. J. P. Niyogi (*Indian Economic Association*), Sir Shri Ram, Dr. S. K. Banerjee, Prof.

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S. N. Bose, Prof. K. B. Madhava, Sri N. C. Chakravarti, Dr. C. R. Rao, Sri Pitambar Pant (*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 and Director of Research and Training School*), Sri P. A. Gopalakrishnan, Sri M. S. Bhatnagar (*Representatives of the Government of India*), Dr. N. S. R. Sastry (*Representative of the Reserve Bank of India*), Mr. George Barrell, Sri Nihar Chandra Chakravarti (*Members of the Governing Body*).

Appendix 18: Committees Set up by the Council, 1956-57

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

Journal Committee: Prof. S. N. Bose, Dr. Debabrata Basu, Dr. Raghu Raj Bahadur, Prof. Panchanan Chakravarti, Dr. M. N. Ghosh, Shri D. B. Lahiri, Prof. K. B. Madhava, Prof. P. C. Mahalanobis (*Editor, Sankhya, ex-officio*), Shri Moni Mukherjee, Dr. U. S. Nair, Dr. B. Ramamurti, Dr. C. R. Rao and Dr. N. S. R. Sastry (*Representatives of the Governing Body of the Research and Training School*), Sri A. Mahalanobis (*Member-Secretary*).

Examinations Committee: Dr. S. K. Banerjee, Sri N. C. Chakravarti, Sri V. M. Danlekar, Sri M. L. Ganguli, Sri D. Y. Lelo, Prof. K. B. Madhava, Prof. P. C. Mahalanobis, Sri N. T. Mathew, Dr. U. S. Nair (*Representative of the Governing Body*), Sri Pitambar Pant, Dr. B. Ramamurti, Dr. C. R. Rao, Dr. N. S. R. Sastry, Sri J. M. Sen Gupta, Sri Sadasiv Sengupta, Sri K. N. Chakravarti, Sri S. R. Rao, Sri N. C. Ghosh (*Member-Secretary*).

Appendix 19: Office Bearers and Council Members of Branches, 1956-57

Bombay: Sri V. L. Mehta (*President*), Professor C. N. Vakil, Sri R. G. Saraiya, Sri L. S. Vaidyanathan and Dr. N. S. R. Sastry (*Vice-Presidents*), Sri M. A. Telang and Sri K. C. Cheriyan (*Joint Secretaries*), Dr. D. T. Lakdawalla (*Treasurer*).

Mysore: Sri A. Ananthapadmanabha Rao (*President*), Sri Srinagabhushana (*Vice-President and Secretary*), Sri R. Ramaswami (*Hony. Treasurer*), Sri Mir Ahmed Hussain (*Joint Secretary*), Sri S. K. Ekambaram, Sri R. Guru Raja Rao, Sri S. K. Rana, Sri C. Ramaswami, Sri R. Natarajan, Sri H. S. Narayana Rao and Sri S. K. Iyengar (*Members of the Executive Committee*).

Aligarh: Professor D. P. Mukherjee (*President*), Mr. A. Salim (*Secretary*).

Appendix 20: Board of Directors of the International Statistical Education Centre, Calcutta, 1956-57

Chairman: P. C. Mahalanobis.

Members: G. Darmois, R. G. D. Allen, E. Lunenberg (*International Statistical Institute*); P. A. Gopalakrishnan, S. K. Bose (*alternate*) (*Government of India*); C. R. Rao, S. C. Sen, A. Matthai, *Secretary, (Indian Statistical Institute)*