

INDIAN STATISTICAL INSTITUTE

FORTYFOURTH ANNUAL REPORT

April 1975—March 1976



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 (died on 4 February 1974. No election of President took place during the period under the old regulations.)

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. Shri K. P. S. Menon, (Former Chairman) I.C.S. (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 (Former Chairman); (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) (resigned).

Vice-Presidents: 1. Shri Vishnu Sahay, I.C.S. (Retired), Former Governor of Assam & NEFA; 2. Shri Subimal Dutt, I.C.S. (Retired).

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

Vice-Chairmen: 1. Shri Ajit Dasgupta (Calcutta area, died on 22 July 1976); 2. Dr. Jagjit Singh, Chairman and Managing Director, Indian Drugs and Pharmaceuticals Ltd. (Delhi area).

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

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

Joint Secretaries: 1. Dr. D. Dutta Majumder, Professor, Electronics and Communication Science, Indian Statistical Institute (Calcutta area), elected in the Adjourned Annual General Meeting held on 30 March 1974. 2. Dr. K. S. Parikh, Professor, Planning Unit, Indian Statistical Institute (Delhi area), elected in the Adjourned Annual General Meeting held on 30 March 1974.

Members of the Council

1. Dr. B. P. Adhikari, Dr. es. Sc. (Paris), Professor, Indian Statistical Institute; 2. Dr. Debabrata Basu, Research Professor, Indian Statistical Institute; 3. Dr. Deb Kumar Bose, Professor, Indian Statistical Institute; 4. Dr. P. K. Bosu, M.Sc., D.Phil. Pro-Vice Chancellor, Calcutta University; 5. Dr. T. A. Davis, Professor, Indian Statistical Institute; 6. Dr. S. W. Dharmadhikari, M.Sc., Ph.D. (California), Department of Statistics, University of New Mexico; 7. Dr. Ambarish Ghosh, Dr. es. Sc. (Aix-Marseille), Professor, Indian Statistical Institute; 8. Shrimati Nirmal Kumari Mahalanobis; 9. Dr. Ashok Mitra, Ph.D., Naional Fellow, Indian Council of Social Science Research; 10. Dr. T. V. Hanurav, Professor, Indian Statistical Institute; 11. Dr. V. S. Huzurbazar, Professor and Head, Department of Mathematics and Statistics, University of Poona; 12. Shri S. Naqvi, Centre for Study of Regional Development, Jawaharlal Nehru University, New Delhi; 13. Dr. J. Roy, Research Professor, Indian Statistical Institute; 14. Professor S. S. Srikhande, Ph.D., Head of the Department of Mathematics, University of Bombay; 15. Shri S. M. Sundara Raju, M.Sc., Chief, SQC Division, Indian Statistical Institute.

Government Nominees on the Council [Rule 6.1(b) (I)]

1. Cabinet Secretary, Cabinet Secretariat, Government of India (Shri B. D. Pandey, I.C.S., 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 Moni Mohan Mukherjee, Director, Research and Training School, Indian Statistical Institute; 2. Dr. 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, Karnataka State Branch:** Professor Srinagabhushana.

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Part I: Teaching, Training, Research, Projects and Publications

I. TEACHING AND TRAINING

1. *Teaching for Degrees and Diplomas*

The preparatory, first and second year courses of the M. Stat., have been renamed as first, second and third years respectively, from the academic session 1975-76.

The following is a list of the number of students admitted to the degree and training courses during the academic session, 1975-76.

	<i>Number of students during 1975-1976 Academic Session</i>				
1. Courses leading to a Degree in Statistics:					
1.1 Bachelor of Statistics with Honours [B. Stat. (Hons.)]					
1st year	17
2nd year	17
3rd year	19
4th year	19
1.2 Master of Statistics (M. Stat.)	
1st year	8
2nd year	16
3rd year	25
1.3 Research Fellows and Research Scholars	67
2. Specialised Courses in Applied Statistics leading to Diplomas :					
2.1 Statistical Quality Control & Operations Research (Calcutta)	15
3. Courses in Statistics for Persons in Employment:					
3.1 Statistical Officers' Training Course (jointly with the CSO)					15

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*Number of students during
1975-1976
Academic Session*

4. Evening Courses:					
4.1 Statistical Methods and Applications:					
	(i) Calcutta	..	..	..	38
	(ii) Delhi	..	..	..	18
4.2 Diploma in Statistical Quality Control and Operations Research (Bombay & Madras):					
4.2.1	Bombay—1st year	..	..	..	22
	Bombay—2nd year	..	..	..	11
4.2.2	Madras—1st year	..	..	..	13
	Madras—2nd year	..	..	..	22
4.3 Six-month Course in SQC Bangalore (July-December 1975 and January-June 1976)					54
5. Electronics Computer Courses:					
5.1	Diploma in Computer Science	..	..	..	8
5.2	Intensive Course on Programming and Applications	..			20
5.3	Course on Operation of Punch Card Machines	..			12
6. Documentation Training Course, Bangalore					9
					445

2. International Statistical Education Centre (ISEC)

The Centre, operated jointly by the International Statistical Institute and the Indian Statistical Institute, under the auspices of the UNESCO and the Government of India, conducted its 29th term of teaching for 23 trainees from 13 countries of Asia and Africa. Twenty of them received fellowships from the Government of India, 12 being from the Colombo Plan and 8 under the Special Commonwealth African Assistance Plan. One Indian trainee and one from Brunei received fellowships from their Governments.

3. Professional Examinations

The Institute conducts professional examinations for the Statistician's Diploma, Computer's Certificate, Certificate on Punched Card Machines and on Statistical Field Surveys. Examinations are held in May and November. In 1975-76, very few candidates applied for the last two certificates, and examinations were not held. Details of the Diploma and certificate for which examinations were held are given below.

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3.1 *Statistician's Diploma Examination*

During 1975-76, 131 candidates registered (61 in May; 70 in November) for the examinations but 33 candidates (13 in May; 20 in November) failed to appear in any of the papers. Of those who finally appeared, 51 candidates (28 in May; 23 in November) passed in one or more papers.

3.2 *Computer's Certificate Examination*

In 1975-76, 44 candidates (22 in May; 22 in November) registered for the examinations. Only four candidates (1 in May; 3 in November) failed to appear in any of the papers. Of these who finally appeared, 21 candidates (10 in May; 11 in November) passed in one or more papers.

3.3 *Number of successful candidates qualified during 1975-76 for the award of Diplomas and Certificates in Professional Examinations*

The number of candidates who had successfully completed the entire professional examinations and qualified for the award of Diplomas and Certificates is given below.

Statistician's Diploma

Seven candidates (4 in May; 3 in November).

Computer's Certificate

Six candidates (2 in May; 4 in November).

II. THEORETICAL STATISTICS AND MATHEMATICS

1. *Topology, Measure Theory and Functional Analysis*

A. K. Roy worked on extremal structure of convex sets, (Choquet) integral representations of points on compact convex sets and properties of Lindenstrauss spaces—that is Banach spaces X such that X^* is isometrically isomorphic to $L(\mu)$ for some $\mu^1 \geq 0$. A. B. Raha continued his work on Hewitt-Nachbin spaces and E-compact spaces. A. Maitra worked on integral representations of invariant measures. S. C. Bagchi continued certain investigations in function theory on Bohr groups. A. Maitra and B. V. Rao carried out work on selection theorems for partitions of Polish spaces. H. Sarbadhikari worked on selection and uniformization results in metric spaces. Study groups were formed to work on Harmonic analysis and Dynamical systems.

2. *Probability and Ergodic Theory*

E. M. Paul continued his work on probabilistic number theory. He proved several theorems which show that if the values of an additive arithmetical function show some kind of regular central tendency, then the function has a distribution.

S. Natarajan continued his studies on ergodic theory of transformations associated with expansions which are generalisations of the usual decimal and continued fraction expansions. Research work was also carried out on Brownian motion and on perfect measures.

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3. Inference

C. Srinivasan explored in depth the connection between admissibility of estimators and boundary value problems. For example, for the multivariate normal the following result was proved: A necessary and sufficient condition for a generalized Bayes procedure δ to be admissible is the existence of unique bounded solution for a suitable elliptic equation with appropriate boundary conditions. For a much smaller class of estimators, Brown has obtained a similar characterization but in terms of a different boundary value problem. C. Srinivasan was able to extend some of his results to multiparameter exponential families.

J. K. Ghosh introduced a new notion of minimal pair-wise sufficiency and used it to prove Pitcher's theorem on the existence of minimal sufficient δ -algebra for compact or coherent families. J. K. Ghosh and T. Chandra introduced a notion of deficiency to compare two tests with equal Bahadur efficiency. J. K. Ghosh with N. Mukhopadhyay have proposed two sequential procedures for classifying a new population into one of two given populations whose characteristics are known only from two given samples; Monte-Carlo investigations show these procedures to be more efficient than the usual non-sequential ones. J. K. Ghosh, B. K. Sinha and B. K. Sinha have disproved a conjecture of Neymann characterizing the multinomial and the negative multinomial.

K. Unni has been studying unbiased estimation for incomplete exponential families. He has simplified considerably the proof of Kagan's characterization of best unbiased estimators for incomplete exponential families when the parameter space is an algebraic variety. He has applied these techniques to get some new results in a reliability problem. Y. R. Sarma obtained some results on characterization of distributions based on the properties of order statistics. He also continued his work on large sample tests for Markov processes.

4. Combinatorial Theory, Graph Theory, Design of Experiments and Sampling

K. Nirmala determined the minimum and maximum values of $f(G) + f(\bar{G})$ where G is the complement of the Graph G and f , the total chromatic number. This solves a problem posed some years ago by Chartrand and Mitchem. Investigations about other parameters f are being continued. Research is also being done on the clique number of a graph with given degrees. A. R. Rao and C. Berge have worked on a combinatorial problem in logic.

G. M. Saha obtained a series of PBIB designs which serve as balanced designs for asymmetrical factorial experiments. He also evolved a different approach to the analysis of certain common types of non-orthogonal data in which the analysis of designs for factorial experiments, balanced or not, is simplified to a great extent. He also obtained several results on weighing designs and technical configurations.

T. P. Tripathi obtained results regarding estimation of proportions in domains using inverse equal probability sampling, estimation of sub-population means on successive occasions and estimation for population ratios on successive occasions.

5. A number of workers are engaged in research activities in various other fields of mathematics and statistics. Three students obtained their Ph.D. degree and two more are expected to submit their thesis.

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6. Generalised Inverse

S. K. Mitra introduced optimal inverse of a matrix and studied its properties and applications. He also obtained solutions of the matrix equation $A \times B + C \times D = E$ by using canonical representation of a singular pencil.

7. Characterisation

B. Ramachandran proved a conjecture of Gøisser and disproved a conjecture of J. B. H. Kepermann on the normal law. He answered a question raised by C. R. Rao on maximal normal components for probability distributions in multidimensional space and solved a problem posed by Pyke and Marsaglia on probability laws. B. Ramachandran, V. Ramaswami and K. Balasubramanian have given a proof of the explicit formula for the stable c.f.'s which does not appeal to the infinite divisibility of and the consequent Levy representation for such characteristic functions. B. Ramachandran, V. Ramaswami and K. Balasubramanian have given a proof of the explicit formula for the stable c.f.'s which does not appeal to the infinite divisibility of and the consequent Levy representation for such c.f.'s.

8. Inference

R. S. Singh studied the nonparametric estimation of mixed partial derivatives of a multivariate density and studied its asymptotic properties. He studied the empirical Bayes estimation and sequence-compound estimation with rates in non-continuous Lebesgue-exponential families. He also studied the rate for uniform strong consistency of empirical distributions of independent non-identically distributed multivariate random variables. He studied the rates near $O(n^{-1})$ in empirical Bayes estimates for unbounded parameters in Lebesgue-exponential families. He obtained results regarding improving on known non-parametric uniformly consistent estimators of derivatives of a density. Singh and Tracy have obtained strongly consistent estimators of K^{th} order regression curves and rates of convergence.

9. Game Theory

T. E. S. Raghavan worked on completely mixed games and matrices with nonpositive off-diagonal elements. T. E. S. Raghavan and T. Parthasarathy have obtained results on the existence of saddle points and Nash equilibrium.

III. APPLIED STATISTICS, SURVEYS AND COMPUTING

During the year, the Applied Statistics, Surveys and Computing Division was mainly engaged in the following types of work: 1. Teaching and training, 2. Lectures and seminars, 3. Research, 4. Project work, 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.

1. Teaching and Training

The following courses were organised by the Division.

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1.1 *Diploma in Computer Science*

Three students were awarded the diploma in 1974-75, on the basis of an approved dissertation submitted after successful completion of work. Six trainees were admitted to the course in 1975-76.

1.2 *Specialisation in Applied Statistics and Data Analysis*

Six M. Stat. students in their final year completed the specialisation programme in August 1975. Seven final year students of M. Stat. course were admitted in 1975-76.

1.3 *Intensive Course in Programming and Applications of Electronic Computers*

This course is primarily meant for employed persons whose duties are concerned with computation and data analysis. Of the 20 trainees who enrolled for the eleventh session (29 October 1975—10 January 1976), 19 received certificates of merit and one a certificate of attendance. The emphasis in this course was on statistical methods in management.

1.4 *Six-week Specialisation Course on Mechanised Data Processing for Trainees of the International Statistical Education Centre, Calcutta: (Twenty-ninth Session)*

Six trainees from four countries participated.

1.5 *Occasional Course on Computer Programming In FORTRAN Language*

Four such courses meant for scientists and engineers were organised. Among those trained were five engineers from the West Bengal State Electricity Board and 22 technical personnel from the Bhilai Steel Plant.

1.6 *Course on Statistical Craftsmanship*

Six trainees completed the course which has been designed to impart practical training in statistical work with participation in live projects.

1.7 *Course on Operation of Punch Card Machines*

Ten trainees completed the course (June 1975) which imparts practical training in the operation of punch card machines—key punch and verifier, sorter, tabulator and reproducing summary punch. Twelve trainees were admitted to the course in September 1975.

1.8 *Miscellaneous Courses*

Refresher course of lectures on sampling theory and practice were organised for officers of the National Sample Survey Organisation at Calcutta during July-August 1975. A series of invited lectures were given by Dr. J. Roy to trainees of the Course on Data Processing for Social Scientists organised by the Council for Social Development, New Delhi, 18-22 December 1975.

2. *Research*

The staff members conducted research with an emphasis on Statistical Methodology and

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Computation. Biometricians attached to the Division were engaged in research on human health planning and on survival and growth factor for fish.

Twentythree research papers and technical reports were published and sent for publication.

3. *Project Work*

In order to maintain contact with live problems, the Division takes up statistical projects which may lead to theoretical developments. During the year, the Division was engaged in the following projects.

3.1 An evaluation study of the Pilot Intensive Rural Employment Project of the Government of India.

3.2 A cost-benefit analysis of selected projects sponsored by Rural Electrification Corporation, West Bengal.

3.3 System design and development for recruitment and the examination procedure of the Union Public Service Commission.

3.4 A study of the effect of input materials and process condition on the quality of X-ray films manufactured by the Hindusthan Photo Films Ltd.

The following surveys were started in March 1976:

- (i) An enquiry into the nature of urban poverty
- (ii) Household survey on distribution of public expenditure on Social Services in West Bengal, 1976.

4. *Consultation and Advisory Activities*

As in previous years, statistical and computational help was provided to individuals and organisations engaged in research and data processing work. Some staff members assisted the Union and State Public Service Commissions.

5. *Operation and Maintenance of H-400 system*

Fifteen major jobs were undertaken during the period on the computer system.

IV. PHYSICAL AND EARTH SCIENCES

1. *Chemistry*

Research was carried out on the interaction of organic nitrogenous compounds with soil-clays (absorption of cationic surfactants on clays, absorption of amino acid (glycine, alanine, lysine)—Complexes of Cu and Co metals on clay surfaces).

An electrical method for calculating cation exchange capacity of clays has been developed in the laboratory.

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One research report was prepared.

2. *Electronics and Communication Science*

The research activity in the Electronics and Communication Science Unit can be broadly classified into the following main three topics:

2.1 *Memory Technology*

The research problem in this topic includes both computer and biological systems. The activity is oriented towards the following sub-groups: Advances in memory technology; properties of biological memory and their simulation and circuit realisation; combinatorial reliability methods for improving system performances.

2.2 *Statistical Methods in Pattern Recognition, Learning Machines*

In the field of pattern recognition, the probabilistic and non-probabilistic theories were investigated and the Fuzzy set algorithm were studied to improve the recognition scores of various Indian languages. The other activities include the statistical studies of speech communication process; application of pattern recognition technique in information retrieval problems; computer simulation of intelligent robots; acoustic phonetic studies of Indian languages; design and development of optical scanners; and cybernetics and Man-Machine Communication Research.

