

INDIAN STATISTICAL INSTITUTE

FORTYTHIRD ANNUAL REPORT

April 1974 – March 1975



203 Barrackpore Trunk Road
CALCUTTA 700 035

INDIAN STATISTICAL INSTITUTE

President: Professor S. N. Bose*, F.R.S., D.Sc., F.N.I., National Professor.

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Joint Secretaries: 1. Dr. D. Dutta Majumder, Professor, Electronics and Communication Science, Indian Statistical Institute (Calcutta area); 2. Dr. K. S. Parikh, Professor, Planning Unit, Indian Statistical Institute (Delhi area).

MEMBERS OF COUNCIL

1. Dr. B. P. Adhikari, Dr.es.Sc. (Paris), Professor, Indian Statistical Institute; 2. Dr. Atma Ram† D.Sc., F.N.A., F.S.G.T.; 3. Dr. R. R. Bahadur†; 4. Dr. Debabrata Basu, Research Professor, Indian Statistical Institute; 5. Deb Kumar Bose, Professor, Indian Statistical Institute; 6. Dr. T. A. Davis, Professor, Indian Statistical Institute; 7. Dr. S. W. Dharmadhikari, M.Sc., Ph.D. (California), Department of Statistics, M.S. University of Baroda; 8. Dr. Ambarish Ghosh, Dr.es.Sc. (Aix-Marseille), Professor, Indian Statistical Institute; 9. Shrimati Nirmal Kumari Mahalanobis; 10. Dr. Ashok Mitra, Ph.D., National Fellow, Indian Council of Social Science Research; 11. Dr. T. V. Hanurav, Dean of Studies, Indian Statistical Institute; 12. Dr. V. S. Huzurbazar, Professor and Head, Department of Mathematics and Statistics, University of Poona; 13. Shri S. Naqvi, Gokhale Institute of Politics & Economics, Poona; 14. Dr. J. Roy, Indian Statistical Institute; 15. Dr. Triguna Sen†; 16. Dr. B. R. Seshachari†; 17. Professor S. S. Srikhande, Ph.D., Head, Department of Mathematics, University of Bombay; 18. Dr. T. N. Srinivasan,† Ph.D., Indian Statistical Institute; 19. Shri S. M. Sundara Raju, M.Sc., Chief, S.Q.C. Division, Indian Statistical Institute.

Government nominees on the Council (Rule 6.1(b) (f)): 1. Cabinet Secretary, Cabinet Secretariat, Government of India (Shri B. D. Pandey, ICS, or his representative); 2. Joint Secretary, Ministry of Finance, Department of Expenditure, Government of India (Shri S. K. Ghosh); 3. Director, Central Statistical Organisation and ex-officio Joint Secretary, Department of Statistics (Shri V. R. Rao).

Co-opted Members (Rule 6.1(c)): Professor M. Mukherjee, Director, Research and Training School, Indian Statistical Institute; 2. Dr. B. S. Minhas, Head, Delhi Centre, Indian Statistical Institute.

*Died on 4 February 1974

**Former Chairman

†Resigned

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PART I: GENERAL REVIEW OF THE WORK DONE DURING THE YEAR

1. GENERAL ADMINISTRATION

1.1. *Membership:* During the year 1974-75, 128 persons were enrolled as ordinary members. The membership of 21 members was terminated in terms of Rule 3.1 of the Rules of the Institute. Ten ordinary members became life members. Two ordinary members resigned, the membership of four ordinary members were revived, and according to information available in the Institute one life member and one ordinary member died.

Thus the membership position as on 31 March 1975 was 462 (347 ordinary, 104 life, 4 honorary life and 7 institutional members).

During the year 1974-75, 150 sessional members and 208 student members were enrolled for one year.

1.2. *General Meetings*

1.2.1. *Special General Meeting:* 26 July 1974: The meeting considered the revised Memorandum of Association of the Institute and adopted it unanimously.

1.2.2. *Annual General Meeting:* 31 October 1974: (a) The revised Memorandum of Association of the Institute as adopted by the Special General Meeting held on 26 July 1974 was confirmed. (b) The Annual Report of the Institute for 1973-74 was adopted, subject to certain decisions of the Council taken in its meeting held on 29 October 1974. (c) A statement of income and expenditure accounts of Plan and Non-Plan revenue expenditure for 1973-74 and also a statement of capital expenditure for 1973-74, both being subject to adjustment and audit, as circulated, were considered.

1.2.3. *Adjourned Annual General Meeting:* 22 March 1975: (a) Auditors' Report, Audited Statement of Accounts, and Balance Sheet etc. for 1973-74 together with Administration's comments were adopted; (b) Inclusion of Shri P. G. Sarkar, Adviser (Finance and Administration), in the Implementation Committee, set up earlier in the Annual General Meeting held on 31 October 1973, with a view to quicker finalisation of the accounts after the annual closure.

A list of President, Vice-Presidents, Office-bearers and members of the Council is given in *Annexure I*.

1.3. *Meetings of the Council and of the Governing Body of the Research and Training School:* The Council of the Institute met, jointly with the Governing Body, six times during the year on: (1) 28 April 1974; (2) 29 June 1974; (3) 25 July 1974; (4) 29 October 1974; (5) 30 December 1974; and (6) 22 March 1975.

1.4. *Meetings of the Finance Committees:* The Finance Committees of the Council and the

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Governing Body met jointly thrice during the year on 29 October 1974, 30 December 1974 and 22 March 1975.

1.5. *Membership of the Governing Body and Finance Committee:* The names of the members of the members of the Governing Body of the Research and Training School and of the Finance Committee are given in *Annexure 1*.

1.6. *Institute Staff:* The following officials continued to function in the positions mentioned against their names during the year.

1. Dr. C. R. Rao : Secretary-Director; 2. Professor M. Mukherjee : Director, Research and Training School; 3. Dr. D. Dutta Majumdar : Joint Secretary for Calcutta area; 4. Dr. K. S. Parikh : Joint Secretary for Delhi area; 5. Shri Biman Bose : Administrative Officer and Assistant Secretary.

Shri P. G. Sarkar, I.A.A.S., Director, Audit and Accounts, Posts and Telegraphs, Calcutta, joined the Institute on deputation on 28 November 1974 as Head of Administration, Finance, Budget and Accounts. He was designated later as Adviser, Finance and Administration, by the Council in its meeting on 30 December 1974.

1.7. *New Appointments:* The technical staff of the Institute was strengthened during the year by the addition of the following persons:

1. Arup Mullick, M.A. (Econ.) (Calcutta) Ph.D. (Econ.) (Rochester), E.R.U.; 2. E. P. S. Bhaskara Rao, M. Stat., Ph.D. (Statistics), Math-Stat.; (3) Asit Baran Raha, M. Stat., Ph.D. (Statistics), Math-Stat.

1.8. *Resignations and Retirements:* The following senior members of the staff left the Institute during the year: 1. Shrimati Kalpana Joshi (S.R.C.); 2. Shri N. C. Mukherjee (Administration); 3. Dr. T. Parthasarathy (RTS); 4. Shri J. Saha (Library); 5. Shri N. S. Sreenivasan (SQC, Bangalore); (Nos. 1, 2 and 4 retired from service on superannuation).

1.9. *Obituary*

(i) *Professor Daniel Thorne:* The Council of the Indian Statistical Institute and the Governing Body of the Research and Training School, in the joint meeting held on 29 June 1974, mourned the sad and untimely death of Professor Daniel Thorne, economist, Ecole Pratique des Hautes Etudes, Sorbonne, Paris, who was associated with the Indian Statistical Institute for a long time. The members also expressed their heartfelt sympathy for his wife, Mrs. Alice Thorne, in her bereavement.

(ii) *Lord P. M. S. Blackett:* The Council of the Indian Statistical Institute and the Governing Body of the Research and Training School, in the joint meeting held on 25 July 1974, mourned the death of Lord P. M. S. Blackett, and paid glowing tributes to the contributions made by him. Condolences were sent to the family.

1.10. *Review Committee:*

(a) *Take-over of National Sample Survey:* The previous annual reports had reported that the work of the National Sample Survey (N.S.S.) and the associated staff were taken over by the

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Government of India on 1 June 1972. The above-mentioned event and the subsequent actions of the Indian Statistical Institute for revising its memorandum and rules, etc. arose out of the broad features of the Review Committee's recommendations. Certain administrative matters, arising out of the take-over of the N.S.S. have yet to be settled between the Government of India and the Institute.

The proposals for restructuring and reorganisation of the Institute in the light of the Review Committee's recommendations are detailed below.

(b) *Proposals for restructuring of the Institute:* The previous Annual Report (1973-74) had reported that the Council of the Institute and the Governing Body of the Research and Training School deliberated on the proposals for restructuring of the Institute in their meetings held on (1) 6-7 July 1973, (2) 30 October 1973, (3) 29 December 1973 and (4) 16-17 March 1974.

The restructuring proposals, in the form of alterations in the Memorandum of Association and the Rules and Regulations of the Institute, were finally drawn up by the Council on 25 July 1974. These proposals were unanimously adopted by the Special General Meeting on 26 July 1974, after incorporating certain amendments. In accordance with Rule 14 of the Institute, the proposals were confirmed at the Annual General Meeting on 31 October 1974.

Meanwhile, as required by the West Bengal Societies Registration Act, 1961, the permission of the Registrar of Societies was sought on 9 October 1974 for alterations in the Memorandum of Associations, submitting to him the proposed alterations. The required permission was given by the Registrar of Societies in a communication dated 6 January 1975.

In accordance with the Societies Registration Act, the alterations to the Memorandum, Rules and Regulations, as confirmed by the Annual General Meeting of 31 October 1974, were submitted to the Registrar of Societies on 29 November 1974. By a stipulation of the same Act, the Registrar should, within thirty days of receipt of the above communication, intimate to the Institute in writing that the alterations have been filed, or should state his objections, if any.

After waiting for about three months for such an intimation, the Registrar of Societies was informed in a communication on 26 February 1975, that since much longer than thirty days had elapsed and no written intimation had been received from him, it was being presumed that he had no objections to the alterations and that these had been filed. The Registrar was also informed that, in accordance with clause 7 of the ISI Act, the alterations were now being submitted to the Government for approval.

In a communication dated 28 January 1974, the Department of Statistics had been informed of the intention of the Institute to make alterations in the Memorandum of Association, Rules and Regulations, and that the approval of the Government would be sought for such alterations. In a reply dated 19 February 1974, the Department had required that proposals for alterations should be accompanied by a statement indicating the need for such alterations and the implications thereof. After completing the due processes as required by the Societies Registration Act, the proposed alterations were submitted to the Government along with an explanatory statement as desired by them, on 28 February 1975.

In accordance with clause 7 of the ISI Act, 1959, no change in the Memorandum of Association, Rules and Regulations is possible without the previous approval of the Government. This approval has since been accorded.

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1.11 *Land and Construction*

Baranagar: In the previous Annual Report for 1973-74, certain developments regarding the construction of the library building were recorded. The following are the main developments during the current year:

(a) The report on soil investigation of the site for the proposed multi-storied library building was received.

(b) Initial difficulties in proceeding in the matter were removed after the Government had exempted the ban on the construction of the library building.

(c) The Government's approval for the sketch plan was obtained and the local municipality sanctioned the construction of the ground floor.

(d) Tenders for the pile foundation and miscellaneous work were invited and also duly opened for examination.

(e) The architects appointed by the Institute, viz. Messrs. Ballardie Thompson & Mathews (P) Ltd. examined the tenders and recommended that the contract be awarded to Messrs. Braithwaite Burn & Jessop Construction Co. Ltd. The Works Advisory Committee considered these proposals in detail and also recommended the award of the contract to Messrs. Braithwaite Burn & Jessop Construction Co. Ltd.

(f) Protracted negotiations ensued with the approved contractors for the finalisation of terms and conditions.

(g) Tenders were invited for the supply of stone chips, sand and coal.

(h) The pile driving work (341 piles) was completed on 24 March 1976. Other miscellaneous works in that connexion are nearing completion.

Delhi: The construction of a group of buildings for the Institute commenced during the early part of the financial year, 1973-74, on the 14.76-acre plot of the Institute land, on Saheed Jeeb Singh Sansanwal Marg in Haus Khas. Buildings under construction are the faculty offices, library, dormitory, class rooms and kitchen comprising a total carpet area of about 60,000 square feet and costing an estimated Rs. 32 lakhs.

2. RESEARCH AND TRAINING SCHOOL

The Research and Training School carried out its training and research activities under the guidance of the Director Professor M. Mukherjee.

The statisticians at Calcutta and Delhi carried out research, conducted training programmes and provided consultation service to other scientists.

2.1. *Training Programmes*

2.1.1. *Admission to Courses:* In addition to some changes in the syllabus of the B.Stat (Hons) course, there was a major revision in the M.Stat. course from the current year. The existing two-year M.Stat. course for which all graduates with mathematics are eligible has been modified to

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make it a two-year course for graduates in statistics, while graduates not having a statistical background are required to undergo a one-year M.Stat (Preparatory) course before joining the first year of M.Stat course. The M.Stat course has also been started at the Delhi Centre on a modest scale with the first year only.

The following is a list of the number of candidates admitted to the degree and training courses during 1974-75.

	<i>Number of admissions</i>
<i>1. Courses Leading to a Degree in Statistics</i>	
<i>1.1 Bachelor of Statistics with Honours (B. Stat.) (Hons.)</i>	
1st year	22
2nd year	22
3rd year	17
4th year	20
<i>1.2 Master of Statistics (M. Stat.)</i>	
Preparatory year	18
1st year	11
2nd year	32
<i>1.3 Advanced Studies leading to Diploma or Ph.D (Research Course preparatory to Ph.D.)</i>	
Research Fellows, Scholars, Project Assistants, Apprentices	37
Special Practical Training in SQC and OR	4
<i>2. Specialised Course in Applied Statistics leading to Diplomas:</i>	
2.1 Statistical Quality Control and Operations Research	6
<i>3. Courses in Statistics for Persons in Employment:</i>	
3.1 Statistical Officers' Training Course (Jointly with the Central Statistical Organisation)	11
3.2 Specialisation Course for Statistical Officers (Jointly with the Central Statistical Organisation)	9
3.3 Short duration courses for officers on deputation	3
<i>4. Evening Courses:</i>	
<i>4.1 Statistical Methods and Applications:</i>	
(i) Calcutta	40
(ii) Delhi (in collaboration with the Central Statistical Organisation)	40
<i>4.2 Diploma in Statistical Quality Control and Operations Research (Bombay and Madras)</i>	
4.2.1 Bombay—1st year	28
Bombay—2nd year	16
4.2.2 Madras—1st year	24
Madras—2nd year	22
<i>4.3 Six-month Evening Course in S.Q.C.(Bangalore)</i>	
4.3.1 July—December 1974	27
4.3.2 January 1975—June 1976	31

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	<i>Number of admissions</i>
5. <i>Electronic Computer Courses:</i>	
5.1 Diploma in Computer Science	6
5.2 Intensive Course on Programming and Applications	22
5.3 Course on Operation of PUNCH Card Machine	10
5.4 Course on Statistical Craftsmanship	6
6. <i>Courses at the International Statistical Education Centre, Calcutta:</i>	
6.1 Regular Course in Statistics	22
6.2 Specialisation Course for Individuals	1
7. Documentation Training Course, Bangalore	10
8. <i>Indian Statistical Service Officers Course:</i>	
Probationers	3
Total	547

2.2 RESEARCH ACTIVITIES

The units for applied research and science laboratories attached to the Research and Training School, together with the names of Heads of Units, are as follows:

Kaati Bhusan Pakrasi (*Anthropometry and Human Genetics*), Jogabrata Roy (*Applied Statistics, Surveys and Computing*), Prabhat Ranjan Pal (*Biochemistry*), Bhupendra Chandra Das (*Biometry*), Subodh Kumar Roy (*Botany*), Durga Narayan Ghosal (*Chemistry*), Samarendra Kumar Mitra (*Computing Machines and Electronics*), Trupapur Antony Davis (*Crop Science*), Manadom Venkateswarier Raman (*Demography*), Deb Kumar Bose (*Economic Research*), Dwijesh Dutta Majumder (*Electronics and Communication Science*), Ratan Lal Brahmachary (*Embryology*), Anima Sengupta (*Family Planning*), Sohan Lal Jain (*Geology*), Shyam Matai (*Leaf Protein*), Alokangda Mitter (*Linguistic Research*), Monimohan Mukherjee (*National Income Research*), Amulya Bhusan Gupta (*Physics*), Durgaprosad Bhattacharyya (*Pre-Census Population Studies*), Sibabrata Chatterjee (*Psychometric Research and Service*), Ramkrishna Mukherjee (*Sociology*), and T. N. Srinivasan (*Planning and Regional Survey, Delhi*)

B. S. Minhas was the head of all activities at the Delhi Centre from 1 August 1974, while T. N. Srinivasan was put in charge of all teaching and training programmes at Delhi from the same date.

T. V. Hanurav was the Dean of Studies during the year. T. J. Rao was in charge of the training at the International Statistical Education Centre (ISEC), Calcutta, till October 1974, when E. M. Paul took over. S. M. Sundara Raju was in charge of the Statistical Quality Control Division.

2.2.1 Important Topics of Research: The research work of the Institute during April 1974-March 1975 is embodied in a large number of research papers sent for publication, besides mimeographed technical reports. The fields of research covers, besides statistics and mathematics, various subjects for which the Institute has specialised research units—anthropometry and human genetics,

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applied statistics, surveys and computing, biochemistry, biometry, botany, chemistry, computing machines and electronics, crop science, demography, documentation and library science, electronics and communication science, embryology, economics and econometrics, family planning, geology, leaf protein, linguistic research, national income research, physics, planning and regional survey, precensus population studies, psychometry, sociology, statistical quality control and operation research. A selected list of topics organised in broad divisions on which research was carried out during the year is given below.

A. MATHEMATICS AND STATISTICS

Calcutta

- (i) Descriptive Theory of Sets
- (ii) Combinatorial Mathematics
- (iii) Automata Theory
- (iv) Harmonic Analysis
- (v) Linear Algebra
- (vi) Probability Theory
- (vii) Statistical Inference
- (viii) Design of Experiments
- (ix) Sample Surveys
- (x) Operations Research

Delhi

- (i) Some Estimation Problems in Sampling Theory
- (ii) Minique Theory
- (iii) Some Characterization Problems
- (iv) Factorization of a Multivariate Hermitian matrix
- (v) Estimation of Kth Order Regression Curves
- (vi) Some Problems in Non-Parametric Estimation
- (vii) An Extension of Glivenko-Cantelbi Theorem
- (viii) Prediction and Regression in Growth Curves

B. APPLIED STATISTICS, SURVEYS AND COMPUTING

In accordance with the contemplated restructuring of the Indian Statistical Institute, the activities of the Computer Science Unit was extended during the year and a new Division of Applied Statistics, Surveys and Computing (ASSC) has been created to organise training, research and consultation activities in these areas.

During the period, the ASSC Division was engaged in the following types of work: 1. Teaching and training, 2. Lectures and seminars, 3. Research, 4. Sample Survey Projects, 5. Consultation and advisory activities, and 6. Operation and maintenance of the H-400 Computer system.

A detailed report on these activities is given below:

Teaching and Training: The Division organised the following courses:

- (i) *One-year programme of Advanced Studies in Computer Science and Survey Methodology:* Eight trainees were admitted to the course.

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(ii) *Specialisation in Applied Statistics and Data Analysis: (One-year Specialisation Programme in the second year of the M. Stat Course):* Seven trainees are undergoing this course which will be completed by July 1975.

(iii) *Intensive Course in Programming and Applications of Electronic Computers:* This course is mainly intended for employed persons whose duties involve computation and data analysis. The minimum requirement for admission is a good degree with knowledge of Mathematics at the graduate level.

The tenth session of the course was held from 30 September 1974 to 13 December 1974. The emphasis was on Operations Research Applications. Of the 22 trainees who joined the course, 18 received certificates of merit and 4 certificates of attendance.

(iv) *Six-week Specialisation Course on Mechanised Data Processing for trainees of the International Statistical Education Centre, Calcutta: (Twenty-eighth session):* Nine trainees from eight different countries participated.

(v) *Course on Statistical Craftsmanship:* This course is intended to provide practical training in statistical computation to students who have passed the higher secondary examinations. The course provides opportunities for the trainees to participate in real life projects undertaken by the Division. They also receive training in the use of desk calculating and punch card machines. Six trainees were admitted to the course.

(vi) *Course on Operation of Punch Card Machines:* The object of this course is to provide practical training in the Operation of Punch Card Machines—Key Punch and Verifier, Sorter, Tabulator and Reproducing Summary Punch. The minimum qualification for admission is the Higher Secondary Certificate, preferably with Mathematics and a typing speed of at least 30 words per minute. Ten trainees were admitted to the course.

Sample Survey Projects

A survey on "Some Aspects of Family Planning in Calcutta" was completed in April 1974. The processing of the data has been completed and the report is under preparation. Certain additional tables on Calcutta Fertility Survey 1970 were prepared at the suggestion of Professor D. V. Glass.

The Ministry of Agriculture and Community Development has requested the ASSC Division to conduct an evaluation study of the Pilot Intensive Rural Employment Project undertaken in the Nayagam block, Midnapore District. The design for the survey has been completed and the field work will be taken up in May 1975.

Consultation and Advisory Activities

On a request from the Union Public Service Commission, J. Roy, T. Maitra and A. K. Adhikari undertook a system study of the data processing work involved in the selection and recruitment work of the Commission. A report was submitted to the Commission on 11 November 1974.

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J. Roy, A. K. Chaudhuri and Tandra Das provided statistical advice in scientific research on seven projects being conducted by medical personnel, psychologists, and others in universities.

Sixteen major projects were undertaken during the year on the H-400 computer system. Eleven dissertations were submitted by students of the Advanced Course in Science, 1973-74. Nine papers/technical reports were prepared by members of the staff.

C. PHYSICAL AND EARTH SCIENCES

(i) *Computer Development, Electronics and Communication Science*

The research activities in the Electronics and Communication Science Unit can be broadly grouped under the following:

Computers' memory technology: The research problems in this scheme includes the studies on the latest magnetic bubble technology and theoretical modelling of biological memories. The basic properties of neuron cells and their circuit realisation have been studied.

Statistical methods in pattern recognition, learning machines, and computer simulation of artificial intelligence: The project is broadly divided into two divisions, namely (a) Acoustic phonetics, and (b) Pattern recognition. In the field of pattern recognition, both probabilistic and non-probabilistic theories were studied and applied in the field of speech recognition and handwritten character recognition. Computer simulation of robot problems have been investigated. Spectrographic data of Telugu speech sounds were statistically analysed and acoustic cues investigated.

Digital communication techniques: The work includes the design of pseudo-random noise generator and the study of the properties of various error correcting codes. Some theoretical work on switching and digital filtering techniques were successfully completed.

(ii) *Electronics Unit*

The research activities in the Electronics Unit can be grouped under the following:

(a) *Theoretical Physics*

The main fields of investigation in Theoretical Physics are:

- 1) Particle Physics
- 2) Nucleon—Nucleon Forces and Nuclear Physics
- 3) Implications of Hadronic Interactions in Cosmic Rays
- 4) Space-Time Quantisation and Related Problems
- 5) Measurement Problem in Quantum Mechanics.

(b) *Physics of Fluids*

Flow analysis in a hydrocyclone separator

Hydro and aero cyclones are used in engineering for separating liquid-liquid or solid air mixtures. This is one of the most commonly used devices for reducing pollutants at the source. Theoretical studies are being carried out to analyse the complex flow patterns inside a hydrocyclone and experimental studies are being carried out in the Hydrodynamical Laboratory of the Applied Mathematics Department, Calcutta University.

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Study of Interaction between water-sediment mixture and mobile sand bed.

The interaction of water-sediment mixture with the erodible sand-bed moulds the bed into different bed configurations which changes the resistance to flow and sediment transport and thus changes the depth of the flow, stage of the river, diffusion of waste etc. In extreme case, the change in bed configuration can cause a three-fold change in resistance to flow and to fifteen-fold change in concentration of bed material transport. A thorough, critical, theoretical and experimental study is being carried out to study the mechanism of bed forms and sediment transportation. Experiments are being carried out in the tilting flume available at the Hydrodynamical Laboratory of the Applied Mathematics Department, Calcutta University.

Numerical study of a tidal river

Any alteration in the tidal regime of an open channel greatly influences the flow condition and hence the stability of the channel. Among the various methods of studying the probable effects of the engineering works, the numerical model method is now well established. The model is based on the principle of solving the system of partial differential equations of hydrodynamics with the help of high-speed digital computer.

Mathematical analysis of flame stabilization problem

Mathematical analysis is being carried out on laminar and turbulent flame fronts when they are stabilized in a rectangular cavity.

(c) *Digital Techniques*

Digital Filters: Linear filtering and spectrum analysis are fundamental signal processing operations of great utility in many branches of science and technology. Some studies were made on the design of a Universal Digital Filter. The work is continuing.

FFT Processor: Real-time analysis finds its application in diverse fields such as communication, radar, pattern recognition and many other scientific fields. It concerns the analysis of the ongoing phenomenon in both frequency and time domain. A real-time Fast Fourier Processor has been designed to efficiently handle problems of statistical analysis (viz, ensemble averaging, amplitude histogram, data smoothing etc) and data communications pattern recognition. The design including computer simulation has been completed. The work is in progress.

Fault Tolerant Systems: Some detailed studies were made on various types of fault tolerant systems.

(iii) *Chemistry*

(a) Absorption behaviour of different dyes with basic structural similarity but with significant substitution in their molecules on aluminosilicates, particularly those pertaining to soils.

(b) The spectrophotometric study of the reaction between dyes with poly-electrolytes such as poly-(acrylate) and poly-(methacrylate), carboxymethyl cellulose as well as anionic and cationic detergents. Metachromasia of dyes-stuffs observed in the presence of polyanions and micelles of surfactant molecules has been theoretically explained.

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(iv) *Geology*

A. Research in the Pranhita—Godavari Valley

- (a) Sedimentology of the Pre-Cambrians
- (b) Sedimentology and Stratigraphy of the Gondwanas
- (c) Structural geology
- (d) Palaeontology of the Gondwanas.

B. Study of Recent Sedimentary Deposits of the Usri river around Giridih.

(v) *Physics*

Investigation of interaction of physics and other disciplines of science. Interaction of physics and medicine is the theme of the current study.

D. BIOLOGICAL SCIENCES

(i) *Anthropometry and Human Genetics*

(a) Indo-Soviet Anthropological Project to study anthropometric, serological and biochemical and genetic characters of ten endogamous castes and tribal populations in Maharashtra.

(b) *Social Biology*: Study on fertility and reproductive wastages by social classes; and study on family health problems vis-a-vis family planning activities by social groups.

(c) Review of physical anthropology in Asia.

(d) Morphology, serology, dermatoglyphics and micro-evolution in Haiti, West Indies.

(e) Study of biochemical polymorphism amongst several tribal populations in the Telengana area of Andhra Pradesh (in collaboration with the National Institute of Nutrition, Hyderabad).

(f) Genetic studies of human placental enzymes (in collaboration with the B. J. Medical College, Poona).

(g) Study of developmental genetics of production of lactate dehydrogenase (LDH) in the human system (in collaboration with the Department of Anthropology, Calcutta University).

(h) Bio-social investigations among the nomadic Dhangars (shepherds) and Nandiwallas of Maharashtra.

(i) Inheritance of cleft chin, ear lobes and some behavioural traits: family, twin and population study.

(ii) *Biochemistry*

(a) Level of beta-carotene contents of edible green levels,

(b) Level, extraction and purification of ATP-ase, a soluble enzyme present in green leaves.

(c) Active principles of *Cassia tora*, especially the anthraquinones type of compounds, which are of medical value.

(d) Amino acid levels in germinating pulses.

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(iii) *Biometry*

(a) Data on nature and extent of diseases, climate and morbidity, etc. were collected and analysed with a view to the measurement of level of health.

(b) Investigations on the survival and growth of post-embryonic carp and adult carp.

(iv) *Botany*

(a) Inter-varietal interactions in rice.

(b) Inter-species interactions in wheat and gram, and wheat and pea mixtures.

(c) Development of high-yielding rice varieties.

(d) Rodent ecology and behaviour.

(v) *Crop Science*

The following investigations were carried out, with an emphasis on the application of statistics to biological problems.

(a) Biometrical studies on levo- and dextro-rotatory situations in plants. Data on additional species of plants were collected from various geographical regions to study the possible association between asymmetry and latitude.

(b) The study on Fibonacci numbers and their application to biological structures was extended to more plants and animals.

(c) The study on the morphology, anatomy, floral biology and process of germination of common palms was continued.

(d) The reproductive behaviour of the Baya weaver bird and the ecology, of the coconut robber crab were studied.

(vi) *Embryology*

(a) Synthesis of RNA.

(b) Role of a particular lectin on the inhibition of DNA synthesis with its particular site of action.

(c) Electrotaxis in the brittle star (a marine invertebrate)—its role on the central nervous system.

A research expedition was conducted in the Andaman Islands to study ecological science and electrotaxis in the brittle star.

(vii) *Entomology*

(a) Swarming of mosquitoes.

(b) Skeleto-muscular mechanism of the functioning of the head capsule in a mosquito larva.

(c) Ecology of Calcutta insects.

(viii) *Leaf Protein*

(a) Optimal conditions, like fertilizer dose, seed rate and harvesting time for the maximum yield of leaf protein, were established with the help of data collected during three years and statis-

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tically-designed experiments in the following crops: mustard, turnip, tetrakalai, luerne, bajra, hybrid nasipier and ragi.

(b) Investigations on possible and proper utilization of water weeds continues with a detailed study on *Eichhornia crassipes*, *Ipomea reptans*, *Cassia sophora* and *Polygonium hydropiper*.

(c) Preliminary work was done on the acceptability of leaf protein for human consumption in collaboration with the Viharial College of Home and Social Sciences, Calcutta.

E. SOCIAL SCIENCES

(i) Demography

- (a) Calcutta Fertility Survey
- (b) Trends and differentials of fertility in Calcutta
- (c) Mathematical analysis of female fertility in Calcutta
- (d) Validity of response in fertility enquiries
- (e) Evaluation of demographic survey data for family welfare programmes
- (f) Problems encountered in demographic data collection and analysis
- (g) Internal migration data in India.

(ii) *Economic Research*: The Economic Research Unit (E.R.U.) is mainly concerned with the studies on various problems of economics, econometrics, teaching and holding seminars, discussions and lectures.

During the year, the E.R.U. organised teaching courses in economics and econometrics for B. Stat. and M. Stat. students, and also specialisation courses in the Research and Training School and the International Statistical Education Centre with the co-operation of the National Income Research Unit. An advanced course in economics and econometrics leading to the Ph.D. degree of the Institute is also organised by the E.R.U. One student was admitted to the course during the year.

The research work is chiefly concerned with applied economic studies on problems of planning and economic development, besides methodological studies in mathematical economics and econometrics.

A project was undertaken for the analysis of factors responsible for the bottlenecks arising in the industrial system in the eastern region during the years 1971 to 1974. A study on the interdependence of the key sectors—coal, power, steel and transport—in the eastern region was assigned to the E.R.U. by the Planning Commission. Researchers formed into groups for the four industries and visited installations and sites within the region for the purpose. A report outlining the deficiencies in the system leading to the development of the bottlenecks in the critical areas and suggesting possible remedies is now being finalized.

Preliminary steps were completed for undertaking a sample survey of industrial and construction labour (including contract labour) working in the Haldia project. The object of this survey would be to study the socio-economic characteristics of those workers—the terms and conditions of their service, their living conditions, occupational history, and link with native place and agriculture.

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A note prepared on the working of the Calcutta State Transport Corporation, suggested short-term measures for improvement in its performance for submission to the Calcutta State Transport Corporation Enquiry Commission, in 1975.

Seminars by seven visiting scientists were organised during the year. Among other important seminars arranged at the Institute was one on "Indian economy and current stagnation" in which eminent economists from other institutions took part.

(iii) Family Planning

The activities of the Family Planning Research Unit were centred on the following new and continuing projects:

Projects I, II, III and IV: Studies of medical termination of pregnancy in some Calcutta hospitals.

Data were collected from the records of four major Government hospitals in Calcutta during February 1973 and August 1973. The major objectives of the studies which included 1340 cases were to find out (i) The socio-demographic variables, e.g., religion urban/rural residence, socio-economic status, employment, living children, period of pregnancy and age of the aborters, and (ii) The decision-making factor and interest in controlling repeat abortion.

Project V and VI: Interviewing aborters in hospitals

One hundred cases of vacuum aspiration were studied in the Calcutta Medical College Hospital by interviewing women during February and May 1974.

Another 100 cases of aborters (all methods) were studied in the R. G. Kar Medical College Hospital by interviewing women during September to November 1974.

Project VII: A study of knowledge, attitude and behaviour of secondary school teachers in West Bengal regarding population awareness and family planning.

The major objective was to ascertain (i) the role of the teacher as the adviser to students on family size, population awareness etc; (ii) the needs of a school with regard to materials, training of teachers and curriculum revision; and (iii) the knowledge, behaviour and attitude of teachers about fertility control.

Prior to the study, pre-test was conducted in Calcutta high schools during May-July 1974. Two hundred twentyfive teachers returned the self-administered questionnaires. The main study has been continuing.

Project VIII: A socio demographic study of sterilisations performed in a Calcutta hospital.

The objective was to study the socio-economic and demographic background of the surgically sterilised persons in the Ramakrishna Mission Seva Pratishthan, Calcutta.

A total of 773 cases of vasectomy and 1600 cases of ligation were studied.

Project IX: Project World Population Year 1974.

Seven research papers, three information bulletins and charts were prepared during the year.

(iv) *Linguistic Research*

(a) Study on the phonetic structure of Indian languages (Bengali, Hindi, Telegu, Punjabi and Sanskrit) and the application of results in the areas of speech pathology, second language teaching and cultivation of the mother tongue.

(b) Investigation of problems relating to the structure of meaning (ranking speech sound features in the phonetic structure of Indian languages, behaviour of speech sounds in isolated dictionary entry words, and stability of speech sounds).

(c) A statistical approach to linguistic problems (Bengali, Hindi, Telegu and Serbo-Croatian). Phonetic and linguistic data are being used for those studies, including data from schools for hearing-impaired children in India and Yugoslavia.

(v) *National Income Research*: The National Income Research Unit (N.I.R.U.), Calcutta, is concerned with analytical studies on national income and its several distributions. The studies entail, among other things, obtaining estimates that are not available in official statistics, working out interrelations among relevant variables and furnishing thereby explanations of the growth of the Indian economy.

The main items of research work during the period were as follows:

1. Development of a social statistical system for developing countries in general and India in particular.
2. Studies on poverty.
3. Proximate role of quantitative information on economic policy.
4. Analytical work on the state accounts of West Bengal and some States in the eastern region of India, as recommended by the Committee on Regional Accounts.
5. Selected bibliography of unpublished research work on national income and wealth of India.
6. Regional study on differential consumer weights under varying household sizes in Engel curve analyses.
7. Shifts in the trend and structure of the Indian economy in the light of official national income statistics.
8. Use of household budget data from the National Sample Survey, Eighteenth Round, for constructing indices of consumer price differentials between the rural areas of different States in India.
9. Shifting and incidence of indirect taxes through Leontief's input-output table.

The NIRU participated in the teaching programme of the Research and Training School and the International Statistical Education Centre (I.S.E.C.) Calcutta. Subjects taught were economic development, economic statistics, econometrics, and national income. Arrangements were also made for specialisation of ISEC students, and for research work leading to dissertation for students who had already qualified for M. Stat, and studies leading to certain term papers for Ph.D. students. Research supervision continued to be an activity of the Unit.

(vi) *Planning and Regional Survey*

The research work of the Planning and Regional Survey Units, Delhi, covered a number of areas in economics, econometrics and statistics. The topic covered included Indian planning strategy and economic policy; foreign trade policies of India and their impact on economic development; economics of household consumption in India; energy economics; general equilibrium theory, production relations in Indian agriculture, agrarian slavery in Kerala; inequalities in

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distribution; income regional planning including in particular problems of urbanisation and migration; central place hierarchy for the Karnal area of Haryana and a regional study of Goa.

The topics on which research in statistics was conducted have been reported in the section on Mathematics and Statistics.

Project Work:

(a) Work on the project, Contractual Relations in Indian Employment, is being continued by A. Rudra under a grant from the Indian Social Science Research Council (ICSSR). A field survey in certain districts of West Bengal was completed during the year.

(b) The project report on "Central Place Hierarchy for a Developing Region—Karnal Area (Haryana)" is being edited for publications.

(c) A regional study of Goa was taken up with a view to examine the problems of settlement environment relationship in the context of rapid urbanization and industrialisation of Goa. Base maps were prepared and demographic and socio-economic data for all villages and towns were compiled from secondary sources.

(d) Data compilation for a study of the market centres and spatial development in Haryana and a study of the spatial pattern of distribution of towns, regulated markets and sub-yards and the available services and facilities are in progress.

(e) The impact of metropolitan cities on the pattern of development in the surrounding areas is being analysed.

(f) The basic data on inter-census growth and occupational structure of population of nearly 200 urban centres have been mapped and the analysis is in progress.

(g) As a part of the activities of the Commission on Processes and Patterns of Urbanisation in Developing Countries, International Geographical Union (I.G.U.), Dr. L. S. Bhat, in collaboration with Professor C. D. Deshpande, Bombay University, contributed a paper on Urbanisation in India. The paper is based on the questionnaire circulated by the I.G.U. Commission in September 1974.

(h) Compilation of data has been completed in a study on migration using 1961 census data. The analysis and interpretation of data and a review of the relevant studies on migration are in progress.

Teaching and Research Guidance

Teaching for the One-year Evening Course in Statistical Methods and Application was undertaken as in earlier years. Twenty two candidates took the final examination of the 1972-74 session and twelve passed. Five candidates sat for the supplementary examination and all passed. Seven students are appearing for the Part I examination, 1974-75 session.

The teaching in Delhi for the M. Stat. degree of the Institute was revived this year, after a lapse of five years. Four students were admitted. Ten research scholars are working on their doctoral dissertation. Five new scholars were admitted during the year.

Eleven books and documents were translated into English from foreign languages. Eleven seminars by foreign and Indian scientists were organised by the Unit. Eighteen discussion papers were presented by visiting scientists and staff members.