2.3 *Digital Communication Technique*

The work consists of both theoretical and experimental investigation of data communication link between two places in an urban environment. The experimental work on phase lock technique and theoretical aspects of various codes, the problem of interference and noises have been studied. The switching and filtering techniques for efficient data communication are under investigation. A detailed study undertaken on the infrastructure requirements for digital-data-communication network in developing countries will be presented at the South East Asia Regional Computer Conference to be held in Singapore in September 1976.

2.4 *Training*

Eight students from technical institutions were given practical training for two months.

Nine papers were published and four read at conferences.

3. *Electronics*

3.1 *Theoretical Physics*

Research on the following problems was continued.

3.1.1 *Particle Physics*

The unity of elementary particle forces and the implications of the lepton-hadron relation.

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3.1.2 *Nuclear Physics*

The calculation of the nucleon-nucleon potential and phase shifts on the basis of the nucleonic structure.

3.1.3 *Cosmic Rays*

High energy experimental information and theoretical predictions are being utilised to explain the muon-electron ratio observed in cosmic rays experiments.

3.1.4 *Measurements Problem*

Some aspects of measurements problem in Quantum Mechanics are studied on the basis of a new theory of electrons and space-time quantisation.

3.2 *Physics of Fluids*

3.2.1 *Flow Analysis in Hydrocyclone Separators*

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 were carried out to analyse the laminar and turbulent flows on the conical surface of the hydrocyclone. Experiments were carried out in the Hydrodynamical Laboratory of the Applied Mathematics Department, Calcutta University, on three hydrocyclones with different overflow and underflow diameters. Flow patterns were photographed by injecting dye through tubes of small cross-section into different regions of the hydrocyclone.

3.2.2. *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 change the resistance to flow and the quantity of sediment transported and thus changes the depth of the flow, stage of the river, diffusion of waste, etc. In extreme cases, the change in bed configuration can cause a three-fold change in resistance to flow and ten to fifteen-fold change in the concentration of bed material transport. An experimental study was carried out in the tilting flume of the Hydrodynamical Laboratory of the Calcutta University, to study the mechanism of bed formation and sediment transportation. It appeared from experiments that surface waves have an important influence on the formation of ripples. Theoretical analysis is being carried out in that direction.

Arrangements for the installation of a recirculating flume at the Indian Statistical Institute were completed.

3.2.3. *Flame Stabilization Problem*

Mathematical analysis of a laminar flame front stabilized in a rectangular cavity was completed.

The mathematical analysis of the cold flow problem for an opposed jet was completed by assuming potential flow and the existence of two line vortices in the regions of recirculation. Theoretical results obtained were compared with experimental results obtained at the C.M.E.R.I., Durgapur.

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3.2.4. *Flow Model of a Tropical Cyclone*

Theoretical investigation was carried out to construct a flow model for the vortex flow in a tropical cyclone. The project was undertaken at the Meteorological Department, Calcutta Airport.

3.3 *Digital Techniques Laboratory*

3.3.1. *FFT Processor*

Real Time Analysis finds its application in diverse fields such as communication, radar, and pattern recognition. It concerns 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 smothering, etc.), data communication, pattern recognition, etc. Design including computer simulation has been completed. The work is in progress.

3.3.2. *Digital Filter*

Linear filtering and spectrum analysis are fundamental signal processing operations of great utility in many branches of sciences and technology. Some studies have been made on the design of a Universal Digital Filter. The work is being continued.

Five research papers were published and six technical reports prepared.

4. *Geology*

4.1 Integrated programme of research in the *Pranhita Godavari Valley* with emphasis on:

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

4.2 *Study of Recent Fluvial Processes*

Investigation into the basic process of fluvial transportation and deposition which is expected to provide insight into mechanism of sedimentation as operating in ancient river systems. This involves field studies in the Usri river valley around Giridih and experimental-theoretical studies at Calcutta.

Two research papers were published.

5. *Physics*

Studies have been conducted on the interaction of physics and medicine, particularly on the application of electrophysics in dermatology.

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Physics (theory and practice) was taught in the first, second and third years of B. Stat. (Honours) Course.

Two research papers were sent for publication.

V. BIOLOGICAL SCIENCES

1. *Anthropometry and Human Genetics*

The following studies were conducted.

1.1 *Social Biology*

Family health problems by social groups in rural West Bengal; Some aspects of family planning in Calcutta; Population composition by social groups in rural West Bengal; and biosocial problems of fertility.

1.2 *Genetics of Dermatoglyphics*

Dermatoglyphics among the Samthals; Haiti dermatoglyphic data.

1.3 Biomedical characteristics of the inhabitants of Mirpur and its adjoining villages in Midnapur District, West Bengal.

1.4 Health effects of Family Planning in Calcutta.

1.5 Human Chromosomes in health and disease.

1.6 Anthropometry and genetical follow-up study among the nomadic Nandiwallas of Maharashtra.

1.7 Genetic analysis of inheritance of C-line polymorphism.

1.8 Analysis of anthropometric and biochemical serological data collected in ISI—Soviet Research Project, 1971.

1.9 Genetic study of human placental enzymes.

1.10 Biochemical polymorphism and blood groups among Andhra castes and tribes.

1.11 Relationship between cervical cancer and enzyme polymorphism.

1.12 Analysis of biological data collected in Dhangar Project.

Eight research papers were published.

2. *Biochemistry*

The following experimental studies were conducted.

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2.1 Inorganic pyrophosphatase in green leaves.

2.2 Emodin from *Cassia tora* Linn.

2.3 Protolytic activity of germinating pulses.

Two research reports were prepared.

3. *Crop Science*

The following studies were continued.

3.1 Biometrical studies in levo- and dextro-rotatory situations in plants. Data on several species of plants and animals were collected from various geographical regions to work out the possible association between asymmetry and latitude.

3.2 Studies on the germination process, morphology, anatomy and floral biology of species of palms.

3.3 Studies on Fibonacci numbers and their application to biological structures were made on some additional species of plants and animals.

3.4 Animal behaviour studies on the Baya weaverbird, crabs and the common house crow.

Thirteen research papers were published and/or sent for publication.

4. *Embryology*

The following researches were conducted.

4.1 The biosynthesis of various macromolecules like R.N.A., D.N.A. protein, in the course of embryonic development.

4.2 Nuclear control in *Acetabularia*—the giant cell.

Certain marine organisms collected from the Andamans were examined by a specialist on coral fauna. It appears that this is the first report on such organisms from Indian waters.

5. *Leaf Protein*

A list of research topics studied on different aspects of leaf protein is:

5.1 Screening of local vegetation.

5.2 Optimal conditions like fertilizer dose, harvesting time and seed rate in various crops.

5.3 Establishment of optimal conditions by statistically designed experiments.

5.4 Proper utilization of water woods.

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5.5 Possible use of byproducts like fibre and fluid.

5.6 Nutritional aspects.

5.7 Acceptability problems.

5.8 Storage and keepage quality.

5.9 Processing conditions.

5.10 B-carotene stability.

5.11 Some physiological aspects.

5.12 A detailed study was taken up on the rate of uptake minerals like P, K & N by water hyacinth from water.

One paper was published and two sent for publication.

VI. SOCIAL SCIENCES

1. *Demography*

The following research work was conducted.

1.1 Analysis of data from female schedule, Calcutta Fertility Survey 1970.

1.2 Analysis of comparable data on family planning from male and female schedules, Calcutta Fertility Survey 1970.

1.3 Study of demographic factors in rural development.

1.4 Study of inter-State variations of nuptiality in India.

1.5 Preparation of an annotated bibliography of studies by the Demographic Research Centre, 1957-75.

1.6 Study of fertility and family planning situation in India.

1.7 Evaluation of family planning programme in India.

2. *Research in Economics and Econometrics*

The Economic Research Unit (E.R.U.) conducted research which covered various fields of applied economics and econometrics and undertook the main responsibility of teaching economics, econometrics and planning on the different courses of the Institute in Calcutta. Four students were selected for the advanced course in economics leading to the Ph.D. degree (1975-76) and four others assisted in projects.

The major research projects were the following.

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2.1 Study of Interdependence of Coal, Power, Steel and Transport in the Eastern Region

A study on the interdependence of the key sectors—coal, power, steel and transport—in the eastern region of the Indian economy had been assigned to ERU by the Planning Commission. The investigation for the Project was carried over an year. The final report outlining the deficiencies in the industrial system leading to the development of bottlenecks in critical areas and suggesting possible remedies was submitted to the Planning Commission in June 1975.

2.2 Haldia Project Study

The Unit carried out a sample survey of industrial and construction labour (including contractors' labour) working in the Haldia Project. The object of this survey was to study the socio-economic characteristics of the workers—the terms and conditions of their service, their living conditions, occupational history and links with native place and agriculture. The data collected from about 500 workers were scrutinized and the tabulation partly completed during the year under review.

2.3 Industrial Type Study Survey Series, Greater Calcutta, 1976

The series was initiated in March 1975 in collaboration with State Planning Board and Urban Centre of the Indian Institute of Management, Calcutta, with the purpose of studying the structure and functioning of the major industry "types" in the city. The main elements of the study relate to the broad socio-economic-technical characteristics of the types, their modes of operation and relations with the most of the economy. The surveys for these industry types, viz. (a) food and beverage, (b) paper and board, and (c) glass, were completed in 1975. Further surveys will be taken up after the completion of a preliminary report based on the three surveys and background data, which is under preparation.

2.4 Survey of Unorganized Transport Workers: Calcutta, 1976

The work on the project, sponsored by the ICSSR Advisory Committee on Poverty and Unemployment, was started in November 1975. The listing and sample selection were completed for most groups of workers. The schedule and the instructions were finalized, and necessary training imparted to the investigators. The schedule-filling work will be undertaken from April 1976. About 1200 sample workers in and around Calcutta—gin and cycle rickshaw pullers, handcart pullers and porters of various types—would be interviewed. The object is to collect information on these groups of unorganized labourers so as to study various aspects of their life and work and the structure of these unorganized labour markets and thereby depend our understanding of the poverty in urban areas.

2.5 Study of Energy Policy

A study on the economic utilization of coal in the country was undertaken during the period. The various measures for improving the efficiency of coal in industrial use were examined. The policy for switching over to coal from forest and animal products in domestic use was critically analysed.

The utilization of urban waste as a source of manure for agricultural use was the subject of an analytical model which was worked out to serve as a guide for their optimal use.

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Four research papers were published, 12 papers read at conferences and 10 technical papers were released.

2.6. *The research work conducted at the Delhi Centre in Economics and Regional Planning* covered a number of areas in economics, econometrics and statistics. The important topics covered included foreign trade policies of India and their impact on economic development, foreign trade sector in planning models, optimal trade policy and compensation under endogenous trade uncertainty, Indian inflation and its differential effects, methods of demand projections, structure of Indian economy, a labour co-efficient vector and input-output matrix in the Indian Economy for 1970-71, self reliance and India's planning strategy, power and distribution of profits, studies in regional planning covering micro and macro levels of areas and the development of appropriate cartographic techniques in special analysis and synthesis.

2.7 Project Work

2.7.1 Work was continued on the project "Contractual relations on Indian agriculture and their effects on productivity employment," taken up on a grant from the Indian Council of Social Science Research.

2.7.2 A draft on the structure of the economy of Uttar Pradesh was prepared with the help of a economist who acted as a consultant to the U.P. State Planning Commission.

2.7.3 The project report on "Central Place Hierarchy for a Developing Region—Karnal Area (Haryana)" was published under the title *Micro Level Planning—Case Study of Karnal Area (Haryana)*.

2.7.4 In a regional study of Goa, the processing of data on demographic and social services was completed.

2.7.5 In collaboration with the Bombay University, a study was completed on the Process and Patterns of Urbanisation in India. The findings of the study were published in a book entitled, *Essays on World Urbanisation*, Ronald Jones, Editor.

A study of the pattern of urbanisation around Delhi was completed. A study on the Market towns and spatial development in Haryana is in progress.

2.7.6 Data on migration available from 1971 census and NSS reports are being analysed.

2.7.7 A labour co-efficient vector and input-output matrix in the Indian economy, 1970-71, was prepared. The project was sponsored by the World Bank.

2.8. Teaching and Research Guidance

Teaching in the One-year Evening Course in Statistical Methods and Applications was undertaken as in earlier years. In the second term of the course, 13 students passed, while 41 students joined the new session in October 1975.

Teaching was continued for the second and final years of the M. Stat. degree of the Institute. Four students were admitted to the second year and two students entered the third year.

Sixteen research scholars are working on their doctoral dissertation. In addition to the courses for M. Stat. level open to these scholars, seminars were also offered to them.

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Three books and documents were translated from French. Thirtyfour seminars by foreign and Indian scientists were organised by the Delhi Centre. Twenty-six discussion papers were presented by visiting scientists and staff members. Fifteen research papers, were published during the year and twenty papers submitted for publication and/or read at conferences.

3. Family Planning

The undermentioned new and continuous projects comprised the activities of the Family Planning Research Unit.

3.1 Studies on Medical Termination of Pregnancy (MTP) in Calcutta hospitals.

Women who had MTP in four Calcutta hospitals during April 1972 to July 1973 were interviewed and data was collected from hospital records.

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

Sixtythree schools participated in the study which indicated that the most urgent need was a revision of curriculum for inclusion of topics on population and family planning and the training of teachers.

3.3 The role of voluntary organisations in family planning promotional work. The study is being conducted among four organisations in Calcutta.

Five research papers were prepared by the staff, in addition to the *Annotated Bibliography: Research Studies of Communication Action Research Centre, 1962-65*. Three papers were sent for publication.

4. Linguistic Research

4.1 Study of the phonetic structure of Indian languages and application of results in speech pathology, teaching of second language and the cultivation of mother tongue

Research is being conducted on Bengali, Hindi, Telugu and Punjabi phonetics, speech habilitation and audiometric tests.

4.2 Investigation of problems relating to the structure of meaning.

Research is being conducted on ranking of speech sound features in the phonetic structure of Indian languages; behaviour of speech sounds in isolated dictionary entry words or contextual words; and the stability of speech sounds.

4.3 A statistical approach to linguistic problems: Statistical studies are in progress and are planned in Bengali, Hindi, Telugu and Serbo-Croat languages.

4.4 Publications

The manuscripts of following books have been prepared:

- (i) A Short Outline of Telugu Phonetics by D. Kostic, A. Mitter and Bh. Krishnamurti (Indian Statistical Institute)—in press.

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- (ii) Tests for Articulatory Evaluation of English Speech Sounds by D. Kostic, A. Mitter (Draft Version, Calcutta 1974, Revised Draft Version 1975).

5. National Income Research

The National Income Research Unit (N.I.R.U.), Calcutta, is mainly engaged in analytical studies on national income and its several distributions. In these studies, the objective is to obtain, among other things, estimates which are not available in official statistics, working out inter-relations among relevant variables and furnishing thereby explanations of the growth of Indian economy.

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

5.1 The work of preparing component tables of State accounts of West Bengal and other Eastern States was taken up by the N.I.R.U., in accordance with the recommendations of the Committee on Regional Accounts.

5.2 The work on the shifting and incidence of indirect taxes through Leontief's input-output model, taken up in the previous year, was completed.

5.3 To show the extent of government subsidy on higher education and the extent to which different income groups enjoy such benefits, a study was undertaken and completed during the year.

5.4 In a household survey, undertaken during the year in collaboration with the Indian Council of Social Science Research, a comprehensive study is being made of the distribution by expenditure levels of benefits of public expenditure on social services.

5.5 The analysis and interpretation of National Sample Survey (N.S.S.) household budget data (18th round, February 1963-January 1964) was one of the major areas of operation.

5.6 Two new investigations undertaken during the year were (i) Attempt to work out the conceptual underpinnings of a measure of national development (MND) which is allied to, though different from both net national product and net national welfare; (ii) Linkages between the systems of economic and social statistics were explored and a scheme was prepared for the development of social statistics in India.

Five research papers by staff members were published; 14 papers were sent for publication; and two technical reports were prepared.

6. Pre-Census Population Studies

The Pre-Census Population Studies Unit (P.C.P.S.U.) continued with the following projects during the year.

6.1 Pre-Census Population Studies

The collection and compilation of data on pre-census studies continued for the period 1801-1810 and 1831-1840. Unpublished data on 22 villages of Phapoond Pargana, Etawah District,

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Uttar Pradesh, for the year 1822-1823 was used to trace some aspects of socio-economic and sociodemographic changes between 1822-1823 and 1971.