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(vii) *Pre-Census Population Studies*: The Pre-Census Population Studies Unit is carrying on the following projects:

Pre-Census Population Studies: The collection of data from Indian archives and libraries continued and the editing of the all-India volume, *Report on the Population Estimates of India, 1811-1820*, was undertaken. A draft report on the Eastern Region of India relating to the same period was submitted to the Registrar-General, India, in the previous year. The analytical work on time series was also continued. A decennial series of population estimates for each Provincial and Princely States of India as in 1941 was finalised for 1801-1961. A preliminary economic analysis of the pattern of urbanisation in India, 1801-1971, was attempted.

A socio-economic bibliography of India: The purpose of this project is to bring together all materials bearing on socio-economic conditions of India, past and present. Some additions were made in the check list.

Reproduction of records of the Statistical Survey of Bengal, 1807-1814, by Francis Buchanan: It was a multipurpose, comprehensive statistical investigation conducted in six districts of Bengal. The micro-film of the manuscripts was procured from the India Office Library by P. C. Mahalanobis in order to edit and publish them in several volumes. The work on Gorakhpur was continued.

Analysis of the quantitative socio-economic information of the nineteenth century to indicate changes up to date: Work on several village tracts of Uttar Pradesh in Aligarh, Meerut, Dehra Dun and Etwa districts continued on data located at the West Bengal archives for the period 1821-1830. A field investigation was conducted in a village of Aligarh to ascertain the condition in 1974. It is intended to study the changes in several directions between the eighteen twenties and nineteen seventies, touching as many intermediate points of time as possible. The materials available for each village contain information on area, land use, population, labour force, distributive share, prices, wages and tenural condition.

(viii) *Psychometry*

(a) Validity studies of the selection procedure for the Bharat Aluminium Co. Ltd., Hindustan Copper Ltd., Indian Telephone Industries Ltd., and Indian Airlines Corporation.

(b) Construct Validity Study for Non-Language tests of Verbal Intelligence.

(c) Research-cum-service projects were started at the Instrumentation Ltd., Bharat Heavy Electricals Ltd., Mysore Iron and Steel Ltd., Bharat Heavy Plates & Vessels Ltd., and Indo-Burma Petroleum Co. Experimental tests were conducted on the engineers of the Bharat Heavy Electricals Ltd., Hardwar, in order to improve the future selection tests of the organisation.

The Psychometric Research and Service Unit also undertook the teaching of educational statistics and provided guidance for doctoral work.

(ix) *Sociology*

In accordance with its aim of maximisation of the use of accumulated and generating data on social science, the Sociological Research Unit took up a programme of special purpose *Data Centre*, by covering a substantial number of organizations which are working on social change and development in the contemporary situation.

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The following projects may be noted :

1. Transcription of data relating to 80,000 family and non-familial units in India, 1961-62.
2. Second phase of the research scheme on *Content Analysis* (on societal change in India). The first phase of content analysis contained in a technical paper was discussed in the International Social Science Council meeting, "Workshop on Content Analysis in the Social Sciences," Pisa, Italy.
3. Exploratory research on the Study of Pilgrim Centres, Puri (Orissa), Hardwar and Rishikesh (Uttar Pradesh), and Tarakeshwar (West Bengal).
4. Exploratory research on the "Evolution of Nepalese politics since 1960: a study of the growth and development of the Panchayat system of polity."
5. Changes in kinship structure and orientation in India, 1946-47 to 1965-66.
6. A field survey on "working class consciousness" was completed in collaboration with the Faculty of Sociology, University of Bielefeld, Federal Republic of Germany.
7. Study of "Social Space" based on a complete enumeration of a region in Bihar, covering 2,750 villages within the radial distance of 20 miles from Giridih town.
8. Exploratory enquiry into socio-economic structure and change in some villages around Sriniketan, Birbhum, West Bengal.
9. Final report in two volumes on the study of "Variation in family structures in West Bengal, 1946-1966," submitted to the Indian Council of Social Science Research is awaiting publication.
10. Seventy-five new H-400 computer programmes were prepared to facilitate the analysis of kinship structure.
11. A book, "Social Indicators" is in the press.

2.3. *Statistical Quality Control Division (S.Q.C.)*

The Government of India set up a Statistical Quality Control (SQC) unit in 1952 under the technical guidance of the Indian Statistical Institute with the object of (a) promoting the application and development of SQC methods, and (b) undertaking education, training and research in SQC and allied methods.

The unit started with three specialists servicing six factories with an annual grant of Rs. 0.50 lakh. Over the two decades, the unit has grown into an established Division with 12 branches in the country. It has at present 60 specialists servicing 64 factories including some of the key public sector plants like steel, electronics, high pressure boilers, photo films and large-scale public utilities. Four schools in Calcutta, Bombay, Madras and Bangalore are training practitioners in short-term and specialised courses in SQC and allied methods. Over 14,000 managers, technologists, workers and others have been trained so far in the various courses. The Division has serviced over 1,100 factories, turned out about 350 specialists, brought out over 700 popular write-ups, brochures, and published over 250 research papers in the field.

The work of the Division is guided by a Policy Advisory Committee consisting of Shri M.

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S. Pathak (Chairman, Engineers, India) as Chairman, Shri Hiten Bhaya (Chairman, Hindustan Steel Ltd.), Shri V. Krishnamurthy (Chairman and Managing Director, Bharat Heavy Electricals, Ltd.), Dr. C. R. Rao (Secretary-Director, Indian Statistical Institute) and Shri S. M. Sundara Raju, (Chief, SQC Division, IST) as members. The Committee has rendered signal service in promoting the work of the division in select sectors in the public and export-oriented industries.

Service: The highlights of the work during the year were:

- (a) Extension of service to the Hyderabad plant of the Bharat Heavy Electricals Ltd.
- (b) Intensive Project studies in improving yield and quantity, with particular reference to X-Ray films in the Hindustan Photo Films;
- (c) Undertaking exploratory work and basic supervisory training in two of the steel plants in the private sector; and
- (d) Piloting a maiden project work in the coal washeries of Hindustan Steel Ltd.

Sixtyfour plants were regularly serviced and a number of interesting projects, with special reference to design and development of quality systems, were taken up. Two hundred and thirty-eight technical reports were sent to the plants which were serviced.

The special studies undertaken in the Hindustan Photo Films gave valuable clues to cost and waste reduction in X-Ray. A special feature of the work in two of the steel plants, Bhilai and Rourkela, of the Hindustan Steel was in the area of vendor development. As a basic step, training course was organised both within the plants and to select representatives of the vendors. The work done in the area should serve as a model for similar work in a large number of public sector enterprises. The improvement of quality and consistency of supplies with attendant benefits to step up productivity in the plants are the outcome of such exercises. Quality systems design and operation in blast furnace, plate and sheet mills was one of the significant exercises, both in the Rourkela and the Alloy Steel plants.

In response to a request from the Bureau of Direct Taxes, Government of India, a pilot study was undertaken to step up yield and streamline systems and procedures in the recovery of direct taxes in the Department. Proposals were submitted for undertaking detailed project studies.

Education and Training: The Division diversified its education and training programme. Apart from the usual courses in SQC and OR, special training courses were designed and conducted on reliability engineering, management of quality control and orthogonal array techniques. Special courses were conducted on process control techniques in the Hindustan Photo Films. A comprehensive training programme on statistical methods and the design of experiments was conducted in the Hyderabad Unit of the Bharat Heavy Electricals Ltd. and the Hindustan Photo Films at Ootacamund. About 80 persons were covered by these special programmes.

A significant feature of the training was the orientation courses for operatives in local languages—Kanada, Tamil and Telegu—in select industries. Simple techniques dealing with process control and process improvements were presented with the help of gadgets, visual aids and charts. In the photo film factory, about 500 operatives were covered by the four day orientation programmes. In the two other plants, Bharat Heavy Electricals Ltd. and Kirloskar Electric Co., about 150 workers were covered by such programmes.

The tie-up with the Department of Administrative Reforms, Ministry of Home Affairs, Government of India, continued during the year. The Division organised a number of training

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programmes covering SQC and OR topics. About 283 representatives of the various ministries attended.

Altogether 1,677 persons were trained in various in-plant and other courses in the basic techniques of SQC.

One hundred and fourteen persons underwent professional training at post-graduate courses in Calcutta, Bombay and Madras. Sixty persons were covered by the six-month evening certificate course at Bangalore. Executive management training in quality control was another area where about 200 persons were trained by the short-term but intensive programmes arranged in the key public sector enterprises.

Promotion: A special programme was launched during the year to intensify SQC in the public sector enterprises. West Bengal, Tamil Nadu and Maharashtra were chosen for pilot project schemes. Two special promotional brochures dealt with the organisation and development of quality systems and a number of illustrative case studies in a variety of industries were included. Apart from contacts with the departments of industries and the ministers in charge of industries in the State governments, the promotional efforts extended to the constituent plants under the public sector in each State. A two-day special seminar in Hyderabad. (Andhra Pradesh) was attended by the heads of all public sector enterprises and was held under the auspices of the State Directorate of Industries and Commerce. A special seminar on the design of experiments was also arranged in Hyderabad. The Minister of Industries extended whole-hearted support to the organisation and development of quality control in Andhra Pradesh. The Government of Maharashtra and Tamil Nadu also designed some positive steps for the extension of SQC in their States. Vigorous steps are being taken to persuade the West Bengal and the other State governments to have the programmes instituted, to start with, at least in the sick units taken over by the governments. Encouraging response has so far been received.

Another significant feature has been the launching of training and promotion in the area of design of experiments with special reference to orthogonal array techniques. A noted specialist, Dr. G. Taguchi from Japan, gave a few seminars in New Delhi, Calcutta and Hyderabad during December 1974-January 1975 which were attended by a large number of managers and engineers. Special literature is being developed as a follow-up effort. Specially-designed experiments were taken up in the Hyderabad unit of the Bharat Heavy Electricals Ltd., Mysore Electrical Industries and Hindustan Photo Films. Successful trials have opened up a wide scope for promoting the application to a large number of other types of industries in the country.

Introductory visits were paid to 74 plants. Twenty-three pilot studies were completed and 33 promotional reports were sent to various organisations. The staff members participated in 12 seminars and gave 78 lectures, talks etc. on a number of forums.

Research: Eleven papers were published in journals, three papers presented at conferences and accepted for publication. Thirty-seven manuals and technical reports were prepared by the SQC units and project centres during the year.

Other Activities: A special training programme was arranged for the staff of the Division at Calcutta. For the benefit of select representatives from key public sector and some of the other industries in Delhi, a six-day intensive course, on orthogonal array techniques attended by 17 participants, was arranged from 23 to 29 December 1974. Dr. G. Taguchi from Japan was the course director.

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Mr. Ikuo Baba, Visiting Expert in Quality Systems from Japan, visited the Institute from 3 March 1975 under the Colombo Plan scheme to follow up the work of Dr. G. Taguchi and to assist the various SQC units in the design and development of quality systems. Mr. Baba was assigned special projects in Bharat Heavy Electricals Ltd., Bhopal, and the Alloy Steel Plant, Durgapur.

Special surveys are being started in some select industry sectors to assess the current status of quality and to launch measures to popularise modern quality systems.

2.4. Library and Information Services

The Central Library at Baranagore had a collection of 1,32,068 books and bound journals during the previous year. With the addition of 1,111 books during the year, the collection rose to 1,33,179 books and bound journals, 33,226 reprints, monographs, specialised technical reports, besides a large collection of maps, microfilms, microfiches, and photoprints. The services of branch libraries at Bombay, Delhi and Giridih, were co-ordinated with those of the Central Library to serve the researchers, students, and staff of the Institute.

Membership: The total membership of the library during the year was 2,630; the break-up of which is as follows: General members including staff, research scholars, ISI students, guests and NSSO staff—1,990; outside student members—340, sessional members—250, Institutional members—50. Two hundred sixty non-members were given special permission to use the library during the period.

Acquisition: During the year, the library received 2,664 current periodicals, of which 909 periodicals were received through subscription, 1,038 on exchange, and 717 on a complimentary basis.

Seventy-nine new periodicals were added to the existing stock, of which 69 were received on subscription, five against exchange and five on a complimentary basis.

The library continued its exchange arrangements with 164 foreign and 65 Indian Institutions and received periodicals and other serials from them in exchange of *Sankhyā* and other publications.

Technical Processing: The Technical Unit classified 172 and catalogued 280 books. The total number of cards filed was 877, and 89 additional copies of publications were added to the collection.

The Central Records Unit processed and indexed 1,765 old files, 4,346 maps and 1,492 newspapers.

Circulation: 47,323 publications were loaned to the readers; the break-up is as follows: books—9,565, reference publications—20,749 and journals—17,009.

One hundred and twentyeight newspapers, 87 maps, and 62 old files were issued for reference.

The library made inter-library loan transactions with 22 local and outstation libraries; it borrowed 31 publications from outside and lent 15 publications to other libraries.

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Reference and Bibliographical Services: The Information Research and Service Wing of the library compiled and prepared the following bibliographies:

1. Artificial Rain-making.
2. Two hundred main entries of bibliography of scientific publications of the ISI.

The following technical projects are in progress: 1. Revision and up-dating of the Union List of Periodicals, Calcutta Region; and 2. Preparation of a guide to official publications.

Translation: In accordance with an agreement made between the Indian Statistical Institute and Messrs. Computronics India, five computer manuals were translated.

Eleven documents were translated from foreign languages: 7 German, 1 Russian, 3 French, and one from English to French.

General and Scientific Photography: The following is the break up of the work done during the period: Photographs taken: black and white—1,924; Colour photographs—384; Bromide enlargements—4,195; Slides—465; Microfilming—1,197; Photoprints—2,367; Photostat—49; Colour reproduction—104; Black and white reproduction—785; and processing of films—10.

Reprographic Service: Microfiche negatives of rare books and other scientific publications numbering 1,007 pages were prepared.

Circulating Library: The Workers Circulating Library had a collection of 26,138 books in the previous year. During the period, it added 288 books—37 in English and 251 in Bengali. The total collection rose to 26,426 and total membership was 2,022. The total number of issue and return figures during the period was 44,523, as against 43,532 last year.

2.5. Documentation Research and Training Centre (D.R.T.C.), Bangalore

Training: The nine candidates admitted for training in Documentation and Information Science for 1973-74 completed their formal training. They are working on the Trend Report to qualify for the Associateship in Documentation and Information Science.

Ten candidates were admitted to the Documentation Course (1974-75) which commenced on 1 August 1974.

Research: The main subjects of research were: (1) Classification, (2) Indexing, (3) Planning and Information System, (4) Bibliometry, and (5) Information System.

Seminars: The following seminars were organised by the Documentation Research and Training Centre:

1. Seminar on Data Structures and their Applications in Information Storage and Retrieval, 9 November 1974.
2. Seminar on Some Aspects of Colon classification, 10 November 1974.
3. Seminar on Information for Business and Industry, jointly sponsored with the Indian National Scientific Documentation Centre, New Delhi, 2-7 December 1974. About 75 persons, participated from the information field, research laboratories, industry and business houses from all over India.
4. D.R.T.C. Twelfth Annual Seminar, 3-7 March 1975. The theme was Subject Indexing Systems. About 70 delegates participated.

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Publications: The D.R.T.C. continued to collaborate with the Sarda Ranganathan Endowment for Library Science in the publication of the quarterly, "Library Science with a Slant to Documentation." The D.R.T.C. brought out the following:

1. Seminar on Information Service for Business and Industry. Printed papers. pp. 322.
2. D.R.T.C. Annual Seminar (12) on Subject Indexing Systems. Mimeographed papers. pp. 230.

Papers contributed: During the period, the staff of the D.R.T.C. contributed 15 papers, some of which were read at conferences.

Lectures: Seven visiting scientists gave lectures. The D.R.T.C. staff gave seven talks under the auspices of outside organisations. Eighteen colloquia were organised.

Consultancy Service: The D.R.T.C. provided consultancy service to the Aeronautical Systems Analysis Group, Bangalore; Food Science and Technology Information Service of the Central Food Technological Research Institute, Mysore, and a number of other organisations.

Library: During the period, the library received 222 books, 5 new periodicals and 34 reports.

Joint Projects: At the request of the Department of Science and Technology, Government of India, the D.R.T.C. and the Indian National Scientific Documentation Centre jointly organised short-term intensive courses in documentation and information systems and services, which started on 12 March 1975.

The Department of Science and Technology, Government of India, in its programme for developing a national information system for science and technology have recognised data centres and services as an integral part of the system. The D.R.T.C. and the INSDOC have jointly taken up a survey work in this connection.

International Collaboration: The D.R.T.C. has been actively participating in the following projects of the United Nations Educational, Social and Cultural Organisation (U.N.E.S.C.O.).

1. Preparation of a UNISIST handbook for Scientific and Technical Information and Documentation Services.
2. Project on the comparability of higher education studies and degrees in information science.
3. Draft outline of the UNISIST guideline for the organisation of training courses, seminars etc. in library and information science and education, was reviewed by Professor A. Neelamegham. He also reviewed the UNISIST guideline for the titling of articles.

3. INTERNATIONAL STATISTICAL EDUCATION CENTRE (ISEC), CALCUTTA

The International Statistical Education Centre (ISEC) is operated jointly by the International Statistical Institute and the Indian Statistical Institute, under the auspices of the UNESCO and the Government of India. During the year, the Centre functioned under a Board of Directors consisting of *Chairman:* C. R. Rao, *Members:* P. J. Bjerre, G. Goudswaard, E. Lueneberg (ex-officio members representing the International Statistical Institute), B. D. Pandey (Cabinet

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Secretary, representing the Government of India), D. B. Lahiri, and T. J. Rao, *Member-Secretary* (representing Indian Statistical Institute). E. M. Paul took over as member-secretary in place of T. J. Rao from October 1974.

During the year, there were 22 trainees in the ten-month regular course and one in the special course of the twenty-eighth term of the centre. The trainees came from 15 countries in South and South-East Asia, the Far East, the Middle East and also from the Commonwealth countries of Africa.

The Government of India awarded 21 fellowships to the foreign trainees, 16 under the Technical Co-operation Scheme of the Colombo Plan and 5 under the Special Commonwealth African Assistance Plan (SCAAP). There were two other trainees from Hong Kong outside the Colombo Plan and SCAAP in the regular course of the twenty-eighth term.

The regular course of the twenty-eighth term opened on 1 June 1974. During the first four months, the trainees stayed at Calcutta and studied Statistical Methods, along with Auxiliary Mathematics, Numerical Mathematics, Probability Theory, Sampling Techniques, Economics, Economic Planning and Economic Statistics. During October-November 1974 they underwent six-week's training at the Central Statistical Organisation, New Delhi, on methods and problems of compiling official statistical data. Another series of courses were held at Calcutta, during November 1974—January 1975, covering Probability Theory, Sampling Techniques, Sampling distributions and Statistical Inference, Analysis of Variance and Design of Experiments, Demography, Economic Statistics and Economic Planning. During February-March 1975, the trainees had specialized training on an individual basis in selected fields like Data Processing, Demography, Large-scale Sample Surveys, and Economic Planning.

The trainee in the Special Course studied Advanced Computer Techniques and Planning of Educational Surveys.

Periodical and final examinations were held on various topics in the regular course. Certificates of Merit were awarded to 20 trainees and Certificates of Attendance to the two remaining trainees. A certificate of completion was awarded to the trainee in the Special Course.

4. CONVOCATIONS

4.1. *Ninth Convocation: Indian Statistical Institute*

The Ninth Convocation of the Indian Statistical Institute was held on 20 December 1974. Shri P. N. Haksar, Chairman of the Institute, presided. Professor Jerzy Neyman, University of California, Berkeley, U.S.A. delivered the Convocation address, "Problems of young people preparing for research work in Statistics." Professor M. Mukherjee, Director, Research and Training School, presented the annual review on research and training. Dr. C. R. Rao, F.R.S., Secretary-Director of the Institute, made the concluding remarks. The total number of candidates who received degrees, diplomas and certificates was 231. Six candidates were awarded the Ph.D. degree, 35 the M. Stat. degree by examination, two the M. Stat. degree by thesis and 18 the B. Stat. degree. Thirty-two candidates were awarded diplomas in Statistical Quality Control and Operations Research.

In the professional examinations, 11 candidates were awarded the Statistician's Diploma, six the Computer Certificate, and one the Statistical Field Survey (Senior) Certificate. Three candidates were awarded the Associateship in Documentation, Bangalore.

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In the other courses, the total number of candidates awarded certificates, etc. are shown in brackets:

- (i) Statistical Methods and Applications (31); (ii) Statistical Quality Control, Bangalore (55); (iii) Intensive Course on Programming and Applications of Electronic Computers (22); (iv) Operation of Punched Card Machines (9).

4.2. Special Convocation: Indian Statistical Institute:

A Special Convocation was held by the Indian Statistical Institute on 18 December 1974 to confer the degree of Doctor of Science (honoris causa) on Professor Raj Chandra Bose, University of Colorado, U.S.A.; Academician M. V. Keldysh, President, USSR Academy of Sciences; and Professor Jerzy Neyman, University of California, U.S.A.

Shri Siddhartha Shankar Ray, Chief Minister, West Bengal, presided over the function. The guests were welcomed by Shri P. N. Haksar, Chairman, Indian Statistical Institute. The recipients of the degrees, Professor R. C. Bose and Professor J. Neyman, made short speeches of acceptance. Academician M. V. Keldysh could not attend and the degree was awarded to him in absentia. Dr. C. R. Rao, Secretary-Director, Indian Statistical Institute, gave the vote of thanks.

4.3. Convocation: International Statistical Education Centre, Calcutta:

The International Statistical Education Centre (ISEC), Calcutta, held its annual convocation on 21 March 1975. Certificates were awarded to 23 trainees from 15 countries who successfully completed the twenty eighth term of the ISEC (June 1974—March 1975).

Shri S. C. Roy, Vice-President, Indian Statistical Institute, presided. Professor M. Mukherjee, Director, Research and Training School, welcomed the guests. Concluding remarks were made by Dr. C. R. Rao, F.R.S., Chairman, Board of Directors, I.S.E.C.

5. CONFERENCES, SYMPOSIA AND SEMINARS ORGANISED BY THE INSTITUTE

5.1 *International Symposium on Recent Trends of Research in Statistics: Calcutta, 16-27 December 1974.* The Symposium dedicated to the memory of the late Professor Prasanta Chandra Mahalanobis, the founder of the Indian Statistical Institute, was organised by the Institute jointly with the International Association for Statistics in Physical Sciences and the International Association of Survey Statisticians. Over two hundred delegates from 17 countries and India including statisticians, mathematicians, economists, and sociologists attended. A large number of the Institute's technical personnel participated actively in the deliberations.

Shri P. N. Haksar, Chairman of the Institute, inaugurated the symposium on 16 December 1974. Dr. C. R. Rao, Secretary-Director of the Institute, welcomed the guests. Professor J. Neyman, Department of Statistics, University of California and Professor R. C. Bose, Department of Mathematics, Colorado State University, USA, also spoke on the occasion. Professor J. Roy, Programme Director of the Symposium, gave the vote of thanks.

Over 200 papers on mathematical statistics, econometrics and planning, biometry, probability, combinatorics and applications of statistics to various sciences were presented in the different sessions. Special sessions were held in honour of the late National Professor S. N. Bose and the

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late Academician Yu. V. Linnik of the USSR, who were closely associated with the Institute for a long time.

5.2 *Seminar on Personnel Selection and Appraisal Systems:* New Delhi, 20-21 September 1974. The Seminar, organised by the Indian Statistical Institute at the Indian Social Institute, New Delhi, was inaugurated by Shri V. G. Rajadhyakya, Chief Consultant, Planning Commission.

Shri P. N. Haksar, Chairman of the I.S.I., welcomed the representatives who attended from various public and private sector organisations and also from Institutes and universities in India. Dr. C. R. Rao, Secretary-Director, I.S.I., gave the vote of thanks.

The seminar was divided into four technical sessions: (i) Objective systems and procedure of selection, placement and promotion; (ii) Role of objective methods in promoting industrial relations; (iii) Education of management and workers for appreciation of objective techniques of selection, placement and promotion, and (iv) Research in personnel appraisal systems.

After discussions in the plenary session, a resolution recommended the wide use of the objective type of tests in selection, placement and promotion in both private and public sector organisations and the removal of any constraints which may hamper the expansion and development of the Psychometric Research and Service Unit (PRSU) of the Indian Statistical Institute. It recommended the assumption of autonomy for the P.R.S.U., so that it could meet the demand for its assistance from public and private sector organisations.

5.3. *Third Data Base Seminar on Population Statistics:* New Delhi, 28-31 December 1974. The seminar was organised jointly by the Indian Econometric Society, Indian Association for the Study of Population and the Indian Statistical Institute. Some members of the Institute staff presented papers.

5.4. *Fourteenth Indian Econometric Conference:* New Delhi, 1-4 January 1975. The Indian Statistical Institute acted as the host and some staff members presented papers.

5.5. *National Seminar on Social Statistics:* New Delhi, 17-22 March 1975. The seminar was co-sponsored by the Central Statistical Organisation, Government of India and the Indian Statistical Institute. Some members of the Institute staff participated in the discussions.

6. PROFESSIONAL EXAMINATIONS

Only two open examinations were held twice during 1974: (i) Statistician's Diploma, and (ii) Computer's Certificate. Due to poor response from candidates, examinations for the Statistical Field Survey and Punched Card Machines were not held.

Seven centres all over India were pressed into service for the professional examinations during 1974. A general decline was noted in the number of students for the Statistician's Diploma examination but there was some improvement in the number appearing for the Computer's Certificate Examinations. Candidates for the Computer's Certificate were mostly from the Calcutta Centre.

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The details of candidates who registered, appeared and passed in one or more papers of the professional examinations during 1974 are given below:

(i) *Statistician's Diploma Examination*: During 1974, 131 candidates registered (73 in May; 58 in November) for the examination. Twentyfour candidates (14 in May; 10 in November) failed to appear in any of the papers. Of those who finally appeared, 47 candidates (25 in May; 22 in November) were declared successful, having passed in one or more papers.

(ii) *Computer's Certificate Examination*: In 1974, 52 candidates registered (28 in May; 24 in November) for the examination. Only two candidates (2 in May; nil in November) failed to appear in any of the papers. Of those who finally appeared, 33 candidates in all (17 in May; 16 in November) qualified in one or more papers.

(iii) *Statistical Field Survey Examination* and (iv) *Punched Card Machine Examination*: No examinations were held due to insufficient number of candidates.

5. *Number of successful candidates qualifying for the award of Diplomas and Certificates in Open Examinations*: The number of candidates who completed successfully the entire professional examinations and qualified for the award of Diplomas and Certificates during 1974 is given below:

Statistician's Diploma: Seven candidates (3 in May; 4 in November).

Computer's Certificate: Six candidates (3 in May; 3 in November).

A proposal to carefully review and recast, if necessary, the entire syllabi of the professional examinations was mooted during the year. The objective has been to make the syllabus more up to date and capable of catering to the growing needs of the professional examinees. A preliminary committee has been set up for the review and notable changes are expected to follow.

7. VISITING SCIENTISTS

A number of distinguished foreign scientists participated in the research, training and other scientific activities of the Institute during the year. Some of them came on invitation and spent fairly long periods at the Institute to assist in regular work, while others came for short periods and gave lectures and seminars. Most of them were available for consultations by research workers and teachers of the Institute.

1. The following scientists worked at the Institute for fairly long periods during the year 1974-75. The duration of the visit is mentioned within brackets against each name.

DR. MALKHAZ G. ABDUSHELISHVILI, Director, Department of Archaeology and Ethnography, Academy of Sciences, Georgian SSR, and Professor, Tbilisi State University, came with a team of four Soviet scientific workers from the USSR Academy of Sciences, on a joint anthropological research project (14 November 1974-11 February 1975). The other members of the team were:

(i) PROFESSOR S. ARUTINOV D. SERGEEV, Deputy Director, South-Asia Programme, Institute of Ethnography,

(ii) DR. (MRS.) IRINA MIKHAILOVNA SEMASHKO, Institute of Ethnography,

(iii) DR. V. A. ALEXEEV, Physical Anthropologist, Institute of Ethnography, and

(iv) DR. O. ISMAGULOV, Institute of History, Academy of Sciences, Kazakhstan SSR, Alma Ata.

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The Soviet anthropologists, in collaboration with the workers of the Anthropometry and Human Genetics Unit, conducted anthropological field work in Maharashtra. The team collected anthropometric, somatoscopic, dermatoglyphic and other data on ten endogamous castes and tribes. The team studied the Santhals of Hooghly district and also examined pre-historic skeletal materials housed at the Deccan College, Poona, for new features.

MR. IKUO BABA, Visiting Expert in Quality Systems from Japan, came to the Institute (3 March 1975-1 June 1975) to assist the SQC Units of the Institute in the design and development of quality systems. He took up special projects in the Bharat Heavy Electricals Ltd. and Alloy Steel Plant, Durgapur.

DR. CHRISTOPHER BLISS, Essex University, England, worked at the Planning and Regional Survey Unit, New Delhi, on a study of agro-economic conditions in Palampur village, Uttar Pradesh (October 1974-April 1975). Seminars: (i) A proposed study of high-yielding varieties, (ii) Perfect and imperfect capital markets, and (iii) Cost benefit analysis.

DR. R. P. GUPTA, Ohio State University, U.S.A., worked at the Planning and Regional Survey Unit, New Delhi, on the theory of graphs (15 December 1974-15 August 1975).

DR. C. G. KHATRI, Gujarat University, Ahmedabad, worked at the Planning and Regional Survey Unit, New Delhi, on characterisation problems, matrix algebra, and MINQUE theory (September 1974-March 1975).

PROFESSOR JANOS KORNAI, Institute of Economics, Hungarian Academy of Sciences, Budapest (14 January 1975-11 March 1975) accompanied by Mrs. Kornai visited India for a programme of lectures and seminars, under a grant from the Indian Council for Social Science Research. Their programme in India was arranged by the Planning and Regional Survey Unit, New Delhi.

Professor Kornai held a series of four regional seminars, one each at Calcutta, Trivandrum, Bombay and Delhi, which were attended by younger economists in the universities and governments in the surrounding region. He gave lectures at the Madras Institute of Development Studies, Indian Institute of Public Administration, Delhi, Indian Institute of Management, Calcutta, and the Department of Economics, Punjab University, Chandigarh. He addressed three seminars jointly organised by the Planning and Regional Survey Unit and the Delhi School of Economics. Mrs. Kornai also participated in the regional seminars. Professor Kornai and Mrs. Kornai participated in discussions with Professor S. Chakravorty, Member, Planning Commission, and the staff of the Perspective Planning Division, Planning Commission. The topics covered by the lectures, seminars and discussions included: (i) Autonomous control of economic systems; (ii) Anti-equilibrium (iii) Mathematical Planning in Hungary; (iv) Hungarian economic reforms; (v) Planning techniques with special reference to Hungary; (vi) Multi-level planning; and (vii) Directions of future research in economics. In Calcutta, he gave lectures on: (i) Economic reform in Hungary; (ii) Mathematical planning in a socialist country; (iii) The Hungarian multi-level planning mode, and (iv) Anti-equilibrium.

PROFESSOR DJORDJE KOSTIC, Director, Institute for Experimental Phonetics and Speech Pathology, Belgrade, Yugoslavia (7 September 1974-25 March 1975) came on his seventh visit to the Institute in connection with the programme of fundamental linguistic research being conducted in collaboration between the Indian Statistical Institute and the Institute for Experimental Phonetics and Speech Pathology, Yugoslavia. His visit was arranged during the year under the Fourth Indo-Yugoslav Cultural Exchange Programme.

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While in India, Professor Kostic participated in the International Symposium on Recent Trends in Statistical Research, Calcutta (16-28 December 1974). He also visited New Delhi, Hyderabad and Agartala in connexion with his research work in India. He conducted a eight-day seminar at the Institute for Speech Rehabilitation, Agartala, Tripura, and delivered lectures in Calcutta, New Delhi and Hyderabad.

In collaboration with Indian and foreign scientists, he wrote the following books:

- (i) A Short Outline of Hindi Phonetics, pp. 196.
- (ii) Bengali Speech for Hearing-impaired Children (in press).
- (iii) A Short Outline of Telegu Phonetics (in preparation for press)

His research work at the Indian Statistical Institute included (a) A project on the statistical processing of data on linguistics and data from schools for hearing-impaired children in Yugoslavia; and (b) Study of information patterns and syllable stress in Bengali. A project on research in speech pathology was being conducted by him in collaboration with the Department of Linguistics, Osmania University, Hyderabad. Plans were made to carry out research in linguistics with special emphasis on the Hindi language in collaboration with the Central Hindi Institute, New Delhi.

Lectures: Linguistics Session, International Symposium on Recent Trends in Statistical Research (Calcutta), (ii) Modern methods of speech habilitation of hearing-impaired children (Delhi), (iii) Speech habilitation of hearing-impaired children, with special emphasis on the pre-school age child (Hyderabad); and (iv) Second language learning (Delhi).

PROFESSOR NORMAN WINGATE PIRIE, F.R.S., Head, Biochemistry Department, Rothamsted Experimental Station, Harpenden, Herts, United Kingdom (31 December 1974-6 January 1975) came on his fourth visit in connexion with research in producing protein from green leaves to supplement food requirements in India.

DR. ALGIS PRAZAUŠKAS, Research Associate, Department of India, Sri Lanka and Nepal, Institute of Oriental Studies, USSR Academy of Sciences, arrived on 25 March 1975, in connexion with the collaboration project between the USSR Academy of Sciences, Indian Statistical Institute and the Statistical Publishing Society, on the publication of books.

DR. PODURI S. R. S. RAO, Rochester University, Rochester, New York, U.S.A., who is working on sampling and MINQUE theories joined the Planning and Regional Survey Unit, New Delhi, on 17 July 1974.

MR. MICHAEL SHEPHERD, School of Library and Information Science, University of Western Ontario, Canada, visited the Documentation Research and Training Centre, Bangalore (1 October 1974-31 December 1974) to work on a project entitled, "Data structures: Computer-generation of a Thesaurus from a scheme for classification."

DR. R. S. SINGH, Michigan State University, East Lansing, Michigan, U.S.A., joined the Planning and Regional Survey Unit, New Delhi, on 14 October 1974, to work on some estimation problems.

DR. NICHOLAS STERN, St. Catherine's College, Oxford University, England, worked at the Planning and Regional Survey Unit, New Delhi, on a study of agro-economic conditions in Palampur village, Uttar Pradesh (December 1974-April 1975). *Lectures:* Cost benefit analysis.

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DR. (MRS.) ELAINE SVENONTUS, Assistant Dean, School of Library and Information Science, University of Western Ontario, Canada, visited the Documentation Research and Training Centre, Bangalore (14 January 1975-30 April 1975) to participate in its teaching and research programmes.

DR. LEONID YAROVIEVICH TCHERKASSKI, Chief Department of Scientific Publications, Institute of Oriental Studies, USSR Academy of Sciences, Moscow. (19 February 1975-4 April 1975), came in connexion with the collaboration project between the USSR Academy of Sciences, Indian Statistical Institute and the Statistical Publishing Society on the publication of books.

II. *The following are some of the scientists who paid short visits and gave lectures and/or seminars and participated in conferences.*

PROFESSOR P. ALLEN, F.R.S., Department of Geology, University of Reading, U.K. (11 April 1974). *Lecture: Torridonian (late Pre-Cambrian) of Northwestern Britain and continental drift.*

DR. (MRS.) HELOA BUNKE, Head, Central Institute for Mathematics and Mechanics, Academy of Sciences, German Democratic Republic; delegate to sixty-second session, Indian Science Congress, Delhi (16 January 1975). *Lecture: Structural inference in Statistics.*

DR. K. M. CELLIER, Principal Research Scientist, Commonwealth Scientific and Industrial Research Organisation, Australia: (5-8 September 1974). *Lecture: The C.S.I.R.O. and its activities with special reference to statistics.*

DR. R. CHAKRABORTY, University of Texas, U.S.A. (30 December 1974). *Lecture: Gene differentiation with reference to human populations.*

PROFESSOR M. N. DAS, Indian Agricultural Research Statistics, New Delhi (13 June 1974). *Seminar: Varying probability sampling with selection probabilities exactly proportional to size.*

DR. JACK B. FISHER, Fairchild Tropical Garden Research Centre, Miami, Florida, U.S.A. (21 August 1974). *Lecture: Variety of branching in the palms.*

PROFESSOR ERIC DE GROLLIER, Secretary-General, Institut National des Techniques de la Documentation, Paris (17 January 1975). *Lecture: Global information networks (DRTC, Bangalore).*

DR. MARK KANTAR, Sir George William University, Montreal, Canada (7-13 February 1975). *Lecture: Probability inequalities of convex sets.*

PROFESSOR A. J. KOSTEMANS, Director, Botanical Gardens, Bogor, Indonesia (31 June 1974-7 July 1974) came in connexion with research work being conducted in the Crop Science Unit. *Lecture: A botanical expedition to New Guinea.*

PROFESSOR F. W. LANCASTER, Department of Library Science, Urbana-Champaign, Illinois (16 January 1975). *Lecture: NSF project on evaluation of impact of information on natural growth. (DRTC, Bangalore).*

DR. HENNING LAEUTER, Chief of Scientific Working Team, CIMM, Berlin, German Democratic Republic; delegate to sixty-second session, Indian Science Congress, Delhi. *Lecture: Minimal solutions for estimation procedures in linear models under restrictions (16 January 1975).*

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DR. M. F. LYNCH, Post-graduate School of Librarianship and Information Science, University of Sheffield, U.K. (15-17 and 25-27 March 1975) *Lecture: (i) Computer-based information retrieval systems, and (ii) Chemical structures and chemical notation.*

DR. MACINTOSH, Massachusetts Institute of Technology, U.S.A. (20 February 1975) *Lecture: Data-base management.*

MARGARET F. MACKELLER, Director of Library Services, US Information Service, India (23 September 1974). *Lecture: Trend of librarianship in India (DRTC, Bangalore).*

PROFESSOR G. MARTIN, Grenoble University, France (29 September 1974). *Lecture: The conceptual basis of social indicators.*

DR. G. J. MITCHESON, M.R.C. Laboratory of Molecular Biology, University of Cambridge, U.K. (29 February 1975). *Lecture: The spatial control of differentiation in the blue-green alga Anabaena.*

SHRI ASOK MITRA, Secretary to President of India; President, Indian Association for Study of Population (14 August 1974). *Seminar: Population in India's development.*

SHRI S. G. MOHANTY, McMaster University, Hamilton, Canada (2 September 1974-22 March 1975). *Lecture: Recent developments of some combinatorial aspects of probability and statistics.*

PROFESSOR H. MORIMOTO, Osaka City University, Japan (11 January 1975-22 March 1975). *Lecture: Adequate fields.*

DR. R. N. NAG, Honorary Visiting Obstetrician and Gynaecologist, Ramakrishna Mission Seva Pratishan Hospital, Calcutta (14 December 1974). *Seminar: Observation on first-birth pattern in West Bengal with special reference to teen-aged mothers.*

DR. K. G. MURTHY, University of Michigan, U.S.A. (12 February-3 March 1975). *Lecture: (i) How good is the simplex algorithm? (ii) Path problems in converse and abstract polytopes. (iii) Recent developments in combinatorial optimisation, and (iv) Complementarity and fixed point computing algorithms.*

DR. D. C. RAO, Population Genetics Laboratory, University of Hawaii, Mahoa. (6-7 August 1974). *Lectures: (a) Familial correlation through path diagrams, (b) Path analysis of familial correlations.*

PROFESSOR GEORG RASCH, Department of Education, University of Western Australia; also University of Copenhagen, Denmark (30 November 1974-27 December 1974). *Lecture: A joint study in growth of individual animals and wages in separate industries.*

DR. PAUL REVESZ, Institute of Mathematics, Hungarian Academy of Sciences, Budapest, Hungary (6-9 December 1974). *Lecture: Invariance principles.*

MR MALCOLM RUGBY, Environmental Data Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Washington (17 January 1975). *Lecture: Use of U.D.C. in computer-based information system (DRTC, Bangalore).*

DR. R. RUSHTON, Associate Professor of Geography, University of Iowa, U.S.A. (28-29 March 1975). *Lectures: Development of computer algorithms for locating central facilities.*

MR. M. SIBUYA, International Business Machines World Trade Corporation, Japan (7 January 1975). *Lecture: Computers in flow simulation.*

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DR. RANJAN K. SOM, Technical Adviser, Family Planning Population Division, United Nations, New York (12 September 1974). *Lecture: Survey data needed for studying the inter-relatives of population dynamics and economic and social factors.*

DR. CAROLYN WATTERS, University of Western Ontario, Canada (1 October 1974-31 December 1974). *Lecture: Information processing (DRTC, Bangalore).*

III. *The following are some of the distinguished visitors who visited the Institute for short periods on different assignments.*

DR. MARIA AUGUSTINOVICZ, Head, National Planning Office, Budapest, Hungary (17-20 January 1975)

PROFESSOR A. V. BACHURIN, Vice-Chairman, GosPLAN, USSR (4 March 1975).