6.2 *Economic Changes in Rural India*

A village in Birbhum District, West Bengal, surveyed by Kalimohan Ghosh in 1925 following guidelines of Rabindranath Tagore was resurveyed; and (ii) up-to-date data on socio-economic variables were collected from different *tehsil* headquarters of Aligarh District, U.P.; these villages were originally surveyed in 1822 in the course of settlement operations. A survey of the trend of socio-economic changes in Bengal Presidency has been attempted for the period 1750-1800.

6.3 *Dr. Francis Buchanan's Survey of Six Districts under the Presidency of Fort William in 1807-1814.*

Professor P. C. Mahalanobis procured the microfilmed manuscripts of this survey with a view to publishing them serially. The manuscripts of Gorokhpur district were transcribed. An analytical paper indicating socio-economic changes of the tract was presented at the Fortyfourth session, Indian Historical Records Commission, Bikaner, 22-23 January 1976.

6.4 *A Socio-Economic Bibliography of India upto 1970*

Some additions were made to the compiled materials.

7. *Psychometry*

7.1 Validity studies were completed of the selection procedure for the Bharat Aluminium Co. Ltd., Hindustan Copper Ltd., Indian Telephone Industries Ltd., Union Public Service Commission, and Indian Airlines Corporation. Reports are now available.

7.2 In order to improve the selection tests for graduate engineers, technicians of the Psychometric Research and Service Unit, ISI, visited the plant of the Bharat Heavy Electricals Ltd., Hardwar, for a study of working conditions. An experimental test battery was administered on the employed engineers.

7.3 The Unit participated in the selection programme for the All India Management Association, Bharat Heavy Electricals Ltd., Larson & Toubro Co., Hindustan Aeronautics Ltd. and other public and private sector organisations.

7.4 The Psychometric Research and Service Unit also took part in the selection of personnel in the Indian Statistical Institute. The Unit undertook the teaching of educational statistics and guidance for doctoral work.

7.5 Theoretical and practical training in psychometry was arranged for six weeks for an officer on deputation from the Indian Telephone Industries Ltd., Bangalore.

8. *Sociology*

Of the large number of research projects in the Sociological Research Unit which have either been completed or are in progress, the following may be noted.

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- 8.1 A programme of a special purpose Data Centre for substantive research.
- 8.2 Content Analysis (on social change in India).
- 8.3 Pilgrim Centres: a comparative study of Hindu pilgrims and their activity in Eastern India.
- 8.4 Group relations in Giridih and surrounding areas with special reference to the development of the scheduled castes and tribes.
- 8.5 Inequality in the Third World State: concepts and measures of equality—inventory of Indian situations.
- 8.6 Exploratory research on evolution of Nepalese politics since 1960: a study of the growth and development of the *panchayat* system of polity.
- 8.7 Changes in kinship structure and orientation in India, in general, and West Bengal in particular, over the period of 20 years, 1946-47 to 1965-66.
- 8.8 Socio-economic structure and changes in some selected backward regions of West Bengal and Bihar.
- 8.9 Problems and possibilities of utilization of national sample survey data (1-19 rounds) and agro-economic data, preparation of a directory of social science institutes in India.
- 8.10 Preparation of a directory of reputable sociologists of India, at the initiative of the Department of Sociology, Bielefeld University, Federal Republic of Germany.
- 8.11 Trend Report on Indian Sociology.
- 8.12 A study of violence as a tool of change in the Indian polity, with 1857 as a starting point.
- 8.13 Socio-cultural and biological adaptation in contrasting eco-systems, in collaboration with anthropologists of the Institute.
- 8.14 *Workshop on Understanding the Social Reality, 4-6 October 1975.*

The Workshop sponsored by the Sociological Research Unit was attended by social scientists of different disciplines, including Dr. J. Mathes, Professor of Sociology, University of Bielefeld, Federal Republic of Germany. A synopsis of the proceedings was published.

8.15 *Publications*

- (i) Variation in Family Structures in West Bengal: 1946-1966 (in two volumes); and
(ii) Family and Planning in India.

Both are in the press for printing.

Ten research papers were published.

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VII. STATISTICAL QUALITY CONTROL (SQC) AND OPERATIONS RESEARCH

1. *Introduction*

The Statistical Quality Control (SQC) Division was set up by the Government of India in 1952 under the technical guidance of the Indian Statistical Institute with the object of promoting applications of Statistical Quality Control and Operations Research (SQC & OR) methods, training of technologists and trainers, servicing of industrial establishments and conducting research in statistical quality control, operations research and allied methods. From a start of three specialists and an annual grant of only Rs. 0.50 lakh, the Division has now grown to twelve centres manned by about 60 specialists. Sixty-five factories which are being serviced at present include some of the key public sector plants, viz. steel, electronics, heavy electricals, high pressure boilers, and large-scale public utilities like railways and state transport organisations.

During the period 1975-76, the main emphasis was given on the development of quality systems, training of trainers and operatives, application and appreciation programmes for executives, scientists and technologists and on special project studies to cut down costs by way of reduced wastes and rejections in each factory. At Calcutta, Bombay, Madras and Bangalore, specialised training courses are being conducted regularly in SQC & OR at the professional level for managers and technologists from industry. The Division has so far trained about 16,000 managers and technologists, scientists, workers, serviced about 1,200 factories and turned out over 400 specialists in quality control. In addition to a large number of popular write-ups, the Division has prepared around 300 research papers, technical literature, manuals, etc. in quality control and operations research.

2. *The Policy Advisory Committee*

The work of the Division is guided by a high-level Policy Advisory Committee consisting of Shri M. 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, SQCDivision, ISI) as members. The Committee has rendered notable service in promoting the work of the SQC Division in select sectors in public and export-oriented industries.

3. *Service*

Four major industrial establishments, two in the private sector and two in the public sector were taken up for SQC servicing during the period. In the private sector, work started in both the units of Messrs. Dunlop India Ltd. at Calcutta and Madras. A special weight control project in all the five units of Messrs. Brooke Bond India Ltd. was undertaken. The Mysore Iron & Steel, Bhadravati, and Government Soap Factory, Bangalore, took up SQC service during the year.

3.1 Special studies taken up during the year include the yield improvement in X-ray films, reduction of delays in rotor blade balancing in turbine generators, evaluation of current status of quality programme in some fine chemical industries, organising life testing on some components and sub-assemblies in heavy electricals hardware.

3.2 Reliability studies were taken up in some of the power generating equipment divisions

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in the Bharat Heavy Electricals Ltd. A number of seminars and discussion meetings were arranged while following up the programme of field quality assurance.

3.3 The development of quality systems and the training of personnel from within the plants was one of the key activities in the heavy electricals, electronics and medium-sized producer goods industries. Vendor quality programmes were initiated for the Bharat Heavy Electricals, Hindustan Steel Ltd., and Hindustan Photo Films. Special training courses, seminars, and discussion-meetings were organised for the representatives from the vendor plants, and the impact has been quite encouraging. During the year, 65 plants were regularly serviced, 293 technical reports were sent to the factories, 10 new plants were taken up for service, while 8 plants discontinued.

4. Education and Training

Training activities were diversified. Orientation courses for the operatives in regional languages were extended to a number of industries. Training manuals were developed in Tamil, Kannada, Telugu and Bengali.

Special executive development programmes and supervisory development courses were organised at the request of two major groups of textile manufacturers, Messrs. Lala Srilam and Messrs. Loyal Textiles. The programme covered techniques of quality improvement for export, cost reduction approaches in production, and programme for the production efficiency improvements.

An executive development programme on field quality assurance was specially designed for the executives of the Bharat Heavy Electricals Ltd.

In the Calcutta region, special attention was given to the training of industrial executives. Three industry-wise programmes were designed, one each for jute, engineering and foundry, and general management course on organising for quality. A few interesting applications were generated by the participants during their practical training as a part of the programme.

184 trainees underwent professional training both at the post-graduate and undergraduate levels, in the part-time courses at Bombay, Madras and one-year full-time course, etc. at Calcutta as well as in the six-month evening course at Bangalore.

A series of special courses and lectures were arranged by visiting experts to the Institute. In this series, programmes were conducted by Professor Paul Peach, United Nations, Dr. I. Baba and Dr. G. Taguchi from Japan and Dr. K. G. Murthy, Visiting Professor from the USA, in the area of Management of Quality Control and Operations Research, systems approach to quality development and design of experiment at the centres in Calcutta, Madras, Bombay, Hyderabad, Bangalore and New Delhi. Altogether 318 executives and specialists from different industries were trained in these courses.

The arrangement with the Department of Administrative Reforms, Ministry of Home Affairs, Government of India, continued during the year for the training of departmental officers in quantitative techniques on SQC & OR. One thousand eight hundred and twenty-five persons were trained in the in-plant and other courses in the basic techniques of SQC.

5. Promotion

Promotional activities were intensified during the year. The programme in the public sector

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enterprises continued. Special seminars were arranged for the managing directors of all the industries under the Department of Public Undertakings, Government of West Bengal.

Introductory visits were paid to 81 plants and 41 pilot studies were completed. Sixteen pilot study reports were brought out from different SQC centres. The staff members attended 24 seminars; 33 seminars were organised and 117 lectures/talks were delivered during the year.

6. *Research*

Eleven papers were published, six sent for publication and twenty-nine manuals and technical reports prepared during the year by staff members.

The Division launched surveys to evaluate the status of quality in foundry and engineering industries. Special studies are being undertaken to extend help to small-scale plants. A programme has been worked out to organise training and undertake service at the Cooperative Textile Mills, Andhra Pradesh.

Efforts are being made to launch SQC programmes in all the industries under the Department of Public Undertakings in the States. Work has already been started with the Government of West Bengal and four projects were taken up.

VIII. LIBRARY, DOCUMENTATION AND INFORMATION SCIENCES

1. *Library*

1.1 The Central Library at Baranagar had a collection of 1,33,179 books and bound journals in the previous year; with the addition of 1278 books during the year, the collection rose to 1,34,457 books and bound journals; 33,226 reprints, monographs, specialized 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 the Central Library to serve the researchers, students and staff of the Institute.

1.2 *Membership*

The total membership of the Library during the period was 2873, the break-up of which is as follows:

General members including staff, research scholars, students, guests and N.S.S.O. staff: 2203; student members (outside): 350; sessional members: 270; and Institute members: 50. Only 325 casual readers were given special permission to use the library during the period.

1.3 *Acquisition*

During the year, the library received 2,723 current periodicals, the break-up of which is as follows: 926 received through subscription, 1,050 on exchange; and 747 on a complimentary basis.

Fifty-six new periodicals were added to the existing number, of which 15 were received on subscription, 11 on exchange and 30 on a complimentary basis.

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The library continued its exchange with 161 foreign and 41 Indian institutions and received books, periodicals and other serials in exchange of *Sankhyā*, The Indian Journal of Statistics, and other publications. Four hundred twentyfive government publications were accessioned and processed.

1.4 Technical Processing

1861 books were classified and 1743 catalogued in the Technical Processing Unit. Cards filed numbered 7720 and 385 duplicates were added to the collection.

The Central Records Unit processed and indexed 1845 old files, 2,855 maps and 1,620 newspapers. Fifty titles of Government publications were processed in the Library Records Unit.

1.5 Circulation

Publications loaned to the readers numbered 51,375; the break-up is as follows: books, 9595; books on reference, 23,462 and journals, 18,318.

Three hundred fiftytwo newspapers, 32 maps and 175 old files were also issued for reference.

The library made inter-library loan transactions with 14 local and outstation libraries; 55 publications were borrowed, and 5 were lent out to other libraries.

1.6 Reference and Bibliographical Services

The following technical projects are in progress:

- (i) Revision and updating of the Union List of Learned Periodicals, Calcutta Region, 1959;
- (ii) Preparation of Guide to Official Publications.

1.7 Translation

In all 22 documents were translated from foreign languages, French-5, German-9 and Russian-8. The break-up is: Biochemistry-1, Biology-1, Computer Science-7, Econometrics-3, Mathematics-4, Palaeontology-1, Physics-1, Sedimentology-3 and Miscellaneous-1.

1.8 Photography

The following is the break-up: (a) Photographs, black and white-1121, (b) Bromide enlargements-3781, (c) Slides-678, (d) Microfilms-1937, (e) Photoprints-4574, (f) Photostat-122, (g) Reproduction from colour 35 mm slides-321, (h) Black and white reproduction- 544 and (i) Processing of films-14.

1.9 Reprographic Service

1416 pages were xeroxed and 3904 additional copies were prepared. 14,107 pages were reproduced by offset duplicating process (Rotaprint).

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1.10 *Circulating Library*

The Workers Circulating Library had a collection of 27,037 books. The total membership was 2,065. The total issue and return figures numbered 38,867, as against 44,523 last year.

2. *Documentation Research and Training Centre (DRTC), Bangalore*

2.1 *Training*

The ten candidates admitted for training in Documentation for 1974-76, completed their formal training. They are now working on the Trend Report to qualify for the Associateship in Documentation awarded by the Indian Statistical Institute.

Nino candidates were admitted to the Documentation Course, 1975-77, which commenced on 1 August 1975.

2.2 *Research*

The main subjects of research were:

1. Teaching of Library and Information Science;
2. Indexing and Thesauras in Information Systems;
3. Design and Development of Information Systems;
4. Computer-based Information Systems;
5. Plans for Information Systems;
6. Standards;
7. Other Activities in Relation to Regional, National and Global Information Systems.

2.3 *Projects*

Ten students of the 1974-76 batch of the course, who completed the formal training on 31 July 1975, submitted projects which consisted of the study of subjects and design and development of depth classification schedules.

2.4 *Seminars*

All India Seminar on Thesauras in Information Systems, Bangalore, 1-5 December 1975. Twentyone papers including two from abroad were presented at the symposium, jointly sponsored by the D.R.T.C., and the Indian National Scientific Documentation (INSDOC), New Delhi. The accepted papers were printed and copies of the volume were distributed to the authors and other participants numbering about 90.

(ii) UNESCO Regional Seminar on Scientific, Technical and Industrial Information Services, New Delhi, 22-26 March 1976. The seminar was jointly organised by the DRTC and INSDOC. Professor Neelameghan who chaired a session, contributed a background paper on regional and inter-regional collaboration.

2.5 *Collaboration & Consultation Work*

- (i) The D.R.T.C. continued its collaboration with the Sarda Ranganathan Endowment

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for Library Science in the publication of the quarterly, *Library Science with a slant to documentation*.

(ii) As a member of the Documentation Sectional Committee, Indian Standards Institution, the DRTC helped in the revision and preparation of draft standards.

Consultation service was provided, among others, to the Central Drug Research Institute, Lucknow; Department of Science and Technology, Government of India, Institute of Petrol Exploration, Dehra Dun; Research and Development (Group II) of Larsen & Toubro Ltd., Bombay; Bharat Heavy Electricals Ltd.; Indian Space Research Organisation; Tata Energy Institute, Bombay; and Hindustan Steel Ltd., Ranchi.

2.6 Joint Projects

(i) The first course on Documentation and Information Systems and Services, 12 March 1975-22 May 1975, sponsored by the Department of Science and Technology, Government of India, was jointly organised by the Documentation Research and Training Centre, Bangalore and the Indian National Scientific Documentation Centre (INSDOC), New Delhi. The second short-term course was conducted in November 1975.

(ii) In a survey sponsored by the Department of Science and Technology and conducted by the DRTC and INSDOC, information was collected from about 200 institutions in India which generate, collect, organise and disseminate data on different fields of interest.

2.7 International Collaboration

(i) The D.R.T.C. has been designated by the United Nations Educational, Social and Cultural Organisation (UNESCO) as the National Information Transfer Centre for collecting and reporting information on research in progress, publications, etc., in library science to the UNESCO for a programme called the International Information System on Research in Documentation. During the period, some research projects were reported to the UNESCO.

(ii) The Committee on classification of the International Federation for Documentation, functioning in the DRTC, since January 1973 has published a volume of FID/CR Newsletter and a FID Report.

(iii) On a request from the UNESCO, the DRTC has agreed to arrange a seminar of supervisors of library schools in Asia during June 1976. Professor A. Neelameghan contributed a paper to help in the preparation.

2.8 Publications

(i) Presentation of ideas in technical writing by A. Neelameghan, Vikas Publishing House, New Delhi, pp. 189.

(ii) Volume of papers of the Seminar on Thesaurus in Information Systems, pp. 203.

2.9. Research Papers

Eleven research papers were contributed by the staff members at conferences and three papers were published.

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IX. CONFERENCES, SYMPOSIA AND SEMINARS

Among the different conferences symposia and seminars organised by the Indian Statistical Institute or in collaboration with other scientific bodies were the following:

9.1 *Indian Society of Human Genetics, Second Annual Conference, 10-13 November, 1975, Calcutta*

The conference, held under the auspices of the Indian Statistical Institute in its campus, was inaugurated on 10 November 1975 by Dr. S. P. Roy-Chaudhuri, Professor Emeritus, Department of Zoology, Calcutta University. Professor S. K. Mitra, Director, Research and Training School, I.S.I. welcomed the participants. Papers, numbering about 120, were on (1) The Biology of Man in Eastern India, (2) Population Studies, (3) Biochemical Genetics, (4) Human Cytogenetics, (5) Clinical Cytogenetics, (6) Genetic Selection in Man, (7) Population Structure, (8) Clinical Genetics, (9) Interference Studies, (10) Human Variation, and (11) Theoretical Models in Genetics.