PROFESSOR S. A. BARNETT, Department of Zoology, Australian National University, Canberra, Australia (19 December 1974).

MR. M. BELTIC, Yugoslav Consul-General, Calcutta (18 February 1975).

DR. MAX BLAKE, John Curtin School of Medical Research, Australian National University, Canberra, Australia (10-13 December 1974), worked in the Human Genetics Laboratory on problems of biochemical polymorphism.

DR. R. C. BOSE, Department of Mathematics, Colorado State University, U.S.A. (16-17 December 1974).

PROFESSOR M. A. CHAUDHURI, Chairman, University Grants Commission, Bangladesh (12 November 1974).

PROFESSOR KARL A. FOX, Professor Emeritus, Dean of Faculty, Iowa State University U.S.A. (25 November 1974).

MR. E. A. GRIAZNOV, Head of Division, GosPLAN, USSR (4 March 1975).

PROFESSOR M. S. HUQ, Director of Research (Science), University Grants Commission, Bangladesh (12 November 1974).

DR. BERND JAECKEL, South Asian Department, Karl-Marx University, Leipzig, German Democratic Republic (24 February 1975).

PROFESSOR BRUNO KNALL, South Asian Institute, Heidelberg University, Federal Republic of Germany, visited the Planning and Regional Survey Unit, New Delhi, to discuss problems in regional development and National Planning (4-6 November 1974).

DR. E. KNAUTH, Dean, Faculty of Economics; Director, Institute of National Economy, Humboldt University, Berlin, German Democratic Republic (24 February 1975).

DR. G. G. KOTOVSKY, Head of Indian Department, Institute of Oriental Studies, USSR Academy of Sciences (19 February 1975).

DR. M. K. KUDRIAVTSEV, Institute of Ethnography, USSR Academy of Sciences, Leningrad (12 and 13 December 1974).

DR. S. A. KUZMIN, Laboratory of Economic Mathematical Models of Developing Countries, Central Institute of Economics and Mathematics, USSR Academy of Sciences (21-26 March 1975).

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PROFESSOR J. M. LATIFER, Director, Federal Institute for Statistics, Belgrade, Yugoslavia.
(26 February 1975).

PROFESSOR ROBERT R. OSWALD, United Nations Senior Statistical Advisor, U.N. Development Programme, Dacca, Bangladesh (17-19 September 1974).

DR. C. OTTO, Deputy Dean, Faculty of Arts; Director, Institute of Statistics, Humboldt University, Berlin, German Democratic Republic (24 February 1975).

MR. D. PEHC, Minister, Yugoslav Embassy, New Delhi (18 February 1975).

MR. MANFRED PIECHA, Assistant Attache, Consulate-General, Federal Republic of Germany (12 February 1975).

DR. R. RAMANNA, Director, Bhaba Atomic Research Centre, Bombay (24 March 1975).

DR. BRUCE ROTHSCHILD, University of California, Los Angeles, U.S.A. (13-14 September 1974).

MR. R. SAVIC, Yugoslav Embassy, New Delhi (18 February 1975).

PROFESSOR KARL SCHOER, Sociological Institute, Kiel University, Federal Republic of Germany (12 January 1974).

MR. G. K. SHIROKOV, Institute of Oriental Studies, USSR Academy of Sciences (4 March 1975).

PROFESSOR E. S. SSBAYIGGA, Director, East African Statistical Training Centre, Dar-es-Salaam, Tanzania (6 January 1975).

DR. A. VRATUSA, Vice-President, Federal Executive Council, Yugoslavia (18 February 1975).

PROFESSOR S. S. ZARKOVICH, Director, Institute of Statistics, Belgrade, Yugoslavia (26 February 1975).

MR. M. ZEC, Ministry of Foreign Affairs, Yugoslavia (18 February 1975).

8. HONOURS, AWARDS AND SPECIAL ASSIGNMENTS

(i) Honours and Awards

DR. C. R. RAO was elected (i) Fellow, Indian Academy of Sciences; (ii) Honorary Foreign Member, American Academy of Arts and Sciences; and (iii) President, Indian Econometric Society (for the fourth term).

DR. T. A. DAVIS (*Crop Science*) was elected (i) Life Member, American Association for the Advancement of Science, 1975; and (ii) Vice-President, Plantation Crops Society of India, 1974.

DR. B. S. MINHAS (*Planning and Regional Survey*) was elected a Fellow, Econometric Society. He was awarded the Jawaharlal Nehru Fellowship and the Dadabhai Naoroji Prize (Economics) for 1974.

DR. S. K. MITRA (*Planning and Regional Survey*) was elected a Fellow, Institute of Mathematical Statistics, U.S.A.

DR. R. Mukherjee (*Sociology*) became a member of (i) International Sociological Association's Executive Council, Editorial Board and Publication Committee; and (ii) Advisory Board,

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Current Sociology, London. He was also Scientific Adviser, Department of Sociology, Bielefeld University, Federal Republic of Germany, and Chairman, Task Force on Archive Development, International Social Science Council, UNESCO, Paris.

Dr. Supriya Sengupta (*Geology*) was elected to the Council, Geological Mining and Metallurgical Society of India.

(ii) Special Assignments

Dr. L. S. Bhat (*Planning and Regional Survey*) served as a member of the following: (i) Committee, Regional Accounts, Department of Statistics, Government of India; (ii) Commission on Processes and Patterns of Urbanisation in the Developing Countries; and (iii) Board of Examination in Geography, Universities of Mysore and Bombay. Dr. Bhat was one of the participants in the preparation of a status report on geography for the University Grants Commission. He prepared a note on Regional Development and Planning.

Sri D. Bhattacharyya (*Pre-Census Population Studies*) was nominated a member, Indian Historical Records Commission. He was elected Honorary Secretary, Socio-economic Research Institute, Calcutta.

Dr. N. Bhattacharya (*Economic Research*) served as a member, Expert Committee on Consumer Price Index for Working Class in Calcutta, set up by the Government of West Bengal. He became a member, Advisory Committee for Sponsored Research on Poverty and Unemployment, set up by the Indian Council of Social Science Research. He was elected Joint Secretary, Indian Economic Society.

Dr. D. K. Bose (*Economic Research*) continued to serve as a part-time member, State Planning Board, Government of West Bengal.

Shri R. L. Brahmachary (*Embryology*) participated as a teacher in the Summer School organised by the Biochemistry Department, Calcutta University, June 1974.

Shri Prafulla Chakrabarti (*Sociology*) re-joined the Institute in July 1974, after successfully completing the one-year post-graduate diploma course in urban studies at the Centre for Urban Studies, University College London.

Professor A. Neelameghan (*DRTC*) joined the University of Western Ontario, Canada, as a Visiting Professor in the School of Information and Library Science for one year from 1 September 1973. During his visit, he organised the doctoral course and other supporting programmes in library and information science.

Dr. K. S. Parikh (*Planning and Regional Survey*) served on the following committees:

(i) Site Selection Committee, Department of Atomic Energy; (ii) Fuel Policy Committee, Ministry of Mines and Metals; (iii) National Committee on Environmental Planning and Coordination, and (iv) National Committee on Science and Technology.

Dr. J. Roy (*Computer Science*) served as a member, Governing Council, National Sample Survey Organisation.

Dr. T. N. Srinivasan (*Planning and Regional Survey*) was appointed co-editor, *Econometrica* and the *Journal of Development Economics*.

He became a member, Board of Trade, Ministry of Commerce, Government of India.

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9. CONFERENCES, SCIENTIFIC TOURS AND ASSIGNMENTS ABROAD

Dr. C. R. Rao left for the U.S.A. on 28 July, 1974. During 29 July-3 August, he stayed at the University Park and had discussions with the staff of the Statistics Department, Pennsylvania State University.

He attended the International Conference on Characterization of Statistical Distributions at Calgary, Alberta, Canada, 4-10 August. He gave three invited talks:

August 5 (Inaugural address): Characterization of prior distributions and solution to a compound decision problem.

August 7 (Linnik Memorial Lecture): Some problems in the characterization of the multivariate normal distribution.

August 9: Banquet speech

Dr. Rao attended the annual session of the Institute of Mathematical Statistics and also participated, on invitation, in the seminar on Directions of Mathematical Statistics, Edmonton, Alberta, 11-16 August. He gave an invited talk:

August 13: Some problems of sample surveys.

From 17 to 19 August, he was at Winnipeg, Manitoba, on an invitation from the Manitoba University. He gave a talk in the Statistics Department:

August 19: Characterization of probability distributions.

Dr. Rao attended the International Congress of Mathematicians, Vancouver, 20-23 August. He gave an invited talk:

August 22: Functional equations and characterization of probability distributions.

He left for Toronto on 23 August and had discussions with Professor M. S. Srivastava and Professor R. P. Bhargava on some multivariate problems. He left Toronto on 24 August and reached Constanta, Romania, on 25 August.

From 25 August to 1 September, he attended the International Biometric Conference at Constantia. He gave the Presidential address:

August 26: Biometric analysis of growth curves.

He also presided over the session on Applications of Multivariate Methods, 27 August. As President of the Biometric Society, he held a number of meetings with officers of the Society present at the conference.

Dr. Rao visited Belgrade during 1-8 September at the joint invitation of Professor D. Kostic, Director, Institute of Experimental Phonetics and Speech Pathology, Dr. S. Zarkovic, Director, Institute of Statistics and Mr. I. Latific, Director, Federal Institute of Statistics. During his stay in Belgrade, he gave a talk:

September 4: Sample Surveys.

Dr. Rao met Dr. Anton Vratusa, Vice President of Yugoslavia on 4 September and discussed with him about the collaboration between the Indian Statistical Institute and the Institute of Experimental Phonetics and Speech Pathology, Belgrade, in research, and the Institute of Statistics, Belgrade, in the training of statisticians.

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He also met the following and had discussions with them on collaboration in scientific research.

September 3: Mr. Krsto Bulajic, Director-General and Mr. Ljubo Relic, Deputy Director General, Federal Institute for International Scientific, Cultural and Technical Co-operation.

Dr. Pavle Savic, President and Dr. Dusan Kanazir, Vice-President, Serbian Academy of Sciences.

September 5: Senior staff of the Institute of Statistics set up under the Directorship of Dr. S. Zarkovic.

He had a number of discussions with Professor D. Kostic and his colleagues on linguistic and phonetic research in Yugoslavia and India.

Dr. Rao visited Moscow and Leningrad from 8 to 10 September. While in Moscow, he met:

(i) Academician I. M. Vinogradov, Director, Steklov Institute of Mathematics, to discuss about the participation of Soviet probabilists and statisticians in the International Symposium on Recent Trends of Research in Statistics held in memory of Profesor P. C. Mahalanobis in December 1974 at Calcutta.

(ii) Dr. D. V. Bromley, Director, Institute of Ethnography, to discuss about the visit of the Soviet anthropological team and the programme of field work in India.

(iii) Academician A. P. Vinogradov, Vice-President, USSR Academy of Sciences and Dr. S. G. Korneev for a general discussion on the exchange of scientists between the USSR Academy of Sciences and the Indian Statistical Institute.

(iv) Dr. O. K. Dreyer, Director, Oriental Literature Publishing House, Moscow, Dr. Leonid Y. Toberkasski, Head, and Dr. Boris P. Pankratyev, Research Associate, Department of Scientific Publications, Institute of Oriental Studies, USSR Academy of Sciences, to discuss about the collaboration between the USSR Academy of Sciences, Indian Statistical Institute and the Statistical Publishing Society, on the publication of books.

Dr. Rao spent five days in Leningrad and had discussions with Dr. Kagan and his colleagues at the Steklov Institute of Mathematics. He also gave a talk:

September 13: Unified theory of linear estimation, at the University of Leningrad.

He visited the Institute of Ethnography, Leningrad, and had further discussions about joint projects with the ISI. He returned to India on 19 September, 1974.

Dr. Rao visited Jundi Shapur University at Ahwaz, Iran, from 28 to 31 March 1975 on invitation to attend the Sixth National Mathematics Conference. He gave three invited talks:

March 29: Estimation of parameters in linear models.

March 30: Some characterizations of the multivariate normal law.

March 30: Compound decision problems.

After the conference he visited Shiraz, Isfahan and Tehran. In Tehran, he gave two talks on:

April 9: What is statistics?, one at the College of Statistics and Information Sciences and another at the National University. He returned to India on 10 April 1975.

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Dr. A. Basu (*Anthropometry*) visited Moscow and Leningrad under the Indo-Soviet Cultural Exchange Programme (1972-74) during March-May 1974. He gave two seminar talks at the Institute of Ethnography, USSR Academy of Sciences, Moscow, and one seminar talk at the Institute of Ethnography, Leningrad. He also undertook experimental work at the Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow. Dr. A. Basu visited the Department of Human Genetics, University of Newcastle-upon-Tyne, United Kingdom, under the WHO Exchange of Research Workers Grant, during May-August 1974. Experimental work was undertaken by him on human cytogenetics. Seminars were given by him at the Department of Human Genetics of the University, and also at the Department of Anthropology, Durham University. He left India on 19 March 1974 and returned on August 1975.

Shri P. Bandyopadhyay (*Electronics*) visited the International Centre for Theoretical Physics, Trieste, Miramare, Italy, from 15 August to 15 October 1974, on invitation. He also delivered lectures and took part in discussions at the following places during the period: (i) Max-Planck Institute for Physics and Astrophysics, Munich, Federal Republic of Germany. (ii) Department of Applied Mathematics and Theoretical Physics, Cambridge University, England. (iii) Department of Theoretical Physics, Oxford University, England. He left India on 14 August 1974 and returned on 16 October 1974.

Shri Atis Dasgupta (*Sociology*) attended the Workshop on Content Analysis in the Social Sciences, Pisa, Italy, 5-14 September 1974.

Professor T. A. Davis (*Crop Science*) visited Bangladesh as an United Nations Consultant on coconut and arecanut production, January 1975-March 1975. Two reports on "Coconut and arecanut production in Bangladesh" and "Diseases afflicting the areca palm in Bangladesh" were specially prepared by him for the Food and Agriculture Organisation, Rome.

Shri M. A. Gopinath (*D.R.T.C.*) participated in the International Training Course in Information Retrieval and Information Retrieval System organised by the U.N.E.S.C.O. at Katowice, Poland, 4-22 August 1974.

Shri C. R. Malakar (*Demography*) left for the U.S.A. on 5 September to join the Princeton University for advanced training on a Population Council Fellowship.

Dr. B. S. Minhas (*Planning and Regional Survey*) attended (i) International Seminar on the Subsistence Sector in the South Pacific, University of South Pacific, Suva, Fiji Islands, 12-23 August 1974 and (ii) Club of Rome Meeting, Rome, 14-17 October 1974.

Professor R. Mukherjee (*Sociology*) attended the following:

(i) International Colloquium on Inequality in the World System, Montreal, Canada, 15-19 May 1974. He participated as a commentator.

(ii) Seminar discussion on population and health sciences of the International Development Research Centre, Ottawa, Canada, 18-19 May 1974.

(iii) Experts meeting on Social Indicators, UNESCO, Paris, 19-26 May 1974. He met several scholars at the Centre d'Etude des Mouvements Sociaux Laboratoire Associe au C.N.R.S. and Centre d' Etude Techniques Economiques Modernes, etc.

(iv) Eighth World Congress of Sociology, Toronto, Canada, 19-24 August 1974. As chairman

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of the Plenary Session 1 of the International Sociological Association, Dr. Mukherjee presented his address on 19 August 1974.

(v) Meeting of working group on the applicability of socio-economic indicators to development planning, Bangkok, 15-21 September 1974, sponsored by the UNESCO.

Professor A. Neelamegham (D.R.T.C.) attended:

(i) The first meeting of the UNISIST Experts on Regional Information Policy Development in South Asia, Colombo, Sri Lanka, 13-15 December 1974. He contributed to the formulation of information policy guidelines for the development of national and international information systems in the South and Central Asian region.

(ii) The meeting of the Expert Group on Development Information System for the ESCAP region, Bangkok, Thailand, 3-7 February 1975. He contributed a working paper. He was elected Vice-Chairman of the Group and Chairman, Drafting Committee.

(iii) He visited the Asian Institute for Development in Bangkok for discussions with the staff members regarding a survey of the development information sources in the ESCAP region.

(iv) A meeting of a study team in Geneva, 24 March 1975-16 April 1975, to make a feasibility study for the establishment of global development information system. The study was jointly sponsored by ILO, UNESCO and IDRC.

During his tours abroad, Professor Neelamegham visited the following organisations for discussions and lectures:

(i) Linguistics Documentation Centre, University of Ottawa, Canada; (ii) National Science Laboratory, Ottawa; (iii) Faculty of Library Science, University of Toronto, Canada; (iv) School of Information Science, Syracuse University, New York; (v) School of Library Science, University of Rhode Island, U.S.A.; (vi) American Society for Information Science, Pittsburgh Chapter; (vii) Graduate School of Library and Information Science, University of Pittsburgh; (viii) National Federation of Abstracting and Indexing Services, U.S.A.; (ix) Peabody College for Teachers, School of Library Science, Nashville, U.S.A.

At the request of the National Council for Science and Technology, Mexico, Professor Neelamegham reviewed the plan for the national information system for science and technology for Mexico. He conducted a basic course on industrial information for engineers and executives from industries in Mexico. He appeared in a television programme and spoke on the "Value of Information."

He gave a report on the management criteria for developing an indexing system for a video tape information system for the Ontario Educational Communications Authority's Video-tape Indexing Project.

As Chairman of the FID/CR and member of the FID/SRC, Professor Neelamegham attended committee meetings and contributed working documents.

Dr. K. S. Parikh (*Planning and Regional Survey*) attended the United Nations Environment Programme Expert Group Meeting on Alternative Patterns of Development, Geneva, 13-18 May 1974.

Shri M. V. Raman (*Demography*) participated in a seminar on Demographic Studies in Rural Areas, organised by the Institute of Statistical Research and Training, University of Dacca, Bangla-

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deah, 23-25 June 1974. He presented a paper and also acted as chairman of technical session. He left India on 22 June 1974 and returned on 26 June 1974.

Dr. J. Roy (*Computer Science*) participated in the workshop on Problems of Field Data Collection, Singapore, 27 October-2 November 1974 and presented a paper. He chaired the session on sampling design.

Dr. A. Rudra (*Planning and Regional Survey*) visited the Cambridge University, London School of Economics and the Universities of Bristol and Sussex as a Commonwealth scholar during May 1974-June 1974.

He attended two meetings of a panel appointed by the UNESCO to evaluate its World Functional Literacy Programme, in Paris and Montreal.

Shri S. Seetharama (*D.R.T.C.*) participated in the Third Training Seminar on Computerisation Techniques, organised by the UNESCO., Paris, 30 September 1974-4 October 1974.

Dr. T. N. Srinivasan (*Planning and Regional Survey*) went to the International Institute for Applied Systems Analysis, Austria, 20 May 1974-20 July 1974, as a visiting research scholar.

He worked at the Department of Economics, Massachusetts Institute of Technology, U.S.A., 29 September 1974-12 October 1974, as a research associate.

Dr. Srinivasan attended a conference on Improvement of Teaching Materials in Economics organised by the Ford and Rockefeller Foundations, Bellagio, Italy, 15-20 March, 1975.

10. CONFERENCES AND SCIENTIFIC ASSIGNMENTS IN INDIA

Shri Suraj Bandyopadhyay (*Sociology*) attended: (i) Expert Committee meeting on Data Bank, Indian Council for Social Science Research, New Delhi, 28-29 March 1974; (ii) Seminar on Comprehensive Area Development Programme, Calcutta, 14 June 1974. Shri Manabendu Chatteropadhyay also attended.

Dr. L. S. Bhat (*Planning and Regional Survey*) participated in (i) Meeting of Regional Science Committee, 8-10 July 1974. He read a paper. (ii) Training Course in Investment Planning and Project Evaluation for State Government officials. He gave eight lectures.

Dr. S. K. Bhatt (*Math-Stat*) attended the annual convention, Operations Research Society of India, Kanpur, 12-14 December 1974, and presented a paper.

Shri D. Bhattacharyya (*Pre-Census Population Studies*) participated in: (i) Seminar on Population Crisis, Calcutta, 16-17 August 1974. He presented a paper. (ii) Third Seminar on Data Base of India Economy: Demography Data for Social and Economic Planning, New Delhi, 29-31 December 1974. He presented a paper. (iii) Fourteenth Econometric Conference, New Delhi, 1-6 January 1975.

Dr. N. Bhattacharya and Shri A. K. Chatterjee (*Economic Research*) attended the conference on "Urban Development: Problems and Issues," Calcutta, September 1974, and presented a paper jointly.

Shri Suhas Kumar Biswas (*Sociology*) attended the Annual Meeting, Indian Anthropological Society, Calcutta, 12-13 April 1974. He read a paper in a seminar held on the occasion.

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Dr. D. K. Bose (*Economic Research*) addressed a Seminar on "Industrialisation in West Bengal," Burdwan, 4 September 1974.

Dr. D. K. Bose and Dr. R. Mukherjee (*Economic Research*) attended the Third Seminar on the Data Base of the Indian Economy, New Delhi, 29-31 December 1974 and presented a paper jointly.

Dr. S. Chakravarti, Dr. R. Mukherjee, Shri D Coondoo and Shri S. Lahiri attended the Fourteenth Indian Econometric Conference, New Delhi, 1-4 January 1975, and presented papers.

Shri Prafulla Chakravarti (*Sociology*) attended the Conference on Urban Development: problems and issues, Calcutta, 27-28 September 1974, and presented a paper.

Shri S. Chatterjee (*Economic Research*) participated in the following: (i) Workshop on "Inflation in India and its remedies," Calcutta, 2 October 1974; (ii) Third All-India Conference, Indian School of Social Sciences (Trivandrum), Bombay, 16-19 November 1974. He presented a paper and was one of the rapporteurs.

Dr. S. Chatterjee and Dr. Manjula Mukherjee (*Psychometry*) participated in the following and gave lectures: (i) Conference of personnel and administration executives on selection, recruitment, etc., Calcutta, 17-18 January 1975, (ii) Seminar on Workshop Development of objective type of test items, Calcutta, 30 January 1975.

Shri A. R. Desai (*Library*) participated in the Third International Study Conference on Classification Research, Bombay, 6-11 January 1975. He presented a paper.

Professor D. Dutta Mazumder (*Electronics and Communication Science*) acted as a co-ordinator and chairman for the session on "R and D in Computer hardware" at the Tenth Annual Convention, Computer Society of India, Ahmedabad, 16-18 January 1975. He presented two papers.

Shri Tejendra Nath Ghosh (*Sociology*) attended the Summer Institute on Applications of Sociology, Bombay, 10-30 June 1974.

Shri M. A. Gopinath (*DRTC*) attended the:

(i) Seminar on Library Co-operation, Bangalore, 15-16 November 1974. He read a paper and edited the working papers of the seminar.

(ii) Seminar on Information Storage and Retrieval Systems, Hyderabad, 2-3 September 1974. He presented a paper jointly with Shri S. Seetharama.

Shri A. K. Halder (*Computer Science*) participated in the Third Seminar on Data Base of Indian Economy, 29-31 December 1974, Delhi, and presented a paper.

Shri R. K. Lahiri (*Economic Research*) attended the seminar on "Changing Agrarian Relations," Hyderabad, 5-6 April 1974

Dr. A. Mallik (*Economic Research*) addressed a seminar on "Indian Inflation—a counter view of the monetarist approach," Calcutta University, 14 August 1974.

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Shri C. R. Malaker (*Demography*) participated in the Seminar on Population Growth, Jadavpur University, 3 June 1974. He presented a paper.

Dr. K. C. Malhotra (*Anthropometry*) attended the Indian Science Congress (Anthropology and Archaeology Section), New Delhi, 2-8 January 1975, and presented a paper.

Dr. B. S. Minhas (*Planning and Regional Survey*) attended the Annual Conference, Madhya Pradesh Economic Association, Indore, 8-10 November 1974.

Sreemati Alokannanda Mitter (*Linguistic Research*) participated in the Seminar on Evaluation of Speech and problems of hearing-impaired children, Agartala, Tripura, 12-20 February 1975.

Professor M. Mukherjee (*National Income*) attended the following:

(i) Meeting of Advisory Committee on Collection of Data for National Income and on Compilation and Analysis of National Accounts, New Delhi, 22-27 April 1974.

(ii) Meeting of Working Group on State Income and Committee on Regional Accounts, New Delhi, 22-27 April 1974.

(iii) Meeting of Committee on Regional Accounts, New Delhi, 20-25 November 1974.

(iv) Seminar on Indian Association for Research and National Income and Wealth, Panchmari, 28 January 1975-2 February 1975.

(v) National Seminar on Social Statistics, New Delhi, 17-20 March 1975. He presented a paper.

Professor R. Mukherjee (*Sociology*) attended the following:

(i) Seminar on Caste Structure in India, Calcutta, 1-5 April 1974.

(ii) Seminar on Planning and Development Co-ordination in the District, Calcutta, 29 June 1974. Shri Suraj Bandyopadhyay also attended.

(iii) National Seminar on India's Population Future, Bombay, 8-11 October 1974. He presented a paper jointly with Shri Manabendu Chattopadhyay.

(iv) Twelfth All-India Sociological Conference, Banaras, 27-30 October 1974. He gave the presidential address.

(v) National Symposium on Life Education and Social Change, Kaggari, Midnapore, West Bengal, 18-19 January 1975.

(vi) National Seminar on Social Statistics, New Delhi, 17-22 March 1975. He contributed a paper.

Professor A. Neelmegham (*D.R.T.C.*) attended the:

(i) Third International Study Conference on Classification Research, Bombay, 6-11 January 1975. He welcomed the participants as Chairman, International Organising Committee. Dr. Helmut Arntz, President of the Federation, delivered the presidential address. Three papers by the DRTC staff were read at the conference.

(ii) Workshop on planning of branch information centres in CSIR laboratories and co-operative research associations, Delhi, 25-27 February. He chaired one session.

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Dr. P. R. Pal (*Biochemistry*) participated in the Summer Institute in Cell and Sub-cellular Biology, Calcutta University, 14 May-11 June 1974.

Dr. K. S. Parikh (*Planning and Regional Survey*) attended (i) Meeting of Chairmen of State Electricity Boards on role of nuclear power in India's power programme, Mussoorie, April 1974; (ii) Seminar on the report of the expert committee on "Performance Approach to Cost Reduction in Building Construction," Trivandrum, 20-21 May 1974; (iii) Seminar on futurological agriculture, transport, communication and industrial activities, Bombay, November 1974. (iv) Third Seminar on Data Base of Indian Economy, New Delhi, 29-31 December 1974. He read a paper. (v) Fourteenth Indian Economic Conference, New Delhi, 1-4 January 1975. He read a paper. (vi) Annual Convention, Computer Society of India on "Computer use and policy in India," Ahmedabad, 16-18 January 1975.

Shri M. V. Raman (*Demography*) attended the (i) National Conference on Population, New Delhi, 6-8 December 1974; and (ii) Fourteenth Indian Econometric Conference, New Delhi, 1-4 January 1975.

Dr. T. J. Rao (*Math-Stat*) participated in the Annual Conference, Indian Society of Agricultural Statistics, New Delhi, 25-28 April 1974.

Sarvasri M. V. Raman, B. N. Sarkar and B. Chakravarty (*Demography*) attended the Third Seminar on Data Base of Indian Economy, New Delhi, 29-31 December 1974 and presented papers.

Professor S. K. Roy (*Botany*) participated in a seminar on "The Problems of Development: social, economic and political," Shillong, 14-16 March 1975. He presented a paper.

Shri B. N. Sarkar (*Demography*) attended the (i) Regional Meeting of Demographers of Demographic and Evaluation Cells and Demographic Research Centres, Calcutta, 25-27 June 1974; and (ii) All India Science Congress, New Delhi, 3-7 January, 1975 and presented a paper.

Dr. (Miss) A. Sengupta (*Family Planning*) attended the National Conference on Population, New Delhi, 6-8 December 1974.

11. PUBLICATIONS

The following publications were brought out during the year:

Sankhyā: The Indian Journal of Statistics, the official organ of the Indian Statistical Institute.

Series A: Volume 36, Parts 2, 3 & 4.

Series B: Volume 36, Parts 2, 3 & 4.

Series C: Volume 36, Part 2 (Quantitative Economics), Part 3 (Sample Surveys: Theory and Practice), Part 4 (Quantitative Economics); Volume 37, Part 1 (Sample Surveys: Theory and Practice).

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The Research and Training School issued 68 technical reports during the period, of which 16 were in the mathematics-statistics group and 52 were on other subjects.

The following books were brought out during the year:

1. A Short Outline of Hindi Phonetics by Djordje Kostic, Alokanda Mitter and K. G. Rastogi (National Council of Education Research and Training, Delhi) pp. VI+196. March 1975. Published by the Indian Statistical Institute.
2. Poverty and Income Distribution in India by T. N. Srinivasan and P. K. Bardhan, pp VIII+553. Published by the Statistical Publishing Society.

Samvadhnam: House Journal of the Indian Statistical Institute, Volume 10, Nos. 1-4, P. C. Mahalanobis Memorial Volume, was published in December 1974.

12. SOCIETY-TYPE ACTIVITIES: BRANCHES

12.1 Karnataka Branch: Executive Committee:

The office bearers and members of the Executive Committee for the year 1974-75 were elected in October 1974.

Membership: There were 48 members at the end of the year (life members: 13; Institutional members: 5; and ordinary members: 30) During the year, four ordinary members became life members; one ordinary member was admitted; two ordinary members resigned, the name of one member was removed from the rolls for non-payment of membership subscription; and one life member died.

Examinations: The following examinations of the Indian Statistical Institute were held at the Bangalore Centre:

- (i) The selection tests for admission to the B. Stat. M. Stat., and advanced study courses, 7 July 1974.
- (ii) The professional examinations in statistics—Statistician's Diploma. May and November 1974.

Surveys and Seminars: The survey on living and working conditions of the students of the Bangalore University was completed and the report is being prepared.

12.2 Bombay Branch: *Membership*: The membership of the Bombay-Poona area was as follows: life members: 18; ordinary members: 15; Total 33.

Training Course: Thirty senior officers from different departments of the Maharashtra State Government attended the training course on "Decision-making techniques for administrations." Twentyeight lectures were delivered.

Admission Tests: The Bombay Branch conducted a number of admission tests on behalf of the Psychometry Research and Service Unit of the Institute. Among the organisations for

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which admission tests were held may be mentioned: Indian Telephone Industries, Bangalore; Hindusthan Steel Ltd., Bangalore and Ranchi; Hindusthan Copper Ltd., Calcutta.

13. INAUGURATION OF DELHI CAMPUS BY PRIME MINISTER

The new campus of the Indian Statistical Institute located in Hauz Khas, Delhi was inaugurated by Shrimati Indira Gandhi, Prime Minister of India, on 31 December 1974, before a distinguished gathering of foreign and Indian scientists.

Shri P. N. Haksar, Chairman of the Indian Statistical Institute, and Deputy Chairman, Planning Commission, Government of India, welcomed the Prime Minister.

Shrimati Indira Gandhi in her inaugural speech paid glowing tributes to the memory of the late Professor P. C. Mahalanobis and called upon the workers of the Institute to continue his outstanding work.

Dr. C. R. Rao, Secretary-Director of the Institute, spoke about the Institute and its activities. Professor J. Neyman, University of California, U.S.A., also spoke. Shri B. S. Minhas, Head, Delhi Centre, Indian Statistical Institute, gave the vote of thanks.

14. EIGHTY-FIRST BIRTH ANNIVERSARY OF PROFESSOR P. C. MAHALANOBIS

The eighty-first birth anniversary of the late Professor P. C. Mahalanobis was celebrated at the Indian Statistical Institute, Baranagar, on 29 June 1974.

The first Mahalanobis Memorial Lecture organised on the occasion was delivered by Professor V. K. R. V. Rao, Director, Institute of Social and Economic Change, Bangalore. He spoke on "The Impact of Inflation on India's National Income." Dr. C. R. Rao, Secretary-Director of the Institute, presided at the function. Among other speakers were Professor V. M. Dankekar, Director, Gokhale Institute of Politics and Economics, Poona and Dr. B. S. Minhas, Research Professor of the Institute.

Shri A. L. Dias, Governor, West Bengal, laid the foundation stone of the library building. Shri P. N. Haksar, Chairman of the Institute, presided. Shri S. Parthasarathi, Director, Indian National Scientific Documentation Centre, also spoke.

An exhibition on Professor Mahalanobis' life and work was opened during the birth anniversary celebrations. Some items depicting research work in the science units were also shown.

The first *coelacanth* fish fossils discovered in India, believed to be 165 million years old, were on display for the first time in the Geology Museum of the Institute.

PART II : ANNEXURES

Annexure I: List of President, Vice-Presidents, Office-Bearers, Members of Council, Governing Body and Members of the Committees of the Council and Governing Body

President: Professor S. N. Bose*, F.R.S., D.Sc., F.N.I., National Professor.

Honorary Vice-Presidents: 1. Dr. C. D. Deshmukh, B.A. (Cantab), D.Sc. (Hony) (Calcutta University and ISI), Bar-at-law, (Former President, 1945-1964) (for a term of five years with effect from November 1969); 2. Sri K. P. S. Menon. ICS. (Retired) (for a term of five years with effect from November 1971); 3. Shri S. C. Roy**, M.A., B.L., Director, NICCO of India Ltd., Calcutta (for a term of five years with effect from November 1972); 4. Dr. Atma Ram D.Sc., F.N.A., F.S.G.T., former Director-General, C.S.I.R. (for a term of five years with effect from November 1973).

Vice-Presidents: 1. Shri Vishnu Sahay, I.C.S. (Retired), Former Governor of Assam and NEFA, 2. Shri S. Dutt, I.C.S. (Retired), Indian Ambassador to Bangladesh.

THE COUNCIL

Chairman: Shri P. N. Haksar, M.Sc., Bar-at-law, I.F.S. (Retired)

Vice-Chairmen: 1. Shri Ajit Dasgupta (Calcutta area); 2. Dr. Jagjit Singh, Chairman and Managing Director, Indian Drugs and Pharmaceuticals Ltd. (Delhi area).

Treasurer: Dr. P. K. Bose, M.Sc., D.Phil, Pro-Vice Chancellor, Calcutta University.

Secretary: Dr. C. R. Rao, M.A. Ph.D., Sc.D. (Cantab), F.N.S., F.R.S.

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*Died on 4 February 1974

**Former Chairman

†Resigned

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Srinivasan, Ph.D., Indian Statistical Institute; 19. Shri S. M. Sundara Raju, M.Sc., Chief, S.Q.C. Division, Indian Statistical Institute.

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Co-opted Members (Rule 6.1(c)): Professor M. Mukherjee, Director, Research and Training School, Indian Statistical Institute; 2. B. S. Minhas, Head, Delhi Centre, Indian Statistical Institute.

Ex-officio Members (Rule 6.1 (d): Secretary of each local branch: 1. *Secretary, Bombay Branch:* Professor P. N. Phutane; 2. *Secretary, Kerala Branch:* Dr. (Miss) A. George; 3. *Secretary, Mysore State Branch:* Professor Srinagabhushana.

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LIST OF MEMBERS OF DIFFERENT COMMITTEES (FOR A TERM OF ONE YEAR FROM 30 DECEMBER 1973)

(Term extended till end of October 1975 or introduction of revised memorandum of the Institute, whichever is earlier)

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†Resigned

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Examinations Committee of the Institute

1. Dr. P. K. Bose, Pro-Vice-Chancellor, University of Calcutta; 2. Dr. V. S. Huzurbazar, Professor and Head, Department of Mathematics and Statistics, University of Poona; 3. Dr. J. Roy, Professor, Indian Statistical Institute; 4. Professor D. D. Joshi, Professor of Statistics, Institute of Social Sciences, University of Agra; 5. Shri V. R. Rao, Director, Central Statistical Organisation, Government of India, and 6. Shri S. Raja Rao, Director, National Sample Survey Organisation (Survey Design and Data Processing), representatives of the Governing Body; 7. Dean of Studies, Research and Training School, Indian Statistical Institute and 8. Shri S. Sengupta, *Member-Secretary*.