9.2 *Fifteenth Annual Econometric Conference, 29-31 December 1975, Calcutta*

The Indian Econometric Society held the three-day conference under the auspices of the Indian Statistical Institute in its campus. The conference in which over 100 econometricians from India and abroad participated was inaugurated by Shri P. N. Haksar, Deputy Chairman, Planning Commission and President, Indian Statistical Institute. Dr. C. R. Rao, F.R.S., Secretary-Director, I.S.I., welcomed the participants and Professor M. S. Iyengar made the Secretary's report. Over 50 research papers, covering a wide range of economic problems and techniques, were discussed and presented in the fourteen technical sessions. Special lectures were delivered by Professor Marc Nerlove, Northwestern University, U.S.A. and Professor T.N. Srinivasan, Indian Statistical Institute, New Delhi. Both of them were awarded the Mahalanobis Memorial Medal, 1975 (International Award), for their outstanding contributions to quantitative economics at the Third World Econometric Conference, Toronto, Canada, August 1975. There was a panel discussion on "Survey Methods in Econometrics." The economists of the Indian Statistical Institute submitted six research papers.

9.3 *Symposium on Recent Developments in Survey Methodology, 22-27 March 1976, Calcutta*

The symposium organised by the Indian Statistical Institute with the support of the Indian Council of Social Science Research was inaugurated by Dr. C. R. Rao, Secretary-Director, I.S.I. on 22 March 1976. Professor P. K. Bose, Pro-Vice-Chancellor, Calcutta University, and Professor M. Mukherjee, Director, Research and Training School, I.S.I., were among the speakers at the inauguration. About 50 papers were presented by the participants on Sampling Theory, Repetitive Surveys, Opinion and Behaviour Systems, Survey Operations and Area Surveys.

X. 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 37, Part 1

Series B : Volume 37, Part 1

Series C : Volume 37, Part 1 (Sample Survey—Theory and Practice)
Part 2 (Quantitative Economics)

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Print order has been given for Series, A Volume 37, Part 2. The preparation for publishing Series A, Volume 37, Part 3 and Series B, Volume 37, Part 2 are nearly completed.

Sixty-five technical reports were issued, of which 27 were in the mathematics-statistics group and 38 were on other subjects.

A backlog of materials for twelve issues of *Sankhyā* and an additional 1500 edited manuscript pages are lying with the printers.

XI. SOCIETY-TYPE ACTIVITIES: BRANCHES

1. *Karnataka Branch*

In view of the change in the name of the State, the Branch was re-named "The Karnataka Branch."

1.1 *Membership*

There were 51 members at the end of the year (life members: 18; institutional members: 5; and ordinary members: 28). During the year, nine ordinary members became life members; six ordinary members were admitted; four members were dropped from the rolls for non-payment of subscription.

1.2 *Surveys*

The report of the "Survey on Living and Working Conditions of the Students of Bangalore University", organised through the Branch by the University's Department of Statistics, was released during the year. The survey which involved 40,000 students revealed many interesting features about the attitude of students to the solution of their problems.

1.3 *Seminar and Lectures*

(i) A seminar on utilisation of farm waste for rural industrial growth was organised jointly during the year with the Karnataka State Financial Corporation, Forum of Science & Technology, Indian Dairy Science Association and Alumni Association and National Dairy Research Institute, Bangalore. A paper on "Statistical approaches in studies of utilisation of farm waste for industrial uses" was submitted jointly by Shri B. V. S. Rao, member, Executive Committee and Professor Srinagabhusana, Secretary of the Branch. A committee was formed to undertake a study on estimating farm waste and its utilisation from a selected village. Shri C. S. Seshadri, Chairman of the Branch, presided over the first session of the seminar.

(ii) Under the joint auspices of the Karnataka Branch of the Indian Statistical Institute, Institute of Engineers (India), Karnataka Centre, and Bangalore Management Association, a meeting of teachers on 30 May 1975, was addressed by Shri P. N. Haksar, Chairman of the ISI Council and Vice-Chairman, Planning Commission, Government of India. Shri C. S. Seshadri, Chairman of the Branch, presided.

(iii) Under the joint auspices of the Karnataka Branch and the Bangalore Management

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Association, Shri H. C. Ramanna, Vice-Chairman of the Branch, gave a lecture on the novel concept of management by sampling.

1.5 Construction Work

Following financial sanction by the ISI Council for preliminary work in connection with the development of the Bangalore campus, the Committee constituted by the centre started work for drawing up a comprehensive plan for a phased development of the campus.

1.6 Bye-laws

The revised bye-laws for the working of the Branches were approved by the ISI Council enabling the Branches to continue without interruption their activities of promoting the application of statistics and statistical methods and approaches to various problems in industry; administration and planning.

2. Bombay Branch

2.1 Membership

The membership of the Bombay-Poona office during the year was as follows.

Life members: 18; ordinary members: 15; total 33.

2.2 Selection Tests

The Bombay Branch conducted a number of selection tests on behalf of the Psychometric Research and Service Unit of the Institute. Among the organisations for which admission tests were held may be mentioned Bharat Heavy Electronics Ltd., New Delhi, Food Corporation of India, Sindi, Indian Airlines, Bombay, and Hindusthan Airlines Ltd., Bangalore.

XII. LIST OF SCIENTIFIC PAPERS PUBLISHED

A. Mathematics and Statistics

- 1 Ghosh, J. K. (with Ghosh, P. K.) (1975): Location change in marginal distribution of linear functions of random vectors, *Jour. Multivariate Analysis*, 5, 294-299.
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- 3 Maltra, A. (1976): Integral representations of invariant measures, *Trans. Amer. Math. Soc.*, 229, 209-225.
- 4 —(with Rao, B. V.): (1976): Selection theorems for partition of Polish spaces, *Fundamenta Mathematica*. 93, 1, 47-56.
- 5 Raghavan, T. E. S. (with Parthasarathy T.) (1975): On the existence of Saddle points and Nash Equilibrium, *SIAM Jour. Control*.

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- 6 **Raha, A. B.** (1975): On minimal N-compact Spaces, *Proc. Amer. Math. Soc.*, 51, 209-212.
- 7 **Rao, C. R.** (1975): Some problems of sample surveys, *Advanced Appl. Prob.*, 7, 50-61.
- 8 — (1976): A natural example of a weighted binomial distribution. *Am. Statistician*, 31, 24-26.
- 9 — (1976): Characterization of prior distributions and solution to a compound decision problem, *Ann. Statist.*, 4, 823-835.
- 10 — (1976): Estimation of parameters in a Linear Model—Wald Lecture 1. *Ann. Statist.*, 4, 1023-1037.
- 11 — (with Khatri C. G.) (1976): Characterization of multivariate normality. Part 1—through independence of some statistics. *Jour. Multivariate Analysis*, 6, 81-94.
- 12 — (with Puri, M. L.) (1975): Augmenting Wilk-Shapiro test for normality. *Festschrift Volume for A. Linder*, 129-139.
- 13 **Rao, Ramachandra A.** (with Nirmala, K.) (1975): The number of cut vertices in a regular graph. *Cahier de Centre D'etudes de Recherche Operationnelle*, 17, 295-299.
- 14 **Rao, Ramachandra A.** (with Rao, Bhaskara K. P. S.) (1975): Modularity in combinatorial Geometrics, *Proc. Ind. Nat. Acad. Sci.*, 41, 260-263.
- 15 **Roy, A. K.** (1975): Closures of faces of compact convex sets, *Annales de l'Institut Fourier*, 23, 221-234.
- 16 — (with Rajagopalan, M.) (1976): Some results on dilations of measures on compact convex sets, *Jour. des mathematiques Pures et appliques*, 55, 173-188.
- 17 — (1976): Extremal dilations and their associated extremal measures, *Jour. Functional Analysis*, 21, 8-31.
- 18 **Saha, G. M.** (1975): Some results in tactical configurations and related topics, *Utilitas Mathematica*, 7.
- 19 — (1975): A note on relations between incomplete block designs and weighting designs, *Ann. Inst. Statist. Math.*, 27.
- 20 — (1975): On construction of balanced ternary designs, *Sankhyā*, Ser. B., 37, 220-227.
- 21 **Sarbadhikari, H.** (1976): Note on some properties of A functions, *Proc. Amer. Math. Soc.*, 56, 321-324.
- 22 — (1976): Some uniformization results, *Fundamenta Mathematicae*.
- 23 **Sarma, Y. R.** (with Derouen, T. A.) (1975): G_1 -minimax procedures for the case of prior distributions in discriminant Analysis, *Biometrika*, 62, 403-410

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- 24 Slagh, R. S. (1976): Nonparametric estimation of mixed partial derivatives of multivariate density, *Jour. Multivariate Analysis*.
- 25 Slagh, R. S. (1975): On the Glivenko-Cantalli theorem for weighted empiricals based on independent random variables, *The Annals of Probability*, 3, 2, 371-374.
- 26 — (1976): Empirical Bayes estimation with rates in non-continuous Lebesgue-exponential Families, *Annals of Statistics*, 4, 2, 431-439.

B. Anthropometry and Human Genetics

- 1 Chakraborty, R. (with Das, S. R., Roy, Monami, Mukherjee, B. N., and Das, S. K.) (1975): The effect of parity of placental weight and birth weight: Interaction with placental alkaline phosphatase polymorphism, *Ann. Hum. Biol.*, London, 2, 227-234.
- 2 Mukherjee, B. N. (with Das, S. K. and Dash Sharma, P.) (1975): Serum protein and red cell enzyme polymorphism in Oxaon tribe, India. *Ann., Hum. Biol.*, London, 2, 201-204.
- 3 — (with Das, S. K. and Roy, Monami) (1975): Investigation of biochemical polymorphism in the Pundra Kshatriyas of 24-Parganas, West Bengal. *Jour. India Anthropol. Soc.* 10, 165-171.
- 4 — (with Das, S. K. and Ghose, B. R.) (1975): Study of three enzyme group systems: phosphoglucomatase, lactate and malate dehydrogenases in a Punjabi population of Delhi, *Ind. Jour. Physical Anthropol. & Hum. Genet.* 1, 67-74.
- 5 Pakrasi, Kanti (1975): Fertility and population problems in India: A biosocial study. *Jour. Indian Anthropological Society*, 10, 2, 181-194.
- 6 — (with Halder, A and Banerjee, A. R.) (1975): A study on abortion problem in India, *Indian Medical Journal*, 69, 6, 109-117.
- 7 — (1976): Population and development plan, *Science and Culture*, 42, 1, 10-15.
- 8 — (with Halder, A and Ray, S.) (1976): On some aspects of national health, *Bull. Cultural Research Institute*, XI, 1 & 2, 71-79.

C. Applied Statistics, Survey and Computing

- 1 Chattapadhyay, A. K. (with Pillai K. C. S.) (1975): Asymptotic expansions for distribution of characteristic roots when the parameters matrix has several multiple roots. *Multivariate Analysis*, III, Academic Press, 117-127.

D. Biometry

- 1 Chakravarti, S. R. (with Grizzle James) (1975): Analysis of data from multiclinic experiments. *Biometrika*, 31, 325-398.
- 2 Das, B. C. (1975): Growth of tissues changes of biochemical components of post-embryonic carp (*Labio-rohita*) treated with yeast. *Indian Journal of Fisheries*, Barrackpore, III, 35-50.

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E. Crop Science

- 1 Davis, T. A. (1975): Fibonacci system in plants. XII International Botanical Congress, Leningrad. *abstracts. II*, 557.
- 2 Davis, T. A. (with Mathai, A. M.) (1975): The origin of foliar spirals in coconut. *Proc. Fourth Session, FAO Technical Working Party on Coconut Production, Protection and Processing*, Kingston, Jamaica.
- 3 — (with Altevogt, R.) (1975). Is the coconut crab a pest of the coconut ? *Proc. Fourth Session, FAO Technical Working Party on Coconut Production, Protection and Processing*, Kingston, Jamaica.
- 4 — (with Ghosh, S. S.) (1975): Morphology of *Adansonia digitata*, Linn. *Adansonia*, 15(4), 471-479.
- 5 — (with Altevogt, R.) (1975): *Birgus Latro*, India's monstrous crab. A study and an appeal, *Bull. Dept. Marine Science*, 7(1). 11-23.
- 6 — (with Ghosh, S. S.) (1975): Morphology of *Salacca edulis* (Arecaceae), *Science and Culture*, 41, 606-608.
- 7 — (with Charles, W.) (1975): The Pajibayo or the peach palm, *Indian Farming*, 26(1), 13-14, 31.
- 8 — (1976): Alicorn or the horn of the Unicorn, *Science Reporter*, 13, 227-230.
- 9 — (1976): Coconut for the roof garden, *Coconut Bulletin*, 6(11), 1-4, 10.
- 10 — (1975): Possibilities of clonal propagation in some single stemmed economically important palms, *Symposium on Palm Tree Breeding*, Rome.
- 11 — (with Ghosh, S. S. and Ghosh, M.) (1975): Morphology and anatomy of juvenile *Aloeis guineensis* (Arecaceae), Form, Structure and Function in paris. *Professor B. M. Joshi, Commemoration volume*, 312.

F. Demography

- 1 Bhattacharyya, Durgaprasad (with Bhattacharyya, Anima) (1975): Khoree Boozoorg, a village in Aligarh District: some indication of changes between 1822 and 1974. *Quarterly Columns*, 2, March
- 2 — (with Ghosh, Ajoy) (1976): Comp. Index to House of Commons Papers, East India (India), 1900-1949, Part 1, *Index Indo-Asiaticus*, Supplement, 28A, March 1-23.
- 3 (1976): A joint paper prepared by Professor P. C. Mahalanobis on Growth of Population of India and Pakistan, 1801-1961, *Artha Vijnana*, March 18. 1-10.
- 4 Pechal, T. K. (1975): A note on the relation between expectation of life at birth and life table mortality rate for the age group 0-4 years, *Ind. Jour. Public Health*, XIX, 1, 9-10.

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G. Documentation and Library Science

- 1 Bhattacharyya, G. (1975): Project on study of subjects. *Library Science*, 12, September, Paper G.
- 2 Misra, J (1975): Librarianship and regional languages as medium of instruction. *Herald of Library Science*, 13, 3-4, July-October.
- 3 Neelameghan, A. (1975): International Standard Institutional Number (ISIN) and International Standard Conference Number (ISCN). *Proc. Sixteenth Convention, Indian Standards Institution, Bhopal, 19-25 October.*
- 4 — (1975): Non-hierarchical Associative Relationships: Their Types and Computer-Generation of RT Lins. Seminar on Thesaurus in Systems, DRTC, Bangalore, 1-5 December, 1975. Paper AA. also *Library Science*, V 13, n 1; 1976, March, Paper A.
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- 6 — (1975): Data elements in a record of an on-going research project. *International Symposium on Information Systems and Services on On-going Research in Science*, Paris, 26-30 Oct.
- 7 — (with Gopinath, M. A.). (1975): Postulate-based Permuted Subject Indexing (POPSI). *Library Science*, V 12, N 3, September, Paper H.
- 8 — (with Seetharama, S) (1975): Information Transfer: The Next Twentyfive Years. *Seminar on Library and Information Science in 2001 A. D.* British Council Division, Madras, 6-10 October, 1975. Also published in *Library Science*, V 13, N 1, 1976, March, Paper A.
- 9 — Presentation of Ideas in Technical Writing, Vikas Publishing House, New Delhi. 189 pp.

H. Electronics, Computers and Communication Science

- 1 Dutta Majumder, D. (1975): Cybernetics, science of engineering and biology, *Jour. Assoc. International De Cybernetics. Cybernetica*, XVIII, September, Belgium, 201-205.
- 2 — (with Das, J. and Chatterjee, N.) (1975): On the properties of error correcting codes for improving computer memory reliability. *Jour. Instn. of Tel. Comm. Engrs.*, 21, 5, May 253-258.
- 3 — (with Das J.) (1975): Some studies on reliability improvement in power system. *Proc. ISI Convention, Bhopal, 19-25 October, 82-87.*
- 4 — (1975): Pattern recognition methods in man-machine communication research, *Proc. 3rd World Congress of General Systems and Cybernetics*, Rumania, 25-29 August, 202-208.
- 5 — (1976): On computerised information retrieval system. *Proc. Symp. on Computer Systems, Organisation an Programming*, University of Calcutta, 23-24 February, 128-139.