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Co-editors: Dr. Maloy Ghosh and Dr. Sujit Kumar Mitra.

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1. Dr. R. R. Bahadur; 2. Dr. D. Basu; 3. Dr. V. S. Huzurbazar; 4. Dr. S. S. Srikhande; 5. Shri K. G. Ramamurthi; 6. Dr. J. Roy; and 7. Dr. J. Sethuraman.

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Advisers: 1. Professor V. M. Dandekar; 2. Dr. L. Hurwicz; 3. Dr. N. S. Iyengar; 4. Dr. B. S. Minhas; 5. Professor M. Mukherjee; and 6. Dr. A. Rudra.

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Annexure 2: List of Scientific Papers Published

A. MATHEMATICS AND STATISTICS

- P1 BHATT, S. K. (with Misra, S. K.) (1975): Sufficient optimality criteria in nonlinear programming in the presence of convex like equality and inequality constraints. *Zeitschrift für Operation Research*, 19, 101-105.
- P2 GHOSH, J. K. (with Subramanian, K.) (1974): Second order efficiency of minimum likelihood estimates. *Sankhyā, A*, 36, 325-358.
- P3 — (with Ghosh, P. K.) (1975): Location change in marginal distributions of linear functions of random vectors. *Jour. Multivariate Analysis*.
- P4 — (1975): Comments on B. Efron's paper on "Defining the curvature of statistical problems." *Ann. Stat.*, 3, 1224-1226.
- P5 MATRA, A. (with Kuratowski, K.) (1975): Some theorems on selectors and their applications to semi-continuous decompositions. *Bull. de l' Academie Polonaise des Sciences. Serie Math. Astr. Phys.* 22, 877-881.
- P6 — (1974): On the failure of the first principle of separation for co-analytic sets. *Proc. American Mathematical Society*. 299-301.
- P7 — (with Rao, B. V.) (1975): Selection theorems and the reduction principle. *Trans., American Mathematical Society*, 202, 57-66.
- P8 — : A note on Bimeasurable functions. *Bulletin de l' Academie Polonaise des Sciences, Serie Math. Astr. Phys.*
- P9 MATHEW, J. (with Bagchi, S. C. and Nadkarni, M. G.) (1974): On systems of imprimitivity on locally compact abelian groups with dense actions. *Acta Mathematica*, 133, 287-304.
- P10 MITRA, S. K. (with Bose, N. K.) (1974): Results in a matrix factorization problem. *Proc. IEEE International Symposium on Circuits and Systems*, San Francisco, 91-94.
- P11 — (1974): On a definition of the chi square distribution, *Gujarat Stat. Rev.* 1, 35, 36.
- P12 — (with Rao, C. R.) (1974): Projections under semi-norms and generalized Moore-Penrose inverse. *Linear Algebra and Appl.* 9, 155-167.
- P13 — (with Trapp, G. E.) (1975): On hybrid addition of matrices. *Linear Algebra and Appl.* 10, 19-35.
- P14 MUKHOPADHYAY, N. (1974): Sequential estimation of regression parameters in Gauss-Markoff set-up. *Jour. Indian Statistical Association*, 12, 39-43.
- P15 — (1974): Sequential estimation of location parameter in exponential distributions. *Calcutta Statistical Association Bulletin*, 23.
- P16 — (1974): Some results on sequential prediction. *Calcutta Statistical Association Bulletin*, 23.

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- P17 RAMACHANDRAN, D. (1974): Mixtures of perfect probability measures. *Annals of Probability*, 2, 495-500.
- P18 —: On the two definitions of independence. *Colloquium Mathematicum*.
- P19 RAO, A. R. (with Nirmala, K.) (1975): The number of cut vertices in a regular graph. *Cahier du C.E.R.O.*, Bruxelles.
- P20 RAO, C. R. (1974): Some thoughts on regression and prediction, Part I. *Gujarat Stat. Rev.* 1, 7-32, and *Sankhyā C*, 37, 102-120.
- P21 — (1974): Projectors, Generalized Inverses and the BLUES. *Jour. Roy. Statist. Soc.*, 36, 442-448.
- P22 — (1975): Teaching of statistics at the secondary level—an interdisciplinary approach. *Statistics at School Level*, 121-140. Almquist and Wicksell International, Amsterdam.
- P23 — (1975): Some problems in the characterization of the multivariate normal distribution. *Linik Memorial Lecture. Statistical Distributions in Scientific Work*, 3, 1-14, Ed. Patl et al. Reidel Publishing Co.
- P24 — (1975): Simultaneous estimation of parameters in different linear models and applications to biometric problems. *Biometrics*, 31, 545-554.
- P25 — (1975): Theory of estimation of parameters in the general Gauss-Markoff model. *A Survey of Statistical Design and Linear Models*, 475-478. North Holland Publishing Co.
- P26 — (1975): Functional equations and characterization of probability distributions. *Proc. Int. Cong. of Mathematicians*, Vancouver, 2, 163-168.
- P27 — (1975): On a unified theory of estimation in linear models—a review of recent results. *Perspectives in Probability and Statistics* (Papers in honour of M.S. Bartlett), 80-104, Ed. J. Gani, Academic Press.
- P28 RAO, T. J. (with Ramachandran, Geetha) (1974): Allocation to strata and relative efficiencies of stratified and unstratified MPS sampling schemes. *Jour. Royal Statistical Society B*, 36, 2, 242-298.
- P29 SAHA, G. M.: Some results in tactical configurations and related topics. *Utilitas Mathematica*.
- P30 SARBADHIKARI, H. (with Bhaskara Rao, K. P. S. and Grzegorek, E.) (1974): Completeness in the lattice of Borel structures. *Colloquium Mathematicum*, 31, 29-32.
- P31 SARMA, Y. R. (with Derouen, T. A.) (1975): G_1 minimax procedures for the case of prior distributions on g in discriminant analysis. *Bionetrika*, 62, 403-406.
- P32 SIKDAR, K. (1974): Decompositions of the state space, homomorphisms and products of semi-group acts. *Czech Mathematics Jour.*, 24, 511-521.
- B. ANTHROPOMETRY AND HUMAN GENETICS
- P33 PAKRASI, KANTI (1974): World Population Year 1974 and the peoples of India. *Science and Culture*, 40, 8, (Aug.), 340-348.

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- P34 PAKRASI, KANTI (1974): Global population problem: a searching look. *Indian Medical Jour.*, 68, 12, (Dec), 228-292.
- P35 BASU, A. (1974): Relevant research in bio-social anthropology: an exercise in problem-formulation. *Proc. Seminar on Indian Anthropology Today*, Department of Anthropology, Calcutta, 21-29.
- P36 —(1974): Gene dynamics in a small tribal community: a speculative study. *Proc. First Conference, Indian Society of Human Genetics, Vo I, Human Population Genetics India.* ed. Sanghvi, L.D. Orient Longmans. Ltd, Bombay, 141-146.
- P37 DAS, S. R. (with Mukherjee, B. N., and Das, S. K.) (1974): Caste variation on the distribution placental alkaline phosphatase genes among the Hindus of West Bengal. *Ann. Human Biology*, 1, 65-71.
- P38 — (with Malhotra, K. C., Mukherjee, B. N., and Das S. K.) (1974): Genetic variants of lactate dehydrogenase in Dhangars of Maharashtra. *Japanese Jour. Human Genetics*, 18, 305-309.
- P39 —(with Mukherjee, B. N., Das, S. K. and Roy, Monam) (1974): Blood groups, serum protein, haemoglobin, serum and red cell enzymes among Kaoras of 24-Parganas in West Bengal. *Human Heredity*, 24, 24-30.
- P40 — (with Mukherjee, B. N., Malhotra, K. C. and Das, S. K.): LDH and MDH variants in five castes around Delhi. *Japanese Jour. Human Genetics*, 18, 401-406.
- P41 MUKHERJEE, B. N. (with Das, S. K. and Kellerman G.) (1974): The distribution of some erythrocyte and serum enzyme group systems in the Mahishyas and the Muslims of 24-Parganas, West Bengal. *Human Biology*, 46, 425-333.
- P42 — (with Das, S. R.) (1974): Distribution of some polymorphic enzyme group systems in India *Proc. First National Conference, Indian Society of Human Genetics*, 21-49.
- P43 MALHOTRA, K. C. (1974): Absence of attached ear lobes in four Mendelian isolates. *Jour. Hum. Evol.* 3: 429-431.
- P44 — (with Kate, S. L., Mutalik, G. S., Bhanu, B. V. and Fulmali, P.M.) (1974): A pedigree inherited skin defect. *Eastern Anthropol.* 27, 267-270.
- P45 — (with Mutalik, G. S., Bhanu, B. V., Kate, S. L. and Fulmali, P. M.) (1974): Incidence of colour blindness among four endogamous nomadic groups: an example of natural selection. *Heredity*, 32, 145-149.
- P46 — (with Mutalik, G. S., Kate, S. L., Bhanu, B. V., Phadke, M.A., Raithe, V.) (1974): A pedigree of Mongol-like facial forms. *Indian Anthropol.* 4, 137-141.
- P47 —(1974): Some models for the study of human population genetics in India. *Proc. First Annual Conference, Indian Society of Human Genetics.* Orient Longmans Ltd. Vol. 1: 157-172.
- P48 — (with Bhanu, B. V., Singh, K. S., Fulmali, P. M. and Guha, A.) (1974): Simian crease

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- polymorphism among five Maharashtrian endogamous groups. *Proc. First Annual Conference, Indian Society of Human Genetics*. Orient Longmans Vol. 1: 198-214.
- P49 MALHOTRA, K. C. (with Mutalik, G. S., Kate, S. L., and Phadke, M. A.) (1974): Serological and biochemical investigations among the Nandiwallas of Maharashtra. *Proc. First Annual Conference, Indian Society of Human Genetics*. Orient Longmans Vol. 1: 11-20.
- P50 — (with Bhanu, B. V., and Kanhere, G. M.) (1974): Quantitative analysis of finger prints: Gavda data. *Proc. First Annual Conference, Indian Society of Human Genetics*, Orient Longmans, Vol. 1: 215-225.
- P51 — (with Bhanu, B. V., Fulmali, P. M., Mutalik, G. S. Kate, S. L., and Sheude, M. N.) (1974): Finger Dermatoglyphics among three nomadic Mendelian isolates. *Proc. First Annual Conference, Indian Society of Human Genetics*. Orient Longmans, Vol. 1: 226-239.
- P52 — (with Shastree, U. S. and Kanhere, G. M.) (1974): Trend of menarche in seven Maharashtrian endogamous groups. *Proc. First Annual Conference, Indian Society of Human Genetics*. Orient Longmans, Vol. 1: 250-250.
- P53 — (1974): Bio-social investigations among the Nandiwallas—a nomadic caste-cluster in Maharashtra. *Bull. Urgent Anthropological and Ethnological Sciences (Austria)*. 16, 1-40.
- P54 — (with Karve, I. and Mehata, M. M.) (1974): Report on the medico-legal case for race determination with special reference to skull. *Bull. B. J. Medical College, Poona*.
- P55 — (with Bhanu, B. V.) (1973): Simian crease in three Mendelian isolates. *Jour. Indian Anthropological Society*. 8, (4A).

C. APPLIED STATISTICS, SURVEYS AND COMPUTING

- P56 CHATTOPADHYAY, A. K. (with Pillai, K. C. S.) (1974): Asymptotic expansions for distribution of characteristic roots when the parameter matrix has several multiple roots. *Multivariate Analysis III*. Academic Press. 117-127.

D. BIOMETRY

- P57 DAS, B. C. (1974): Growth and tissue changes of biochemical components of post-embryonic carp (*Lebio-rohita*) treated with yeast. *Indian Jour. Fisheries*, Barrackpore, III. 35-50. May.

E. BOTANY

- P58 ROY, S. K. (1974): Pre-harvest loss of rice due to rodents. *Economic and Political Weekly*. IX, 26. A66-A67.
- P59 — (1974): Interspecific competition and interaction in cultivated plants. *Indian Biologist*. VI, 1-2, 1-36.

F. CROP SCIENCE

- P60 DAVIS, T. A. (with Bhattacharya, C.) (1974): Some morphological observations in *Durio zibethinus* Murr. (Bombacaceae). *Jour. Indian Bot. Soc.* 53: 48-58.
- P61 — (1974): Baantiomorphic structures in plants. *Proc. Indian National Science Academy*, 40B: 424-429.

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- P62 DAVIS, T. A. (1974): Enantiomorphic structures in *Pychosperma macarthurii* (H. Wendland) Nicholson (Arecaceae). *Jour. Plantation Crops.* 2(2), 9-14.
- P63 — (1974): Form and function of horns, antlers and tusks. Part 1. *Cheetal*, 16(2), 1-6.
- P64 — (1974): Salak, a promising food-yielding palm for India. *Science Reporter*, 12, 124-127.
- P65 — (1974): Form and function of horns, antlers and tusks, Part 2. *Cheetal*, 16(3), 46-50.
- P66 — (1975): Australia's amazing grass tree *Wild Life*. 17, 128-130.
- P67 — (1975): Coconut and arecanut production in Bangladesh. *FAO*, Rome, 1-58.
- P68 — (1975): The diseases afflicting the areca palm in Bangladesh. *FAO*, Rome, 1-20.

G. DEMOGRAPHY

- P69 RAMAN, M. V. (1974): Validity of response in fertility enquiries in traditional rural societies. *Rural Demography* (Bangladesh), 1, 1, 1-4.
- P70 — (1974): A demographic profile of Calcutta. *Population in India's Development, 1974-2000*, Ed. Bose, A., Desai, P. B., Mitra, A. and Sharma, J. N. Vikas Publishing House, (P) Ltd., New Delhi, 281-291.
- P71 — (1974): World Population Year, 1974. *Science and Culture*, 40, 8, 333-335.
- P72 — (1974): Focus on some emerging patterns of family planning. *Indian Medical Jour.* Special Number on World Population Year, 68, 12, 294-296.
- P73 SARKAR, B. N. (1974): Studies on age at first marriage in India. *Proc. All India Seminar on Demography and Statistics*, Banaras Hindu University, Varanasi, Ed. Singh, S. N. 349-380.
- P74 SEN GUPTA, B. (1974): Differential net reproductive of India by States. *Proc. All India Seminar on Demography and Statistics*, Banaras Hindu University, Varanasi, Ed. Singh, S. N. 328-334.

H. DOCUMENTATION AND LIBRARY SCIENCE

- P75 BHATTACHARYYA, G. (1975): Fundamentals of subject indexing languages. *Third International Study Conference on Classification Research*. Bombay. 6-11 January.
- P76 — (1975): POPSI: fundamentals and procedure. *DRTC Annual Seminar*, 12.
- P77 — (1974): Cuttor's procedure for specific subject indexing. *Library Science with a Slant to Documentation*. 11, N2, June. Paper K.
- P78 DESAI, A. R. (1974): Categories, classification and universe of knowledge. *Indian Library Movement*, 1, 3, 98-100.

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- P79 DESAI, A. R. (1974): Categories of knowledge and model building in research. *Indian Library Movement*, 1, 3, 101-102.
- P80 GOPINATH, M. A. (1974): Colon classification for macro documents history. *Library Science with a Slant to Documentation*, 11, N2, June. Paper H.
- P81 — (1974): Standards for use in the planning of library and documentation systems: comparative data from India, UK, USA and Canada. *Library Science with a Slant to Documentation*, 11, N 3-4; September-December.
- P82 — (1974): Cooperative endeavours in raising trained library manpower. *Seminar on Library Cooperation*, Bangalore. 15-16 November.
- P83 — (with Seetharama, S.) (1975): Interdisciplinary subjects and their classification. *Third International Study Conference on Classification Research*, Bombay. 6-11 January.
- P84 NEELAMEGHAN, A. (1975): Absolute syntax and structure of an indexing and switching language. *Third International Study Conference on Classification Research*, Bombay. 6-11 January.
- P85 NEELAMEGHAN, A. (with Gopinath, M. A.) (1974): Planning an integrated national information system for science and technology: a case study. *Library Science with a Slant to Documentation*, 11, N 3-4, Sept-Dec. Paper M.
- P86 — (with Gopinath, M. A.) (1975): POPSI in practice. *DRTC Annual Seminar*, 12.
- P87 — (with Seetharama, S.) (1975): Application of POPSI for preparing an index to collected works: a case study. *DRTC Annual Seminar*, 12.
- P88 RAVICHANDRA RAO, I. K. (1974): Growth of periodicals and obsolescence of articles in periodicals: A case study in sociology. *Library Science with a Slant to Documentation*, VII, N-3; June. Paper L.
- P89 — (1975): Computer-based subject indexing. *DRTC Annual Seminar*, 12.
- P90 SEETHARAMA, S. (1975): Human digestive system: depth classification version of CC. *Library Science with a Slant to Documentation*, 12, N-1, March.
- P91 — (with Gopinath, M. A.) (1974): Communication of scientific and technical information: a review of models, factors, and media in the dissemination and retrieval of information. *Seminar on Information Storage and Retrieval Systems*, Hyderabad. 2-3 September.

I. ELECTRONICS, COMPUTERS AND COMMUNICATION SCIENCE

- P92 DATTA, A. K. (1974): An experimental procedure for hand-written character recognition. *IEEE TC (USA)*, 23, 5, 536-545, May.
- P93 DUTTA MAJUMDER, D. (with Das, J.) (1975): Stability criteria for magnetic bubbles—a new storage element. *Proc., 10th. Annual Conf. CSI*, 18-22 January, Ahmedabad.

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- P94 DUTTA MAJUMDER, D. (with Das, J.) (1975): NDRO memory using ferrite cores. *Proc. All India Con. on Circuits Systems and Computers*. Calcutta University. 27 February-1 March.

J. EMBRYOLOGY

- P95 BRAHMACHARY R. L. (with Tapaswi, P. K.) (1974): A technique for separating the early blastomeres of limnaea. *Curr. Sc.* 43, 494.
- P96 TAPASWI, P. K. (1974): Further investigations on transcription during oogenesis and immediately after activation by sperm in limnaea (Mollusca) eggs. *Acta Embryol. Exptl.* 2.
- P97 RAKSHIT, B. (with Brahmachary, R. L.) (1974): Electrotaxi of the brittle star. *Z. Nat. Forsch.* 29c, 655.

K. ENTOMOLOGY

- P98 DASCHAUDHURI, P. C. (1975): Indoor swarming of the mosquito *Culex pipiens fatigans* Wiedemann in a suburb of Calcutta. *Proc. Zool. Soc., Calcutta*, 26, 121-130.

L. GEOLOGY

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PART III

Statement of Accounts and Auditors' Report for the year 1974-75

AUDITORS' REPORT

We report that we have audited the Balance Sheet as at 31st March, 1975 of:

- (a) The Indian Statistical Institute
- (b) "Other Funds"

Signed by us under reference to this report and the Income & Expenditure Account for the year ended on that date, with the books and records maintained by the Institute and produced to us, and information and explanation given, and subject to and read with the notes thereon, and also subject to the remarks given below, found them to be in accordance therewith:

The remarks referred to above are:-

1. Though the National Sample Survey Unit has been separated from 1st June 1972, the consequential changes with regard to assets (both fixed and current) and liabilities have not taken place as yet. As such, both the Income and Expenditure Account for the year ended 31st March, 1975 and the Balance Sheet as at date will not give a true and fair view to the extent to this unworked out position.