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- 7 — (1976): Reliability evaluation of power system equipments using run-failure repair model, *Proc. Computer Society of India*, Hyderabad, 20-23 January, 91-94.
- 8 (with Paul S. K.) (1976): Concept of Fuzzy sets and application in pattern recognition problems, *Proc. Computer Society of India*, Hyderabad, 20-23 January, 95-99.

I. Geology

- 1 Sengupta, Supriya, (1975): Size-sorting during suspension transportation—lognormality and other characteristics, *Sedimentology*, 22, 257-273.
- 2 — (1975): Experiments on lognormal size distribution of sedimentary particles, *Proc. IX. Intl Sedimentologica Congress*, Nice, France, Theme-6, *Mecanique Sedimentaire*, 163-166.
- 3 — (1975): Sorting processes during transportation of suspended sediments—an experimental-theoretical study, UNGL Rapport, Uppsala University, Naturgeografiska Institutionen, Uppsala, Sweden, 40, 1-53+X.

J. Leaf Protein

- 1 Bagchi, D. (with Matai, S.) (1976): Studies on the performance of tetrakalai (phaseolus aureus Linn) as a leaf protein crop in West Bengal, *Jour. Sci. Food, Agrl.*, 27, 1, 1-7.

K. Planning, Economic Statistics and Econometrics

- 1 Bhat, L. S. (with Deshpande, C. D.) (1975): India, *Essays on World Urbanisation*, Ronald Jones (ed.) George Philip and Son Ltd., London, 358-373.
- 2 — (with Das, B. N., Kundu, A., Sharma, A. N., Bhat D. R., Sastry, C. S., and Mahapatra, R. C.) (1976): Planning—A case study of Karnal Area, India, K. B. Publications, New Delhi.
- 3 Bhattacharyya, Durgaprasad (with Bhattacharyya, Archana) (1975): *Bangla Bhasay Arthaniti Charcha* (Economic Writings in Bengali—Rammohun to Rabindranath), A preliminary survey with a foreword by Satyendranath Sen, Socio-Economic Research Institute, Calcutta, September, IV, 36 pp.
- 4 Bose, D. K. (1975): Planning: the next necessary stage, *Economic and Political Weekly*, X, 28, July 12, 1046-1047.
- 5 Chatterjee, Anil K. (1975): Production and marketing of raw jute, *Mainstream*, December 20.
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- 8 — (1976): On the Class Nature of Land Reforms in India since Independence—A Preliminary Examination, *India State and Society*, Mathew Kurian, Orient Longman.
- 9 Dey, B. (1976): Redistribution of consumer expenditure through taxation and benefits and level of living—A case study in West Bengal, *Arihavyana* XVIII, 1, 20-52.
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- 11 Kansal, S. M. (1976): Changes in value added per person in selected industries in India during 1946 to 1969: Economic and Scientific Research Foundation, New Delhi.
- 12 Mukherjee, M. (with Roy Choudhury, Uma and Rao, D.S.P.) (1975): Economic accounts for developing countries, *Review of Income & Wealth*, 411-455.
- 13 — (1975): An exercise in the estimation of tangible wealth in India since 1950: in *Growth of Indian Economy in Socialism* ed. A. V. Bhuleshkar, 511-554.
- 14 Pal, M. N. (1975): Regional disparities in the level of development in India, *Indian Journal of Regional Science*, 7, 35-52.
- 15 Roy, Bina (1975): A study of survey data used in India to estimate saving, capital formation and allied aggregates. *Data Base of Indian Economy* (ed.) V. M. Dandekar and P. Venkataramaiah, Vol. II, pp. 47-68, Statistical Publishing Society, Calcutta and Indian Econometric Society, Hyderabad.
- 16 Roy, Biswanath (1975): Sundarban: an observation. *Problems of National Liberation*, Calcutta, I, 2, 52-67.
- 17 Srinivasan, T. N.: Foreign Trade Sector in Planning Models in Charles Blizer, Peter B. Clark and Lance T aylor (eds.), *Survey of Planning Models and their Applications*, World Bank and Oxford University Press.
- 18 — (with Bhagwati, J.) (1976): Foreign Trade Regime and Economic Development, India, Vol. VI in special conference series on Foreign Trade Regimes and Economic Development, National Bureau of Economic Research, New York.
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- 20 — (1975): (with Hiroshi, Kono): Nuclear reactor strategies: sensitivity analysis of the Hafale—Manne Model. *Energy Policy*, Sept., 1975, 211-222.

L. Psychometry

- 1 Banerjee, S. N. (1976): A resolution on the epileptic personality—a psychodiagnostic approach. *Jour. Indian Academy of Applied Psychology*, 10.

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- 2 **Psychometric Research and Service Unit (1975):** *Proc. Seminar Personnel Selection and Appraisal System*, September, pp. 158.

M. Sociology

- 1 **Bandyopadhyay, Suraj (1975):** Reflections on unemployment research, manpower and unemployment research in Africa, *Newsletter*, Centre for Developing-Area Studies, McGill University, Montreal, Quebec, Canada, 8, 2, 61-62.
- 2 — (1975): "Book Review", Harold Lubell. *Calcutta: Its Urban Development and Employment Prospects*. Foreward, J. Tinbergen, Geneva, International Labour Office, 1974. Manpower and unemployment research in Africa, *Newsletter*, Centre for Developing-Area Studies, McGill University, Montreal, Quebec, Canada, 8, 1, 45-77.
- 3 — (1975): Social stratification and development: experiences in some villages in West Bengal, Centre for Developing-Area Studies, McGill University, Montreal, Quebec, Canada, Working Paper, Serial No. 11.
- 4 **Chatterjee, Bhola (1975):** Law and panel reform, *Young Indian*, New Delhi, 5, 17, XX, 14-16 & 22.
- 5 — (1975): Suicide, *Young Indian*, New Delhi, 5, 24, 9-12, 22.
- 6 — (1975): The problem of overseas Indians, *Young Indian*, New Delhi, 5, 25, 5-8, 29.
- 7 **Dasgupta, Atis K. (1975):** A note on content analysis, *Sociological Bulletin*, Bombay, 24, 1, 87-94.
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- 9 — (1975): History and tradition in Indian Society: Null and alternate hypothesis, Review of Yogendra Singh's book, Modernization of Indian Tradition, *Sociological Bulletin*, Bombay, 24, 1, 95-108.
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- 11 — (with Chattopadhyay, Manabendu) (1974): Population growth and social policy, Seminar on India's population future, J. Kumar and Vatsala Narain (eds.). Indian Institute of Population Studies, Bombay, 99-116.
- 12 **Chattopadhyay, Manabendu (1976):** A note on inaccessibility of data, *JCSSR Newsletter*, Indian Council of Social Science Research, New Delhi, 6 (3 & 4), 23-29 December 1975, March 1976.
- 13 **Sociological Research Unit (1975):** Understanding the social reality, *Economic and Political Weekly*, Bombay, 46, 1960-61, Nov. 15, 1975 and *Proc. Workshop on understanding the social reality*, Indian Statistical Institute, Calcutta, 4-6 October 1975.

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N. Statistical Quality Control

- 1 **Chawdhury, A. K.** (with Murthy, N. R. Srinivasan) (1976): Application of regression analysis in acceptance testing: *Q.R. Journal*, Bangalore.
- 2 **Chaudhuri, S. K.** (1975): Maintenance of quality in drugs and pharmaceuticals: *Souvenir, All India Seminar On Drugs & Pharmaceuticals*.
- 3 — Quality control of drugs: *Souvenir, Indian Pharmaceutical Association* (Published during 14th National Pharmacy week).
- 4 **Majumdar, A.** (1975): Sampling and testing: *Proc. of the All India Seminar on Drugs & Pharmaceuticals*.
- 5 **Pandey, R. J.** (1975): A note on percentage inspection. *Sankhyā B*, Part II, 114-119.
- 6 **Rao, Anantha R.** (1975): QC in progress—case study on reducing hardwaste in Reeling & Winding Sections of a Textile Mill: *OR Link News Letter*, Indian Assocn. for Quality & Reliability: Bangalore.
- 7 **Rao, N. T. V. Ranga** (1975): A case study on aluminium alloy castings (Pvt.) Ltd.: *Indian Management: (Journal of All India Management Assocn.)*, July.
- 8 — (1975): A review of foundry/moulding rejection via-a-vis control charts application in the area of Process Control Analysis: *QR Jour.* (organ of Indian Assocn. for Quality & Reliability).
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- 10 **Setty, C. A.** (1976): Supplementary activities to standardisation for Quality: *Q.R. Jour.*, Bangalore.
- 11 — (1975): Basic concepts regarding quality & Quality functions: *OR Link: Newsletter Indian Assoc. Quality & Reliability*: Bangalore.

O. Theoretical Physics

- 1 **Bandyopadhyay, P.** (1975): Muonless neutrino events and the photon-neutrino weak coupling theory, *Nuovo Cimento*, Italy, 29A, 353.
- 2 — (with De, S. S.) (1975): S-matrix and duality: an analysis from the view-point of the structure of hadrons, *Nuovo Cimento*, Italy, 27A, 294.

PART II

Convocations, Visiting Scientists, Honours and Awards, Scientific Tours and Assignments

XIII. CONVOCATIONS

13.1 Tenth Convocation: Indian Statistical Institute

The Tenth Convocation of the Indian Statistical Institute, held on 30 December 1975, was presided over by Shri Subimal Dutt, I.C.S. (Retired), Vice-President, Indian Statistical Institute. Shri P. N. Haksar, Chairman, Indian Statistical Institute, and Vice-Chairman Planning Commission, welcomed the guests. Professor Marc Nerlove, Northwestern University, U.S.A., delivered the Convocation address, "Economic Growth and Population, Perspectives of the 'New Home' Economics". Professor S. K. Mitra, Director, Research and Training School, presented the annual review of research and training. Dr. C. R. Rao, F.R.S., Secretary-Director, Indian Statistical Institute, made the concluding remarks. Two hundred sixteen candidates received certificates.

Thirty candidates were awarded the M. Stat. degree, and 18 the B. Stat. degree. Forty-one candidates were awarded diplomas in applied statistics. In the professional examinations, eight candidates were awarded the Statistician's Diploma and five the Computer's Certificate. Twelve candidates were awarded the Associateship in Documentation, Bangalore. In the other courses leading to certificates, the number who passed are mentioned in brackets: Statistical Methods and Applications (Calcutta and Delhi) (43); Statistical Quality Control (Bangalore) (32); Operation of Punched Card Machines (10); and Statistical Craftsmanship (6).

Dr. Ganapati Parashuram Patel, Ph.D., (Michigan), was the first recipient of the Doctor of Science degree awarded on the basis of the thesis.

13.2 Convocation: International Statistical Education Centre, Calcutta

The International Statistical Education Centre (ISEC), Calcutta, held its annual convocation on 27 March 1976. Certificates were awarded to 23 trainees from 13 countries who successfully completed the twenty-ninth term of the I.S.E.C. (June 1975—March 1976). Shri Sankar Ghosh, Minister of Finance, Development and Planning, Government of West Bengal, presided. Dr. N. Bhattacharyya, Member-Secretary, I.S.E.C., read the report for the term. Dr. C. R. Rao, Chairman, Board of Directors, I.S.E.C., Calcutta, made the concluding remarks.

XIV. 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 to the Institute 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.

14.1 The following scientists visited the Institute on invitation and worked for fairly long periods during the year 1975-76. The duration of the visit is mentioned within brackets against each name.

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DR. RUDLOP ALTEVOGT, Director, Zoological Institute, University of Munster, Federal Republic of Germany (*January-March 1976*) came in connexion with collaborative research projects in the Crop Science Unit. He resumed the work on asymmetry in crabs. An unique species, Fiddler Crabs (*Uca Vocana*), whose males show left-dominant claws, was located at Cochin, Goa and Bombay.

MR. IKUO BABA, Baba Consulting Engineers' Group, Japan, came as a Visiting Expert, Statistical Quality Control Division, Indian Statistical Institute. (*3 March 1975-1 June 1975*). He helped in conducting programmes in a series of special courses and lectures arranged for industrial executives at centres in Bangalore, Bombay, Calcutta, Delhi, Hyderabad and Madras.

PROFESSOR G. K. BHATTACHARYYA, University of Wisconsin, Madison, U.S.A., spent nine months (*28 August 1975-31 May 1976*) at the Institute as a Visiting Professor. He gave a course on Inference and some seminars on reliability and inference, and worked on problems of inference in reliability models and brought out some technical reports.

PROFESSOR V. P. GODAMBE, University of Waterloo, Ontario, Canada, who joined the Delhi Centre in January 1976, participated in the teaching work. He prepared a note extending his previous results on Estimating Equations. He presented a paper at the Symposium on Recent Developments in Survey Methodology, Calcutta 22-28 March 1976. *Seminars: (i)* Estimating equations (Calcutta and Delhi), *(ii)* Panse Memorial Lecture (Delhi).

PROFESSOR DJORDJE KOSTIC, Institute for Experimental Phonetics and Speech Pathology, Belgrade, Yugoslavia (*6 December 1975-2 April 1976*) came on his eighth 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. His visit was arranged during the year under the Fourth Indo-Yugoslav Cultural Exchange Programme. In connection with his research work, he met scientists, educationists, diplomats, ministers and government officials, while on visits to Agartala, Calcutta, Delhi and Hyderabad. He participated in a Symposium on Problems of Translation, Delhi, March 1976, and submitted a paper to the Symposium on Indian Bilingualism, Delhi, February 1976. He conducted a eight-day seminar at the Institute for Speech Rehabilitation, Agartala, Tripura, 22-30 December 1975.

His research work in which other scientists collaborated, included the following: (a) Project on statistical processing of data from schools for hearing-impaired children in Yugoslavia, (b) Project on statistical processing of linguistic data from the complete vocabulary of a prominent Yugoslav poet, (c) A study of intonation patterns and syllable stress in Bengali, (d) Study of speech norms in schools for normal children as well as in schools for hearing-impaired children, (e) Study of tonal patterns and syllable stress in Panjabi, (f) Studies in area of Hindi language and linguistics, covering various concrete and abstract aspects of language, (g) Study of phonological norms, development of language and comparative phonetics, (h) Study of difficulties encountered by hearing-impaired children in the early stages of formal primary education and possibilities of preparing special books for them.

Lectures: (i) Possibilities for inter-disciplinary collaboration between social science units and other disciplines, *(ii)* The role of language and its development, and *(iii)* Teaching of foreign language.

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DR. K. G. MURTY, Associate Professor, Department of Industrial and Operations Engineering, College of Engineering, University of Michigan, U.S.A., Visiting Professor, Statistical Quality Control Division, Indian Statistical Institute (11 October 1974—14 July 1975). He helped to conduct special courses and lectures arranged for industrial executives at centres in Bangalore, Bombay, Calcutta, Delhi, Hyderabad and Madras.

PROFESSOR MARC NERLOVE, University of Chicago and Northwestern University, Evanston, Illinois, U.S.A. (December 1975—January 1976) is an eminent economist and recipient of the Mahalanobis Memorial Medal (International Award) for 1975.

During the Tenth Annual Convocation, Indian Statistical Institute, he gave the Convocation Address on "Economic Growth and Population: Perspectives of the 'New Home' Economics."

Lectures: (i) Log-linear probability models with applications, (ii) Estimation of dynamic relations from a cross section of the time series.

DR. PAUL PEACH, teacher in chemistry, industrial manager and one of the early researchers into the uses of Statistical Quality Control, came as a Visiting Expert, Statistical Quality Control Division, Indian Statistical Institute (6-31 March 1975). Dr. Peach conducted programmes in a series of special courses and lectures arranged for the executives from industries at centres in Bangalore, Bombay, Calcutta, Delhi, Hyderabad, and Madras.

DR. PATRICK R. PENLAND, expert in Communication Science, University of Pittsburgh, Pennsylvania, U.S.A., came on a fellowship programme to the Documentation Research and Training Centre, Bangalore. (February—March 1976). He had discussions on the design of experiments on the studies about the validity of absolute syntax of ideas in the communication of human thought.

Course of Lectures: (i) Human communication among librarians, (ii) Inductive and deductive approaches to communication, (iii) Interpersonal communication system, and (iv) Interpersonal aspects of human communication.

DR. ALGIS PRAZAUSKAS, Research Associate, Department of India, Sri Lanka and Nepal, Institute of Oriental Studies, USSR Academy of Sciences, Moscow, came to the Institute on 25 March 1975, in connexion with the joint project between the USSR Academy of Sciences, Indian Statistical Institute and the Statistical Publishing Society, on the publication of books. He continued the work during the year.

PROFESSOR T. E. S. RAGHAVAN, University of Illinois, U.S.A., who joined the Delhi Centre on 29 September 1975, participated in the teaching work.

Lectures: (i) Some recent trends in Games Theory (Madras), (ii) Extensive games and almost complete information (Madras), and (iii) Non-co-operative and Stochastic games.

DR. K. SCHMIDT, Mathematics Institute, University of Warwick, Coventry, Warwickshire, U.K., accompanied by Mrs. A. Schmidt, came as a Visiting Professor at the Delhi Centre (3 September 1975—March 1976). He participated in the teaching work.

Lectures: (i) Ergodic theory, (ii) Skew product of ergodic transformations, (iii) Weak equivalence of ergodic transformation, (iv) Invariant and quasi-invariant measures for ergodic transformations (Delhi and Calcutta).

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DR. R. S. SINGH, Michigan State University, East Lansing, Michigan, U.S.A., joined the Delhi Centre on 15 October 1974. He is working on some estimation problems.

DR. (MRS.) ELAINE SVENONIUS, Assistant Dean, School of Library and Information Science, University of Western Ontario, Canada, participated in the teaching and research programmes in the Documentation Research and Training Centre, Bangalore (14 January 1975—30 April 1975).

14.2 The following are some of the distinguished visitors who came to the Institute for short periods on different assignments.

PROFESSOR KATHLEEN GOUGH ABERLE, Department of Anthropology and Sociology, British Columbia University, Vancouver, Canada (29 December 1975—3 January 1976). She prepared a paper on "Colonial economies in South-East Asia."

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

MRS. INGE DANKOVIKOVA, Department of Economics, Czechoslovak Academy of Science, Prague (22 October 1975—2 November 1975) (Delhi Centre).

DR. MARK HOLMSTROM, Anthropologist, School of Development Studies, University of East Anglia, Norwich, U.K. (23 September 1975)

DR. A. R. KIDWAI, Chairman, Union Public Service Commission, New Delhi (6 October 1975), came in connexion with the development of a computerised system of information processing for selection and recruitment by the Commission.

DR. ARND KRAUSE, Department of South Asian Studies, Karl Marx University, Leipzig, German Democratic Republic (20 November 1975).

DR. CHARLES MACLEAN, Associate Professor of Genetics, University of Hawaii, Honolulu, (21 April 1975).

MR. PAVLOV NIKOLAI MIKHAILOVICH, Technician, USSR. (27 March 1975—November 1975).

DR. V. P. MOZOLIN, Pro-Rector, Patrice Lumumba Friendship University, Moscow (10-17 January 1976).

DR. G. A. NOGLER, Institute für Allgemeine Botanik der Eidgenössischen Technischen Hochschule, Zurich, Switzerland (29 February 1976—March 1976). He came for discussions in the Crop Science Unit on apomixis in flowering plants, particularly of Ranunculaceae.

PROFESSOR N. W. PIRIE, F.R.S., Head, Biochemistry Department, Rothamsted Experimental Station, Harpenden, Herts, England (28 December 1975—2 January 1976). He came to attend the Indian Science Congress. During his stay at the Institute, he supervised the work of the Leaf Protein Unit.

DR. CHRISTIAN REISER, Director, German Academic Exchange Service, New Delhi (13 February 1976).

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MR. G. TAGUCHI, Statistical Quality Control expert from Japan, worked in the S.Q.C. Division and helped in conducting special courses and lectures arranged for executives and specialists in industries at different S.Q.C. centres. (25 March 1976—9 April 1976).

MISS MAHALANDO TATA, School of Planning and Computer Applications, Tebran, Iran (17—18 March 1976).

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

JEAN BANETH, Washington, U.S.A. (20 September 1975). *Lecture*: Reflexions on India economic development (Delhi Centre).

PROFESSOR R. E. BARLOW, University of California, California, U.S.A. (31 March 1976). *Lecture*: Multivariate life table analysis.

PROFESSOR D. ERLINKOTTER, University of California, Los Angeles, U.S.A. (January 1976). *Seminar*: A general model for projection evaluation, investment timing and pricing decisions. (Delhi Centre).

PROFESSOR G. H. FUDGE, Operations Services Systems, Genealogical Society, Church of Jesus Christ of Latter Day Saints, Salt Lake City, Utah, U.S.A. (22 April 1975). *Lecture*: Use of computers in genealogical problems.

PROFESSOR S. K. JAIN, Ohio State University, U.S.A. (25-29 September 1975). *Lecture Series*: Von Neumann algebras and related topics (Delhi Centre).

DR. H. KALMUS, Professor Emeritus of Biology and Honorary Member, Department of Human Genetics, Galton Laboratory, University College London, was accompanied by Mrs. Kalmus (29 November, 2 and 3 December 1975). He had discussions on some human genetic problems in the Anthropometry and Human Genetics Unit. *Lectures*: (i) Hereditary variability in sense perception; and (ii) History of Galton Laboratory.

DR. RENU LASKAR, Department of Mathematics, Clemson University, Clemson, South Carolina, U.S.A. (22-27 August 1975). *Lecture*: (i) Finite geometries and association schemes, (ii) Decomposition of K_n into Hamiltonian circuits.

PROFESSOR JOACHIM MATTHES, Department of Sociology, Bielefeld University, Bielefeld, German Federal Republic; Senior Fellow, Institute for Advanced Studies in Humanities and Social Sciences, Netherlands (2-7 October 1975). *Seminar*: German sociology, antecedents and present issues.

PROFESSOR P. A. P. MORAN, F.R.S., Australian National University (19 September 1975). *Seminar*: Unsolved problems in probability (Delhi Centre).

PROFESSOR H. MORIMOTO, Osaka City University, Japan (9 September 1975). *Lecture*: Localisable measures and the factorisation theorem.

PROFESSOR J. M. PERREAULT, Director, The Library, University of Alabama, Huntsville,

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U.S.A. (1-5 December 1975). *Lectures*: (i) The idea of order: towards foundation for a theory of cataloguing, (ii) Structure and compatibility of UDC and LC class number (D.R.T.C., Bangalore).

PROFESSOR R. W. PICKFORD, Professor-Emeritus of Psychology, Glasgow University, U.K., accompanied by Dr. (Mrs.) Pickford (22 December 1975). He had discussions in the Anthropometry and Human Genetics Unit. *Seminar*: Colour blindness and natural selection.

DR. ALI SMAL, Head, Iranian National Documentation Centre (29 March 1976). *Lecture*: Documentation activities in Iran.

MISS MARY SISSONS, Department of Social Psychology, Newnham College, Cambridge University, U.K. (29 February 1976—March 1976). She had consultations in the Psychometric Research and Service Units and other Units in the Social Science Division, Indian Statistical Institute. *Lecture*: Social class and social interaction.

PROFESSOR JACK STANLEY, Lawrence University, U.S.A. (12-13 September 1975), *Seminar*: Special time, special power: a study of the fluidity of power in a popular Hindu festival.

PROFESSOR P. H. STYAN, McGill University, Montreal, Canada (March 1976). *Seminars*: (i) Equalities and inequalities for ranks of matrices, with applications to linear models; (ii) Estimability and testability in Linear models; and (iii) Uncorrelated residuals and testing for serial correlations in Linear models (Delhi Centre).

PROFESSOR GEORGE C. TIAO, Head, Mathematics-Statistics Department, University of Wisconsin, U.S.A. (11-13 February 1976). *Lectures*: (i) A canonical analysis of multiple time series; (ii) Multivariate life table analysis.

DR. D. J. URQUHART, former Director-General, British Library Lending Services, Boston Spa., U.K. (26-27 September 1975, Bangalore, 24 February 1976, Calcutta). *Lectures*: (i) Development of National Lending Library: early years; (ii) National Lending Library: national and international implications.

XV. HONOURS, AWARDS AND SPECIAL ASSIGNMENTS

15.1 *Honours and Awards*: Dr. C. R. RAO was elected (i) President, Institute of Mathematical Statistics, U.S.A. (President-elect, 1975-76, and President, 1976-77). (ii) President, International Statistical Institute, The Hague (President-elect, 1975-77, and President, 1977-79). (iii) Honorary Fellow, King's College, Cambridge. Dr. Rao was awarded the Commemorative Medal of the Patrice Lumumba Friendship University, Moscow. He was presented with a plaque and shawl at the World Telugu Conference, Hyderabad, 12 April 1975.

DR. D. DATTA MAZUMDAR (*Electronics and Communication Science*) was elected Vice-Chairman, Computer Society of India, Calcutta Chapter.

DR. S. L. JAIN (*Geology*) was admitted to the degree of Doctor of Science by the Lucknow University for his thesis of published papers on "Contributions to the Study of Mesozoic Fossil Vertebrates." The relevant research was carried out entirely in the Indian Statistical Institute.

SM. BINA ROY (*National Income*) was admitted to the Ph.D. Degree (Economics) in February 1975 by the Calcutta University for her thesis on "Estimation of long-term series of capital formation in India, its long-term trends of growth: 1900-1951."

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DR. T. N. SRINIVASAN (*Delhi Centre*) was awarded the Mahalanobis Memorial Medal (International), 1975.

15.2 *Special Assignments*: Dr. L. S. Bhat (*Delhi Centre*) supervised the work of M. Phil. and Ph.D. students of the Centre for Regional Development, Jawaharlal Nehru University, New Delhi. He served as member of the following:

- (i) Committee on Regional Accounts, Department of Statistics, Government of India.
- (ii) Committee on Processes and Patterns of Utilisation in Developing Countries.
- (iii) Board of Examinations in Geography, Universities of Bombay, Mysore and Hyderabad (Osmania).
- (iv) Advisory Committee on Geography for the Indian Council of Social Science Research, New Delhi.

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

DR. T. V. HANURAV (*Applied Statistics, Surveys and Computing*) joined the Institute of Statistics, Belgrade, Yugoslavia, on lien for one year on 12 April 1976. He accepted the U. N. assignment to work as a senior statistical adviser.

DR. S. L. JAIN (*Geology*) continued to serve as a member, Organising Committee, Fourth International Gondwana Symposium, India, 1977.

DR. K. C. MALHOTRA (*Anthropometry and Human Genetics*) acted as the Organising Secretary, Second Annual Conference, Indian Society of Human Genetics, Calcutta. Dr. Malhotra was nominated on the committee, Tenth International Congress of Anthropological and Ethnological Sciences to be held in India in 1978.

PROFESSOR RAMKRISHNA MUKHERJEE (*Sociology*) was elected a member of the following three committees of the Indian Council of Social Science Research on (i) Training, (ii) Research, and (iii) Research Institutes (1976-77).

SHRI S. MUNSHI (*Sociology*), Lecturer, was elected a member, Board of Studies of Sociology, Board of Secondary Education, West Bengal.

DR. M. N. PAL (*National Income*) was elected a member, Editorial Board, *Indian Journal of Regional Science*, 1975.

DR. K. S. PARIKH (*Delhi Centre*) serve as a member, National Committee on Science and Technology.

DR. J. ROY (*Applied Statistics, Surveys and Computing*) was adopted a member, Committee on Computation, International Statistical Institute, December 1975.

DR. T. ROY CHOWDHURY and SHRI T. S. KUTTY (*Geology*) were nominated as leader and alternate leader respectively for the Pranhita-Godavari Valley excursion during the International Gondwana Symposium, India (1977).

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DR. (MRS.) K. SARADAMONI (*Delhi Centre*) participated as member in the meeting of the working groups on (i) Studies on Women (Indian Council of Social Science Research), and (ii) Cultural Statistics (Department of Culture, Ministry of Education, Government of India).

DR. SUPRIYA SENGUPTA (*Geology*) has been re-elected to the Council, International Association of Sedimentologists, for a second term of three years. Dr. Sengupta was re-appointed as Editorial Adviser, *Indian Journal of Earth Sciences*.

DR. T. N. SRINIVASAN (*Delhi Centre*) continued to hold the following posts: (i) Member, Board of Trade, Ministry of Commerce, Government of India; (ii) Chairman, Working Group to examine sampling design estimation procedure, N.S.S.O.; (iii) Member, Working Group on Savings, Ministry of Finance, Government of India; (iv) Member, Working Group of Agricultural Statistics, N.S.S.O.; (v) Co-editor, *Econometrics* and for *Sankhya C*, and (vi) Associate Editor, *International Economics*.

XVI. SCIENTIFIC TOURS AND ASSIGNMENTS ABROAD

(i) DR. C. R. RAO left for the U.S.A. on 14 June 1975 to attend the Fourth International Symposium on Multivariate Analysis, Dayton, Ohio, 16-21 June. He gave a talk:

18 June 1975: Prediction of future observations with special reference to linear models.

DR. RAO arrived in Tokyo on 22 June and spent one week as a guest of the Asian Statistical Institute, Tokyo. He was specially invited to deliver the convocation address at the annual convocation to award diplomas and certificates to fellows trained at the Institute. He gave the following lectures during his stay in Japan:

23 June 1975: Linear Models (Keio University).

24 June 1975: Characterization of Probability Distributions (Tokyo University).

25 June 1975: General discussion on applied statistics (Japanese Union of Scientists and Engineers).

26 June 1975: Some thoughts on regression analysis, Asian Statistical Institute, (ASI).

27 June 1975: Growing responsibilities of government statisticians (Convocation address at the ASI).

DR. RAO returned to India on 30 June 1975 after spending a couple of days at Bangkok.

(ii) DR. C. R. RAO left India on 10 August 1975 for the U.S.A. to attend some Conferences and give lectures abroad.

(a) *Pennsylvania State University, University Park*, (11-21 August). He gave the following talks:

13 August 1975: Statistical thinking.

14 August 1975: Some thoughts on regression and prediction.

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15 August 1975: Statistical modeling and sampling-1.

18 August 1975: Statistical modeling and sampling-2.

20-21 August 1975: Characterization of probability distributions and applications-1 & 2.

(b) *International Econometric Conference, Toronto*: Dr. Rao went to Toronto during the International Econometric Conference to present the Mahalanobis Memorial Medals to Professor Marc Nerlove and Professor T. N. Srinivasan at the General Body Meeting, Econometric Society. He arrived in Toronto on 22 August and left for Atlanta on 23 August.

(c) *Annual Meeting, Institute of Mathematical Statistics., Atlanta, (25-28 August)*.

Dr. Rao was invited to give the Wald Memorial Lectures for 1975.

25 August 1975: Wald Lecture 1-Problems of linear models.

26 August 1975: Wald Lecture 2-Compound decision problems.

27 August 1975: Wald Lecture 3-Prediction problems.

(d) *Round Table meeting on Teaching of Statistics in Schools, Warsaw, (29-31 August)*. Dr. Rao arrived in Warsaw on 28 August to participate in the meeting. He gave a talk:

30 August 1975: A natural example of a weighted binomial distribution—a class room exercise.

(e) *Fortieth International Statistical Conference, Warsaw. (1-9 September)*.

Dr. Rao participated in the discussion on Total Survey Design, a special session held in honour of Professor Mahalanobis. He also attended the Education Committee meetings held on 4 and 8 September.

(f) *Institute of Mathematics and Statistics, Polish Academy of Science, Poznan (10-12 September)*. He gave two talks:

12 September 1975: Estimation and prediction in linear models.

12 September 1975: Right and left-handedness in plants.

He returned to India on 14 September 1975.

(iii) DR. C. R. RAO accompanied by Mrs. Rao left for Moscow on 4 October on an invitation from the USSR Academy of Sciences to attend the 250th anniversary celebrations of the Academy. While in Moscow, Dr. Rao presented the greetings of the Indian Statistical Institute to the Academy (7 October), and the D.Sc. Diploma of the ISI to Academician M. V. Keldysh (15 October) at a ceremony held in the USSR Academy. Dr. and Mrs. Rao were in Leningrad during 10-12 October in connection with the Academy's celebrations and returned to India on 16 October 1975.

While in Moscow, Dr. Rao had discussions with Dr. Bromely, Academician Gafurov, Dr. O. K. Dreyer, Professor A. M. Kagan, Academician Kapitza and Dr. V. Stanis, Rector, Patrice Lumumba Friendship University, on problems of collaboration in scientific research.

DR. L. S. BHAT (*Delhi Centre*) participated in the Indo-British Seminar on Rural Urban Relations in India organised by the Centre for South-Asian Studies, University of Cambridge, U.K., 15-20 September 1975. He presented a paper on 'Central Place Hierarchy in Karnal Area'.

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He gave a lecture on Regional Planning in India at the Institute for South-Asian Studies, Heidelberg, Federal Republic of Germany, October 1975.