[As already commented upon in the last year's accounts, we have a list of assets, namely, furniture and equipments taken over by the NSSO, duly certified by a responsible officer of that Organisation. The Government of India is yet to communicate their decision as to whether these assets could be finally taken over by them or they should be borne on our Asset Register, a rental being recovered from them. The matter is being pursued with the Government of India and it is expected that by the time the next year's account is closed the final decision will be forthcoming. So long as the final decision is not reached, the assets are to be treated as being borne in our accounts. In this context, remarks of the auditors that the balance sheet does not give a true and fair view is not acceptable. Assets should be treated as being owned by ISI and borne in our account.]

BALANCE SHEET

1. Fixed Assets

(a) Asset Register was not maintained for land development. The Land Register, though maintained, does not give detailed break-up of the constituent expenses in connection with land.

Register for other fixed assets, though maintained, leave ample scope for improvement as such:-

- (i) Figures in the Asset Register has been shown as a consolidated item in some cases, hence break-up of expenses is not available there.

[Italicised portions in brackets are the comments of the Administration on the observations made by the Auditor]

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- (ii) Location of assets are not disclosed.
- (iii) Description of assets, e.g., Model, Identity Number, etc., are also not shown.

It is, however, understood that an outside agency has been appointed for assisting the preparation of the Asset Register properly at an early date.

[This objection is of little consequence because the development cost incurred have been shown distinctly in the Fixed Assets Schedule (Schedule I, Item A) to the Balance Sheet.]

An outside agency has already been appointed for verifying the assets and preparing the Asset Register. The minor defects mentioned will automatically be removed on completion of the verification.]

(b) Value of Fixed Assets acquired on that date prior to 31st March, 1952 were taken from those appearing in the inventories prepared as on that date.

[No comments.]

(c) Certificates from the officer concerned regarding the existence and condition of the movable assets as at 31st March, 1975 belonging to the Institute and to different funds under it, were not produced before us for the purpose of verification at the time of audit. However, it is understood that the Institute is having a quantitative list of furnitures and equipments in possession of NSSO. Administrative Officer and Assistant Secretary of the Institute by his office memo under C-4136 dated 18th January, 1973, requested all departmental heads to prepare list of assets in their respective departments. However, whether the order was carried out or not could not be verified by us as no verification statement of assets of respective departments were made available to us at the time of our audit.

Moreover, the maintenance of records of fixed assets at any particular unit offered little scope of comparing a physical verification list with local records. The values shown in the balance sheet are as per General Ledger of the Institute.

[A separate certificate location-wise could not be given. Since an outside agency has already been appointed for conducting physical verification, this would be made available after verification is complete.]

(d) Land: In respect of the following lands, Possession Certificates for items (i) to (ix) and Grant Certificate for item X were produced before us for the purpose of verification.

No Deed of Purchase or Deed of Lease duly stamped and registered was produced before us. As suggested by the previous auditor, legal opinion was sought by the Institute as to whether the Possession/Grant certificates can give the Institute "Good & Marketable Title" to the properties concerned. According to the legal opinion, it appears that the Institute did not become absolute owner of the land unless the Government conveyed the land to the Institute by a Deed and at present, therefore, the Institute has no good and marketable title to the said properties.

(i) 203, Barrackpore Trunk Road,

(ii) 153, Gopal Lal Tagore Road

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- (iii) 156, 160, 165 & 166/1, Gopal Lal Tagore Road
- (iv) 205, Barrackpore Trunk Road
- (v) 206, Barrackpore Trunk Road
- (vi) Delhi
- (vii) 202, Barrackpore Trunk Road
- (viii) In "Village Makatpur"
- (ix) Farm Land
- (x) Bangalore

[For lands acquired through land acquisition proceedings, there cannot be any deed of purchase or any deed of lease. In respect of such lands only grant certificates or only certificates of possession are available and have been shown to the auditors. According to legal opinion, the Institute is the absolute owner of land except that it has no power to sell the property to a third party. This position was already explained to the auditors last year also. The auditors have no suggestion as to how these lands acquired through land acquisition proceedings have to be exhibited in the balance sheet.]

(e) *Building:* Preliminary expenses for New Construction of Library at Baranagar (Item B.I. 6 in Schedule I) accounts for the following:

Architect's fee (Paid to Professor A. K. Banerjee)	Rs. 37,000/-
Law Charges (Solicitor's fee for advising, drafting and finalising agreement with the architect)	Rs. 500/-
Preliminary expenses (fee for the sanctioned plan for construction at 202, 203 and 205, B. T. Road)	Rs. 1,540/-
	<hr/>
	Rs. 39,040/-

The above amount has been shown as Preliminary expenses for the construction of the building but the same should have been shown under Advance Account alike our suggestion in the previous year. Since there has been no change in the facts and circumstances from the previous year, in our opinion the amount should have been transferred to Advance Account.

In this connection, we further suggest that since there has been new appointment of M/s. Ballardie Thompson & Mathews (P) Ltd. as the Architect for the construction of the Library building, the issue relating to the amount paid or payable to Professor A. K. Banerjee should be settled at the earliest. (Architect's fee paid to M/s. Ballardie Thompson & Mathews (P) Ltd. Rs. 40,772/-).

[The remark of the auditors that the sum of Rs. 39,040/- which has been shown as preliminary expenses for the construction of buildings should have been exhibited under 'Advance account' is not acceptable, since the expenditure was finally incurred towards construction of the building and at the time the expenditure was incurred there was no

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question of recovering any portion thereof from the Architect. If at a later stage any amount is ultimately recovered from the Architect as a result of negotiation or otherwise, necessary adjustment will be carried out in the accounts.]

(f) *Sheds and Structures:* (i) The written-down value of sheds and structures (Rs. 62,472.22) on 203, Barrackpore Trunk Road and 153, Gopal Lal Tagore Road do not give a true and fair view as at 31st March, 1975 as the values of the sheds and structures demolished are not, according to the management, ascertainable. Steps, if any, taken by the management to ascertain the value of the demolished structures was not, however, explained to us this year also; in this regard, please refer to our remarks on the fixed assets.

(ii) The sheds and structures situated at 5, R. N. Tagore Road (written down value as on 31.3.75: Rs. 1,86,656.84) have been constructed for UNTAA workshop on the land possessed under Rent Requisition Order.

[(i) As commented upon in the last year's audit report, the objection is no doubt technically valid but is of little consequence. No useful purpose would be served by trying to find out the value of the demolished structures for, the materials recovered from the demolished structures were actually used in the construction of another shed. Any attempt at this stage to find out or to determine the cost of materials actually utilised would be a fruitless exercise. However, the auditors' observation in this connection is noted for our future guidance.

(ii) [No comments.]

(g) It is understood that in connection with the construction of the Electronics Computer Unit, certain items of furniture and equipment were loaned to ISIJU in earlier years. It is also understood that a certified list for the same exists with the Institute wherein the valuation of two items do not have any amount and reported as "not known".

[Please refer to our comment in sub-para of para 1(a), above.]

(h) *Soviet Printing Machine:* Soviet Printing Machine (Item 'L' of Schedule I of the Institute) received by the Institute as gift from Soviet Academy of Sciences and was taken into the books of account at a value of Rs. 18,66,696.58 by corresponding credit to the General Fund in 1970-71. The Machine is being used by the Statistical Publishing Society. We understand from the Report of the Committee on Auditor's Report for 1971-72 Accounts that the machinery are in existence and that a few items are damaged and that there were some special difficulties in utilising some items at the present moment.

[No comments.]

(i) *Construction at Baranagar, Library Building (Item B-1.6 in Schedule I):* (a) As we have stated in our last report, Rs. 76,880/- being the cost of iron and steel purchased during 1973-74 and was lying in stock but were shown in Library Building Account. In the course of our audit during the year, a refund of Rs. 2,188.31 has been received; hence the balance of Rs. 74,691.69 is forming part of the Library Building Account in this year's accounts also. But the same is still lying in stock.

(b) Advance for cement: Rs. 1,74,488/- was made to A.C.C. Ltd. for the supply of cement. This has been shown as an addition to Library Building Account.

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In our opinion, regarding item (a) the amount should have been shown in the stock of iron and steel and for item (b) should have been grouped under 'Loans & Advances' as advance for cement.

[(a) Much of the stock of iron and steel has been used in the year 1975-76 for the construction. This will be reflected in the accounts of 1975-76 when compiled.]

(b) Advance for cement: The final bill in respect of the advance of Rs. 1,74,488/- has been received from the A.C.C. Ltd. The entire quantity of cement is expected to be consumed in 1975-76 for the construction of the library building.

The cost of iron, steel, cement and other materials has already been disclosed in the accounts and necessary accounts maintained separately so as to indicate the quantity consumed and the balance in stock from time to time.]

2. *Investment:* Investment of different funds under the Institute stand in the name of the Indian Statistical Institute. Securities earmarked for specific funds have been disclosed in respective fund balance sheet.

[No comments.]

3. Advance on account of ISIJU Expenditure on joint project for the construction of Electronic Computers in progress excluding value of furniture, equipment, etc., loaned to ISIJU which are included in Schedule (I); Rs. 7,62,329.27.

The above amount has been brought forward from 1973-74. No development has taken place inspite of elaborate observation made by us in our previous report on the above joint project. A confirmation letter dated 6.1.76 was produced to us from Shri S. K. Mitra, Secretary, ISIJU Joint Computer Project Committee, wherein Shri Mitra confirmed that "position remains the same as on 31.3.75."

[The Council has already appointed a Committee to look into these matters and report their findings. The members of the Committee have already been reminded to expedite their report.]

4. Amount claimed/to be claimed from the Government of India: (Item No. 3.1, 2, 3 of the Asset Side of Institute's Balance Sheet). In the absence of relevant sanction/acceptance from the Government in respect of claims, we are not in a position to form any opinion as to the extent to which claims made by the Institute will be accepted by the Government in future. However, we are given to understand that a Committee has been formed by the Government of India for the above matter.

[Amount claimed or to be claimed from the Government of India: The Arrear Claims Committee has already concluded their deliberations and the final report is awaited.]

5. *Amount Recoverable from the Government of Mysore in respect of Bangalore Land requisitioned back by the Government of Mysore: Rs. 29,325/-* (Item 5 of the Assets side of the Institute's Balance Sheet). The position of the said account remains the same since 1967-68. There is a

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difference of Rs. 62/- arising out of the confirmation given by the Deputy Commissioner, Bangalore District, and balance standing in the Institute's Book which is still unadjusted. The Institute in its letter (vide letter No. C3522/744 dt. 31.10.75 has reminded the Deputy Commissioner of Bangalore District to arrange for immediate repayment of the said balance. But till date of our report, the refund has not been received as reported.

[The matter is being pursued with the Government of Mysore and the discrepancy of Rs. 62/- will be taken care of at the time of final adjustment.]

6. *Stores (At cost)*: (Item 7 on the Assets side of the Institute's Balance Sheet and Item No. 3.1 on the Assets side of the Balance Sheet of Development Fund II).

Classification of stores has been made broadly into two categories for the purpose of physical verification.

(i) Iron and Steel materials, Cement and Bricks.

(ii) Other building materials.

The physical verification of both the categories were made after the close of the year, the result of which showed a net loss (shortage) of Rs. 7,099.95 during the year which has been shown in the Balance Sheet under the head "Effect of Physical Verification of Building Materials" (Item 10 of the Asset side of the Institute's Balance Sheet) awaiting approval from the Council for written off.

It appears that in some cases conditions of stores have deteriorated and some are unusable but no effect has been given for any loss of value due to deterioration of stores and/or obsolescence, if any.

Though stores have been shown in the Institute's Balance Sheet as well as in the Balance Sheet of the Development Fund but no separate register of stores for individual fund has been maintained and the same has been shown in a consolidated Register only. The basis of the segregation of stores and also of the loss (shortage) between these two funds made by the Institute's official could not be satisfactorily explained to us.

[The reasons for the discrepancies revealed in the course of physical verification are being examined in detail and the approval of the Council will be taken only after the examination is completed. Necessary adjustment in this respect will be effected in the next year's account after obtaining necessary sanction from the Council.]

The approval of the Council for the disposal of the materials purchased over a decade ago and remaining unused will be taken shortly.]

7. *Loans and Advances*: (Item 8 of the Assets side of the Institute's Balance Sheet).

2. Festival advance to workers: Rs. 5,716.75. There has been excess realisation in respect of the above for Rs. 377.96 liability in respect thereof has not been created. Out of the above balance, some are outstanding since 1960-61 which are reported to be irrecoverable. In our opinion, action should be taken to adjust the same.

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[Festival advance to workers: Necessary action will be taken as suggested by the auditors.]

.3 Advance to Suppliers and Contractors: Rs. 2,42,657.10

.4 Suspense and Other Advance: Rs. 3,36,200.09

.5 Educational Relief and Other Loans: Rs. 2,68,271.42

.6 Security Deposit: Rs. 79,247.07

.7 Sundry Debtors (Partly Recoverable): Rs. 60,605.30

.3 No separate books have been maintained for Advance to Suppliers, Contractors, as such. However, advances are recorded in Suspense Ledger. Some of the advances were given to suppliers against the supply of goods which remain unadjusted for a long time. We give below few examples:

<i>Year of advance</i>	<i>Name of the parties</i>	<i>Amount</i>
1968-69	M/s. Godrej & Boyce Mfg. Co. (P) Ltd.	Rs. 20,885.11
1970-71	M/s. Walford Transport Ltd.	Rs. 4,974.15

[Advance to suppliers and contractors: Necessary action will be taken as suggested by the auditors. We expect to have the cell set up in February 1976 when we will recruit some staff for the Accounts Department and the defects will be removed by necessary adjustment or recovery wherever necessary].

.4 (i) Suspense account has not been reconciled with the main ledger. (ii) The opening balances of the said account could not be verified as no list was produced for verification. (iii) There are various accounts including those of visiting professors from abroad which are lying unadjusted for several years. We give below examples:

P. Polk	DR.	Rs. 5421.00
V. Udompal, Thailand	CR.	Rs. 183.36
Prof. A. Razanov	CR.	Rs. 100.00
Hans Hwe Oho	CR.	Rs. 350.00
Kohai Ohkato	DR.	Rs. 200.00

No action appears to have been taken during the year under review for adjusting the above balance in spite of our last year's report.

(iv) It is also observed that some of the balance are appearing unadjusted in the name of some persons who have already expired. No steps have been taken to adjust the same though this was reported by us in the last year.

(v) An amount of Rs. 2930.24 is still recoverable and remaining unadjusted on account of rent receivable from Dr. B. C. Das.

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(vi) The following are appearing unadjusted in the names of two banks which are cited below:

Year	Name of the bank	Balance
1963-64	United Bank of India, Baranagar	DR. Rs. 1,616.99
1967-68	State Bank of India	CR. Rs. 1,000.00

[So far as 1974-75 is concerned, the discrepancies have been located. But with regard to discrepancies relating to earlier years' accounts it will take some more time. The current year's accounts do not indicate the type of defects which existed in the past years. Due to the shortage of staff, the cell which was promised to be set up last year could not actually come into being. In this connection, please refer to our comments in 7.3 also].

.5 Education Relief and Other Loans: Rs. 2,68,271.42. Included in the above Rs. 1,83,896.95 realisable from NSSO staff on account of Floor Relief Loan. In spite of our remark in our report for the year ended 31st March, 1974, no step has been taken for realisation of the same.

[The matter has been discussed with the NSSO authorities and they are being advised to pay the amounts, already recovered, to the Institute.]

.6 Security deposit receipts in some cases could not be produced before us for verification. In this connection, it has been reported that the rented house at 9B, Esplanade East, has already been vacated by the Institute but security deposit lying with the landlords of Rs. 5,931.36 has neither been realised nor any follow-up action has been taken, although the matter was reported by us in the year 1973-74.

[Same action as suggested in 7.3 above.]

.7 With regard to item No. 7, we could not verify the said account in the absence of confirmation letters from the parties concerned and personal ledger of the said account. These include items outstanding from as early as 1963-64. In this connection, we would like to note that a major part of the said account is owed by Gun & Shel Factory (Rs. 49,721.87) and is outstanding since 1966-67. No action appears to have been taken during the year under review for recovery of the dues in spite of the fact that the matter has time and again been reported by the auditors.

[A substantial portion of this amount appears to be irrecoverable since all our attempts to establish our claim have not so far produced any tangible result. However, before the Council is approached for write off, a last attempt would be made to realise the amount to the extent possible.]

8 Advance for land: (Schedule XIII)—Rs. 91,606.25

- (a) Re: 106 B.T. Road—Rs. 29,799.38.
- (b) Re: Bustee Land Adjacent to 123, Gopal Lal Tagore Road—Rs. 12,137.00.
- (c) Re: Land Adjacent to Goopta Niwas—Rs. 5,652.00.
- (d) Re: 168, Gopal Lal Tagore Road—Rs. 3,744.03.
- (e) Re: Land at Madras—Rs. 21,562.50.

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In connection with the above-mentioned advances, we refer to our report for the year ended 31st March, 1974. The position remains as before.

[The matter is being pursued by issuing reminders to the appropriate authority].

9. Effect of physical verification of Building Materials: Rs. 18,780.76.

The above does not actually represent any asset though displayed on the Assets side of the Balance Sheet. In this connection, we refer to our report under store.

[Please see our comments in Item 6 above.]

10. Cash and Bank Balances (Item No. 13 of the Assets side of the Institute's Balance Sheet)

Certificates from Banks confirming the balance as on 31.3.75 were not made available to us for verification for the following banks:

- (i) Nath Bank Ltd. (in liquidation)
- (ii) State Bank of India (Delhi A)
- (iii) State Bank of India (Delhi B)

It appears from the Schedules VI and VII attached to the Balance Sheet shown as cash balance both in hand and at banks represents the balancing figure, i.e. individual bank account cannot be linked up with individual fund account.

While checking the current account with the Bank of Baroda, Bhilai, with the relevant banker's statement, it was found that the said account has been in operation in the name of Shri K. K. Banerjee instead of the Institute's own name.

[The Institute is getting small amounts from time to time as released by the liquidator of Nath Bank (in liquidation).

Regarding State Bank of India (Delhi A) and (Delhi B)—these two accounts are inoperative over years and the balances in our credit are Rs. 1672.98 and Rs. 698.85 respectively. Steps have been taken to close and withdraw the balance lying in these Banks.

Steps are being taken to open a Bank Account in the name of the Institute in Bhilai].

11. General Fund: (Item 1 of the Liabilities side of the Institute's Balance Sheet)

Out of the amount of Rs. 4,44,714.91 charged in the Income & Expenditure Account as Expenditure on Books and Journals, 95% (Rs. 4,22,479.16) has been capitalised as in earlier year which is not clear to us. (Vide Item F of Schedule I of the Balance Sheet).

[No comments.]

12. Deposit and other Liabilities: Rs. 1,02,917.19 (Item No. 6.1 of the Liabilities side of the Institute's Balance Sheet)

- (a) In spite of observation made by us in our previous report for incorporating the accounts