SHRI R. L. BRAHMACHARY (*Embryology*) visited the Laboratory of Molecular Biology, University of Brussels, November 1975. He worked there on Acetabularia. These organisms were brought to Calcutta, where further experiments were conducted. Some living samples were handed over to the Botany Department, Calcutta University and the Bose Institute, Calcutta. These giant cells have been introduced to scientists in Calcutta for the first time. Shri Brahmachary visited the Wildlife Sanctuaries of Virunga and the Gorilla Sanctuary of Kahuzi Biega, at the invitation of the Institute Zairois pour la Conservation de la Nature, Zaire (*December 1975—January 1976*). The tour was sponsored by the Ministry of External Affairs, Government of India.

DR. SANKAR CHATTERJEE (*Geology*) left on 1 January 1976 for the University of California, Berkeley, U.S.A., for a short period to take up a faculty appointment which would also enable him to study comparative materials of vertebrate fossils.

SHRI V. K. CHETTY (*Delhi Centre*) attended the Third World Congress of the Econometric Society, Toronto, Canada, 19-26 August 1976.

DR. B. C. DAS (*Biometry*) attended the Thirteenth Pacific Science Congress, Vancouver, Canada, August 1975.

PROFESSOR T. A. DAVIS (*Crop Science*) served as a United Nations consultant on coconut production in Bangladesh from January 1975 to May 1975. He completed two reports for the Food and Agriculture Organization. He also attended the following: (i) Twelfth International Botanical Congress, Leningrad, July 1975. (ii) Fourth Session, F.A.O. Technical Working Party on Coconut Production, Protection, and Processing, Kingston, Jamaica, 14-25 September 1975. (iii) Special Symposium on Palm Tree Breeding, F.A.O. Headquarters, Rome, Italy, September-October 1975. He presented a paper on clonal propagation. Professor Davis visited some universities in Canada, U.S.A. and Japan to deliver lectures and collect research data.

DR. K. C. MALHOTRA (*Anthropometry and Human Genetics*) visited Moscow, Leningrad and Tbilisi, USSR, 30 November 1975—13 January 1976. He gave seminar talks at the Institute of Ethnography, Moscow, and the Department of Anthropology, Moscow State University. During his visit, Dr. Malhotra finalized the preparation of a monograph on the anthropological project work undertaken in India jointly by the Indian Statistical Institute and Soviet anthropologists in 1971. He spent two months (*2 February 1976—2 April 1976*) at the Population Genetics Laboratory, University of Hawaii, under a WHO Investigator award, for working on the analysis of biological data collected in the Dhangar Project.

PROFESSOR M. MUKHERJEE (*National Income*) attended the following: (i) U. N. Expert Group meeting on Price and Quantity Statistics, New York, 9-13 June 1975. (ii) Teaching programme on national and regional accounts organised by the Asian Statistical Institute, Jakarta, Indonesia, 27 July 1975—12 August 1975.

PROFESSOR RAMKRISHNA MUKHERJEE (*Sociology*) attended the Executive and Editorial Committee meetings of the International Sociological Association, Paris, 2—10 May 1975. He also visited the Netherlands Institute for Advanced Study in Humanities and Social Sciences, Wassenaar, 10-13 May 1975, and delivered lectures.

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PROFESSOR A. NEELAMBGHAN (*DRTC, Bangalore*) visited the Federal Republic of Germany, Luxembourg, Belgium and the United Kingdom (21 June 1975—9 July 1975) as a member of a three-man mission to identify areas of bilateral and multi-lateral collaboration and cooperation in the field of information between India and other countries. The Department of Science and Technology, Government of India, sponsored the delegation which held discussions with officials and submitted a report. Professor Neelameghan visited the United Nations Asian Development Institute, Bangkok (21 September 1975—2 October 1975) to advise the Institute on future training programmes and surveys in the development information field. He also submitted a report on the development information programme of the Institute for the period 1976-78. The International Council of Scientific Unions (ICSU), Paris, has undertaken on behalf of the Division of Philosophy of the UNESCO and in collaboration with the International Union of the History of Philosophy of Science, to prepare a volume, *Time and Sciences* for publication in the series, *At the Cross-Roads of Culture*. Professor Neelameghan contributed a paper to the volume and also participated in the discussion of the papers contributed to the series at a seminar at the Royal Institution, London, 4-6 February 1976.

Professor A. Neelameghan also attended the following: (i) A meeting of the study team to make a feasibility study for the establishment of a global development information system (DEVVIS) Geneva, 25 March 1975-April 1975. (ii) UNISIST Advisory Committee meeting, Paris, 5-9 May 1975 as its Chairman. (iii) Meeting of DEVVIS study team, Geneva, 10-11 May 1975. (iv) UNISIST Steering Committee meeting, Paris, 13-17 October 1975, as a representative of the Government of India. (v) International Symposium on Information System and Service on Ongoing Research in Science, Paris, 26-30 October 1975. He presented a paper and was a moderator for one session. He visited several documentation and information centres and systems in and around Paris. (vi) Meeting of the Science and Technology Policies Information Exchange System (SPINES) Paris, 17-18 October 1975, as a representative of the Government of India. (vii) International Experts Meeting on the "Ways and Means to an International Information Systems for Economics and Social Development", Berlin, Federal Republic of Germany, 8-12 December 1975. He chaired the meeting.

DR. K. S. PARIKH (*Delhi Centre*) attended the following: (i) Workshop on Energy Demand, 22-24 May 1975, International Institute of Applied Systems Analysis, Laxenburg, Austria. (ii) Third World Congress, Econometric Society, 20-25 August 1975, Toronto, Canada. (iii) Conference on Global Modelling of Agriculture Sector, 22-25 September 1975, International Institute of Applied Systems Analysis, Laxenburg, Austria.

SHRI M. V. RAMAN (*Demography*) participated in the Seminar on Infant Mortality in relation to the Level of Fertility, organised by the Committee for International Co-ordination of National Research in Demography (CICRED) and the Economic Council and Social Commission for Asia and the Pacific (ESCAP) at Bangkok, 6-12 May 1975. He was the rapporteur in a technical session. He left India on 5 May 1975 and returned on 13 May 1975.

DR. J. ROY (*Applied Statistics, Surveys and Computing*) visited Singapore to participate in discussions relating to a programme of publications of the Agriculture Development Council. 25-29 February 1976.

DR. SUPRIYA SENGUPTA (*Geology*) visited the Department of Physical Geography, Uppsala University, Sweden, as a guest scientist (*May-November 1975*) to conduct research on sediment transportation problems. He also delivered several lectures. He participated in the Ninth International Sedimentological Congress, Nice, France, July 1975, and presented a paper. He attended

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the meeting of the Council, International Association of Sedimentologists held during the Congress. His trip was sponsored by the International Association of Sedimentologists and the International Union of Geological Sciences.

SHRI S. M. SUNDARA RAJU (*Statistical Quality Control*) visited the Philippines, Taiwan, Malaysia, Singapore, Hongkong, Thailand and Japan (21 January 1975—3 March 1976) and conducted a number of seminars, symposia and workshops in these countries to promote activities in Statistical Quality Control and Operations Research.

In Japan, where he stayed from 1 to 15 February 1976, Shri Raju delivered several lectures under the auspices of the Japanese Standards Association and the Japanese Union of Scientists and Engineers. He also visited some heavy electrical industries and steel plants in order to study the latest progress in quality systems design and operations. He had useful discussions with the managements of these plants and also with a number of leading experts in the field during his stay in Tokyo and other places in Japan.

XVII. SCIENTIFIC ASSIGNMENTS IN INDIA

DR. C. R. RAO, Secretary-Director of the Institute, presided over the Fifteenth Indian Econometric Conference, 29-31 December 1975, held at the Indian Statistical Institute, Calcutta. He inaugurated the Symposium on Recent Developments in Survey Methodology, Calcutta, 22 March 1976. He also presided over a panel discussion. He inaugurated the Seminar on Weather Modification, New Delhi, 10 February 1976. He delivered three lectures on "Statistics in search of truth," at the Sri Venkateswara University, Tirupati, February 1976, and a lecture on "Some Aspects of Scientific Discoveries," Delhi University, 12 February 1976.

DR. A. BASU (*Anthropometry and Human Genetics*) presided over a session of the Annual Meeting, Indian Anthropological Society, Calcutta, July 1975.

SHRI L. S. BHATT (*Delhi Centre*) participated in a workshop on regional input-output tables organised by the Centre for Regional Development, Jawaharlal Nehru University, New Delhi, July 1975.

SHRI DURGAPRASAD BHATTACHARYYA (*Pre-Census Population Studies*) attended the forty-fourth session, Indian Historical Commission, Bikaner, 22-23 January 1976. He continued as a member, Historical Records Commission.

PROFESSOR D. K. BOSE (*Economic Research*) participated in the following seminars on: (i) National Policy on Population Control, Distribution of Socio-Economic Strategy, Calcutta, 10 May 1975. (ii) Growth of Agriculture-Related Enterprises in West Bengal: Problems and Issues, Calcutta, 25-26 July 1975. (iii) Utilization of Coal, Calcutta, 20-21 December 1975. (iv) Problems of Agricultural Growth in India, Calcutta, 4-6 January 1976. He submitted a paper.

SHRI B. CHAKRABORTY (*Demography*) participated in the Indian Science Congress, Waltair, 3-7 January 1976 and presented a paper.

DR. J. DAS AND SHRI S. K. PAL (*Electronics and Communication Science*) attended the Eleventh Annual Conference, Computer Society of India, Hyderabad, 20-23 January 1976 and presented two papers.

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DR. D. DUTTA MAZUMDAR AND DR. J. DAS (*Electronics and Communication Science*) attended the Symposium on Computer Science, Calcutta, 23-24 February 1976 and presented two papers.

DR. A. GHOSH (*Electronics and Communication Science*) attended the Intensive Summer Seminar on the Theory and Application of Integral Transforms, Calcutta, 2 June 1975—July 1975. He delivered a lecture.

SHRI M. A. GOPINATH AND SHRI S. SERTHARAMA (*D.R.T.C., Bangalore*) attended the Seminar on Library and Information Science in 2001 A.D., Madias, 6-10 October 1975. They presented two papers.

SHRI R. K. LAHIRI (*Economic Research*) attended the (i) Indian Agricultural Economic Conference, Hisar, 6-8 November 1975, (ii) Seminar on Optimum Utilisation of Women Power for Development, New Delhi, 10-12 November 1975, and (iii) Seminar on Land Reforms in West Bengal, Calcutta, 29 November 1975.

SHRI T. MAITRA (*Applied Statistics, Surveys and Computing*) attended the Annual Training Conference, National Sample Survey Organisation, Delhi, 10-13 June 1975.

DR. K. C. MALHOTRA, DR. A. BASU, SHRI B. N. MUKHERJEE AND SHRI SWAPAN DAS (*Anthropometry and Human Genetics*) participated in the Second Annual Conference, Indian Conference, Indian Society of Human Genetics, Calcutta, 10—13 November 1975. They presented papers.

DR. J. MISRA, Chief Librarian, attended the conference of the Indian Association for Special Libraries and Information Centres, Lucknow, November 1975.

MRS. ALOKANANDA MITTER (*Linguistic Research*) participated in the eight-day seminar on problems related to hearing-impaired children organised by the Institute for Speech Rehabilitation, Agartala, Tripura, 22-30 December 1975.

PROFESSOR M. MUKHERJEE (*National Income*) attended the following: (i) Meeting of Committee on Regional Accounts, New Delhi, 21-23 April 1975. He presided. (ii) Meeting of Executive Committee, Indian Association for Research in National Income and Wealth, 7-8 November 1975. (iii) Tenth General Conference, Indian Association for Research in National Income and Wealth, Panaji, Goa, 16-19 January 1976. Dr. Bina Roy, Sarvasree G. S. Chatterjee, B. Dey and G. Pal also attended.

PROFESSOR RAMKRISHNA MUKHERJEE (*Sociology*) attended the following: (i) Symposium on Understanding Social Reality: goals and approaches, Kanpur, 29 November 1975—2 December 1975. He presented a paper. (ii) Meeting of the Indian Council of Social Science Research, New Delhi, 5-7 December 1975. (iii) Fourth All India Sociological Conference, Trivandrum, Kerala, January 1976. He delivered the key-note address. (iv) Meeting of the Indian Council of Social Science Research Committee on Social Statistics and Social Indicators, New Delhi, 18 March 1976.

PROFESSOR A. NEBLAMBGHAN (*DRTC, Bangalore*) attended the following: (i) UNISIST meeting of experts, Delhi, 18-20 March 1976 as a representative of the Government of India. (ii) Meeting of the Documentation Sectional Committee (Indian Standard Guide for Book Num-

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bering), Indian Standards Institution, New Delhi, 20 July 1975. (iii) Training Course on Editorial Inputs for Better University-level Books, Bangalore, 25-29 August 1975. He was the chief guest. (iv) Seminar on Information for Industry, Bangalore, 14-17 November 1975. Professor A. Neelameghan chaired the inaugural session. Three faculty members of the DRTC gave lectures.

DR. P. R. PAL (*Biochemistry*) was a member of the Organising Committee, Annual Meeting, Society of Biological Chemists (India), 27-29 October 1975, Calcutta. He attended the scientific sessions.

DR. K. S. PARIKH (*Delhi Centre*) gave a series of five lectures in a three-week special course on adaptive building technology on the interrelated socio-economic, engineering and design aspects of low-cost construction at the Centre for Development Studies, Trivandrum, June 1975. He attended a National Seminar on Energy, Hyderabad, 5-7 March 1976.

SHRI M. V. RAMAN (*Demography*) participated in the following: (i) Expert Group Meeting on Strategies in Family Planning Implementation, Bangalore, 21-23 April 1975. He presented a paper. (ii) Eastern Regional Demographers' Conference, Calcutta, 4-6 November 1975. (iii) Meeting of Heads of Demography and Communication Action Research Centres and Programme Offices, Department of Family Planning, New Delhi, 1-3 December 1975. (iv) Special Lecture Series, Population Studies Centre, Sri Venkateswara University, Tirupati, 12-13 March 1976. He delivered a course of three lectures at the University College.

SHRI I. K. RAVICHANDRA RAO (*D.R.T.C., Bangalore*) attended the Seminar on Computer-based Information Systems, Hyderabad, 13-15 September 1975. He presented a paper. Shri Rao presented a paper at the Sixteenth Conference, Indian Standards Institution, Bhopal, 19-25 October 1975. Professor A. Neelameghan also presented a paper.

DR. J. ROY (*Applied Statistics, Surveys and Computing*) attended meetings of the Governing Council, National Sample Survey Organisation, Delhi, 10 April, 31 July and 21 November 1975. He also participated in the Working Group on Mechanised Tabulation set up by the NSSO and attended its meetings at Delhi, 12 June and 1 August 1975.

SHRI B. N. SARKAR (*Demography*) participated in the following: (i) Eastern Regional Demographers' Conference, Calcutta, 4-6 November 1975. (ii) Indian Science Congress, Waltair, 3-7 January 1976. He presented a paper.

DR. (MISS) A. SEN GUPTA (*Family Planning*) attended a meeting of the Heads of Demographic and Communication Action Centres and programme officers of the Family Planning Department, Ministry of Health and Family Planning, Government of India, New Delhi, 1-3 December 1975. Dr. (Miss) A. Sengupta, Shri S. Guha Roy and Shri A. K. Ghosal (*Family Planning*) attended a regional meeting of demographers of States Demographic and Evaluation Cells, Demographic Research Centres, and Communication Action Research Centres of the Eastern Region, Calcutta, 4-6 November 1975.

DR. T. N. SRINIVASAN (*Delhi Centre*) attended the Fifteenth Annual Conference, Indian Econometric Society, Calcutta, 26-31 December 1975. He gave an address on "Food and Energy Choices for India."

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PART III

Administration and Office-bearers

XVIII. GENERAL ADMINISTRATION

18.1 *Membership:* During the year 1975-76, eight persons were enrolled as ordinary members. The membership of 11 members were terminated in terms of rule 3.1 of the Rules of the Institute. Thirteen ordinary members became life members. One Institutional member and 12 ordinary members resigned, and according to information available three life members and one ordinary member died.

Thus the membership position as on 31 March 1976 was 442 (318 ordinary, 114 life, 4 honorary life and 6 institutional members).

During the year 1975-76, 110 sessional members and 178 student members were enrolled for a one-year term.

18.2 *General Meetings:*

18.2.1 *Annual General Meeting, 31 October 1975:* The following were the main items of business that were transacted in this meeting.

- (a) Annual Report of the Institute for 1974-75 was adopted.
- (b) Messrs. S. N. Guha & Co. (Auditors) were appointed as auditors of the Institute for the term 1975-76.
- (c) Actions taken for implementation of new regulations were reported:
 - (i) The names of the representatives on the ISI Council from the Government, ICSSR and INSA were reported;
 - (ii) The following appointments were announced: Professors-in-charge of Divisions, Head of SQC and Dean of Studies;
 - (iii) The selection of names of the representatives on the Academic Council were reported;
 - (iv) The results of election in various offices, viz. President, Council, etc. were reported.
- (d) The existing set-up of the Institute with its Vice-Presidents, Chairman, Secretary and other office-bearers and members of the Council, Governing Body, different Committees, bodies etc. was permitted to continue till the end of January 1976, and it was resolved that all steps should be taken during this period for implementation of the new regulations.
- (e) It was reported that the Committee set-up for appointment of the Director of the Insti-

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tute would finalise its recommendations in November 1975, and that bye-laws relating to the appointment of Head, Delhi Centre, would also be finalised shortly.

18.2.2 *Adjourned Annual General Meeting: 31 January 1976*

(a) The audited Statement of Accounts and Balance Sheet etc. for the year 1974-75 together with Auditor's Report and Administrations' comments thereon were adopted.

(b) The implementation of the Revised Regulations of the Institute was further deferred till the end of October 1976 or till Professor Gopinath Kallianpur, appointed as Director of the Institute under the New Regulations, assumes responsibilities, whichever is earlier. The existing set-up of the Institute with its Vice-Presidents, office-bearers, Chairman, Secretary and other members of the Council, Governing Body of RTS, and various committees etc. are to continue till that time.

(c) It was decided to set-up some of the democratic organs like the Academic Council, Divisional Committees for Scientific Workers (DCSW) and Joint Consultative Committees on the basis of the New Regulations.

18.3 *Meetings of Council and Governing Body of Research and Training School:* The Council of the Institute met, jointly with the Governing Body, four times during the year on: (i) 29 October 1975, (ii) 31 October 1975, (iii) 30 December 1975, and (iv) 31 January 1976.

18.4 *Meetings of the Finance Committee:* The Finance Committees of the Council and of the Governing Body, Research and Training School, met jointly twice during the year on 29 October 1975 and 31 January 1976.

A list of Vice-Presidents, Office-bearers and members of the (i) Council of the Institute; (ii) Governing Body, R.T.S.; (iii) Finance Committees; and (iv) Examinations Committee is given in Chapter XLX.

18.5 *Institute Staff:* The following officials continued to function in the posts mentioned against their names during the year:

1. Dr. C. R. Rao: *Secretary-Director.*
2. Dr. D. Dutta Mazumdar: *Joint Secretary for Calcutta area.*
3. Dr. K. S. Parikh: *Joint Secretary for Delhi area.*

Professor M. Mukherjee continued as Director, Research and Training School, during the year, Professor S. K. Mitra was Acting Director, R.T.S., from November 1975 till his retirement in March 1976, when Professor Mukherjee resumed charge.

Dr. K. S. Parikh was in charge of the construction programme and accounts at the Delhi Centre.

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

1. Dr. S. Bagchi, M.Stat., Ph.D., Senior Lecturer

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2. Dr. Sibdas Bandyopadhyay, M.Stat., (I.S.I.) Ph.D. (Minnesota), Lecturer, December 1975.
3. Dr. S. Chakravarti, M.A., M.Sc., Ph.D., Associate Professor
4. Shri A. Dey, Accountant, B.Com(Hons.), Chartered Accountant.
5. Dr. J. Misra, M.A., Ph.D., Chief Librarian
6. Dr. S. K. Paul, Ph.D.(Toronto). Numerical Analyst, December 1975.
7. Dr. B. Ramachandran, M.A., Ph.D., Professor

18.7. *Retirements*: The following senior members of the staff retired from service during the year:

1. Shri H. K. Chaturvedi, Statistician, B.Sc., A.H.B.T.I. (Post-graduate diploma)
2. Professor S. K. Mitra, M.Sc., Director, Research and Training School.

18.8 *Obituary*: DR. J. C. RAY. The Council, Indian Statistical Institute and the Governing Body, Research and Training School, in a joint meeting held on 30 December 1975, mourned the death of Dr. Jyotis Chandra Ray on 23 November 1975. Dr. J. C. Ray was associated with the Indian Statistical Institute as a Vice-Chairman and acting Secretary. He was the Founder Director, Institute of Experimental Medicine, Jadavpur, and was awarded the *Padma Bhushan* by the Government of India.

The members expressed their heartfelt sympathy for his wife in her bereavement.

18.9 *Land and Construction, Baranagar*: In the previous Annual Report for 1974-75, developments up-to 31 March 1976 regarding the construction of the composite library building were recorded.

The following are the main developments during the year 1975-76:

(1) Negotiations with the approved building contractors, namely, Messrs. Braithwaite Burn & Jessop Construction Co. Ltd., were finalised and the contract for pile foundation awarded for Rs. 18,93,626/-.

(2) 341 piles as contracted for were completed within the financial year and only 25 per cent of the pile caps and tie-beams remained to be completed as on 31 March 1976.

(3) Total payments made to the different contractors including the suppliers of stone-chips, steel, cement, sand, steam coal and payment of architects' fees and cost of advertisements during the year amounted to about Rs. 15 lakhs. Pending liabilities as on 31 March 1976 amounted to over Rs. 1 lakh. Therefore, the total expenditure incurred worked out to over Rs. 16 lakhs. The above liability was met from the unspent balance of the grant of Rs. 29 lakhs carried over from 1974-75.

During the year, a grant of Rs. 2 lakhs was received on account of installation of pump, pipe connections, overhead reservoir, etc. A further sum of Rs. 0.50 lakh was received for the con-

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struction of a car shelter. While preliminary work was done for inviting tenders etc., the actual construction did not take place during the year under report, with the result that the entire sum was carried over to the next year.

Delhi: A further grant of Rs. 7 lakhs was sanctioned for construction activities at the Delhi Centre. This amount was earmarked for (i) extra construction work, (ii) payment to the Delhi Development Authority, and (iii) escalation charges to the contractor.

A sum of Rs. 5.41 lakhs has been spent during the year for extra construction work and for payment to the Delhi Development Authority. Payment of escalation charges could not be made as the matter was under dispute as on 31 March 1976. The earmarked amount was, however, carried over to the next year.

Madras: A sum of Rs. 0.50 lakh was received towards the purchase of land at the Madras Centre. The entire amount of Rs. 0.50 lakh was spent during the year.

XIX. LIST OF PRESIDENT, VICE-PRESIDENTS, OFFICE-BEARERS, MEMBERS OF COUNCIL, GOVERNING BODY AND MEMBERS OF THE COMMITTEES OF THE COUNCIL AND GOVERNING BODY.

For a term of two years with effect from November 1973.

It has later been decided by the Governing Body of the Research and Training School and the Council of the Institute at a meeting held on 31 January 1976—which was also approved by the Adjourned Annual General Meeting on the same day, that the existing set-up of the Institute with its Vice-Presidents, Office-bearers, Chairman, Secretary and other members of the Council and of the Governing Body and their various committees etc., be permitted to continue till October 1976 or till the Director assumes his responsibilities in terms of the new regulations, whichever is earlier.

President: Professor S. N. Bose, F.R.S., D.Sc., F.N.I. National Professor (died on 4 February 1974. No election of President took place during the period under the old regulations).

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. Shri K. P. S. Menon, (Former Chairman) I.C.S. (Retired) (for a term of five years with effect from November 1971); 3. Shri S. C. Roy, M.A., B.L., Director, NCCO of India Ltd., Calcutta (for a term of five years with effect from November 1972), (former Chairman); 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) (resigned).

Vice-Presidents: 1. Shri Vishnu Sahay, I.C.S. (Retired), former Governor of Assam & NEFA; 2. Shri Subimal Dutt, I.C.S. (Retired).

THE COUNCIL

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

Vice-Chairmen: 1. Shri Ajit Dasgupta (Calcutta area, died on 22 July 1976); 2. Dr. Jagjit Singh, Chairman and Managing Director, Indian Drugs and Pharmaceuticals Ltd. (Delhi area).

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

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

Joint Secretaries: 1. Dr. D. Dutta Majumder, Professor, Electronics and Communication Science, Indian Statistical Institute (Calcutta area), elected in the Adjourned Annual General Meeting held on 30 March 1974; 2. Dr. K. S. Parikh, Professor, Planning Unit, Indian Statistical Institute (Delhi area), elected in the Adjourned Annual General Meeting held on 30 March 1974.

MEMBERS OF THE COUNCIL

1. Dr. B. P. Adhikari, Dr. es. Sc. (Paris), Professor, Indian Statistical Institute; 2. Dr. Debabrata Basu, Research Professor, Indian Statistical Institute; 3. Dr. Deb Kumar Bose, Professor, Indian Statistical Institute; 4. Dr. P. K. Bosu, M.Sc., D.Phil, Pro-Vice Chancellor, Calcutta University; 5. Dr. T. A. Davis, Professor, Indian Statistical Institute; 6. Dr. S. W. Dharmadhikari, M.Sc., Ph.D. (California), Department of Statistics, University of New Mexico; 7. Dr. Ambarish Ghosh, Dr. es. Sc. (Aix-Marseille), Professor, Indian Statistical Institute; 8. Shrimati Nirmal Kumari Mahalanobis; 9. Dr. Ashok Mitra, Ph.D., National Fellow, Indian Council of Social Science Research; 10. Dr. T. V. Hanurav, Professor, Indian Statistical Institute; 11. Dr. V. S. Huzurbazar, Professor and Head, Department of Mathematics and Statistics, University of Poona; 12. Shri S. Naqvi, Centre for Study of Regional Development, Jawaharlal Nehru University, New Delhi; 13. Dr. J. Roy, Research Professor, Indian Statistical Institute; 14. Professor S. S. Srihande, Ph.D., Head of the Department of Mathematics, University of Bombay; 15. Shri S. M. Sundara Raju, M.Sc., Chief, SQC Division, Indian Statistical Institute.

Government Nominees on the Council [Rule 6.1(b) (1)]: 1. Cabinet Secretary, Cabinet Secretariat, Government of India (Shri B. D. Pandey, I.C.S., 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 Moni Mohan Mukherjee, Director, Research and Training School, Indian Statistical Institute; 2. Dr. 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, Karnataka State Branch:* Professor Srinagabhushana.

Additional Vice-Chairmen: 1. *Chairman, Bombay Branch:* Shri M. D. Chaudhury; 2. *Chairman, Kerala Branch:* Professor Samuel Mathai; 3. *Chairman, Karnataka State Branch:* Shri C. S. Sashadri.

MEMBERS OF GOVERNING BODY OF THE RESEARCH AND TRAINING SCHOOL: 1975-76

1. Shri P. N. Haksar, Chairman (*ex-officio*); 2. Dr. C. R. Rao, Secretary (*ex-officio*); 3. Professor M. Mukherjee, Director, Research and Training School (*ex-officio*); 4. Shri A. K.

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Ganguli, Editor, (*Capital Associated Chambers of Commerce of India*); 5. Dr. S. Misra (*Indian Economic Association*); 6. Shri G. K. Bhagat (*Federation of Indian Chambers of Commerce and Industry*); 7. Shri V. R. Rao, Director, Central Statistical Organisation (*Government of India*); 8. Shri A. K. Sen, Joint Secretary, Ministry of Finance, Financial Adviser to the Department of Statistics (*Government of India*); 9. Shri V. V. Divatia, Adviser, Department of Statistics, Reserve Bank of India (*Reserve Bank of India*); 10. Dr. R. S. Krishnan, Vice-Chancellor, Kerala University (Association of Indian Universities); 11. Dr. R. Bamba, F.N.A., Department of Mathematics, Punjab University (*Indian National Science Academy*); and 12. Dr. D. Basu; 13. Dr. T. V. Hanurav; 14. Dr. B. P. Adhikari; 15. Dr. A. B. Chowdhury, MB.B.S., D.Phil, F.A.M.S., F.N.I., Director, School of Tropical Medicine; 16. Dr. J. C. Ray, M.D., F.N.A. (died on 23 March 1975); 17. Dr. P. V. Sukhatme, Ph.D., F.N.A., Maharashtra Cultivation of Science, Poona (*Council of the Indian Statistical Institute*).

LIST OF MEMBERS OF DIFFERENT COMMITTEES

(for a term of one year from 30 December 1973)

(Term extended till end of October 1976 or introduction of revised memorandum of the Institute, whichever is earlier)

Finance Committee of the Governing Body

1. Chairman of the Institute (*ex-officio*); 2. Secretary of the Institute (*ex-officio*) or in his absence, a Joint Secretary; 3. Director of the Research and Training School (*ex-officio*) or a Joint Director, if any, in charge of RTS; 4. & 5. Two representatives of the Government of India (Shri V. R. Rao and Shri A. K. Sen); 6. Representative of Reserve Bank of India on the Governing Body (Shri V. V. Divatia); 7. & 8. Two representatives to be elected by Governing Body from amongst themselves (Dr. A. B. Chowdhury and Shri A. K. Ganguli).

Finance Committee of the Council

1. Chairman of the Institute (*ex-officio*) or his nominee; 2. Secretary of the Institute (*ex-officio*) or his nominee; 3. Director of the Research and Training School (*ex-officio*) or his nominee; 4. Treasurer of the Institute (*ex-officio*) (Dr. P. K. Bosu); 5. Dr. Jagjit Singh; 6. Dr. B. P. Adhikari; 7. Dr. Bhabatosh Dutta; 8. Shri S. C. Roy, Honorary Vice-President of the Institute; 9. Dr. J. Roy; 10. Shri S. M. Sundara Raju; 11. and 12. Two representatives nominated by the Government of India (Cabinet Secretary or his nominee); and 13. Chief Accounts Officer (*ex-officio*), non-member Secretary.

Examinations Committee of the Institute

1. Dr. P. K. Bosu, 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, representatives of the Governing Body; 7. Dean of Studies, Research and Training School, Indian Statistical Institute; 8. Shri Sadasiv Sengupta; and 9. Shri Tares Maitra, *Member-Secretary*.

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Journal Committee of the Institute

(i) Committee for Sankhyā, Series A

(1) Dr. R. R. Bahadur; 2. Dr. D. Basu; 3. Dr. V. S. Huzurbazar; 4. Dr. K. R. Parthasarathi; 5. Dr. S. S. Srikhande; and 6. Dr. Maloy Ghosh.

Co-editors: 1. Dr. Maloy Ghosh and 2. Dr. K. R. Parthasarathi.

(ii) Committee for Sankhyā, Series B

1. Dr. T. V. Hanurav; 2. Dr. Sujit Kumar Mitra; 3. Shri K. G. Ramamurthi; 4. Dr. J. Roy; and 5. Dr. Maloy Ghosh.

Advisers for Sankhyā, Series A and B

1. Dr. R. R. Bahaduri; 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.

(iii) Committee for Sankhyā, Series C—Parts 2 and 4 (Quantitative Economics)

1. Professor V. M. Dandekar; 2. Dr. L. Hurwicz; 3. Dr. N. S. Iyengar; 4. Dr. B. S. Minhas; 5. Professor M. Mukherjee; 6. Dr. A. Rudra; 7. Dr. T. N. Srinivasan; and 8. Dr. P. K. Bardhan.

Co-editors: 1. Dr. T. N. Srinivasan and 2. Dr. P. K. Bardhan, *Advisor:* 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. A. Rudra.

(iv) Committee for Sankhyā, Series C—Parts 1 and 3 (Sample Surveys : Theory and Practice)

1. Dr. D. Basu; 2. Professor T. Dalenius; 3. Professor M. H. Hansen; 4. Professor D. B. Lahiri; 5. Dr. M. N. Murti; 6. Professor Des Raj; 7. Professor J. N. K. Rao; and 8. Dr. J. Roy.

Co-editors: 1. Dr. J. Roy and 2. Professor J. N. K. Rao.

Advisers: 1. Dr. D. Basu; 2. Professor T. Dalenius; 3. Professor M. Hansen; 4. Professor D. B. Lahiri; 5. Dr. M. N. Murti; 6. Professor Des Raj; and 7. Dr. T. V. Hanurav.

Editor for all the Series: Dr. C. R. Rao, F.R.S.

Bombay Branch: 1975-76

Chairman: Shri M. D. Chaudhuri, M.Com.

Vice-Chairmen: 1. Shri M. A. Telang, M.A., 2. Professor V. B. Mamnath, M.Sc.

Hon. Secretary: Professor P. N. Phutane, M.Sc. (Math.), M.Sc. (Statistics).

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Treasurer: Dr. M. N. Vartak, M.Sc., Ph.D.

Council Member: Professor B. G. Iyer, M.Sc.

Karnataka Branch: 1975-76

Chairman: Shri C. S. Seshadri.

Vice-Chairmen: 1. Shri H. C. Ramanna; 2. Shri P. S. Narayana.

Secretary: Professor Srinagabhushana.

Joint Secretary: Shri C. A. Setty.

Treasurer: Dr. K. P. Srinath.

Members of the Council: 1. Shri K. G. Katway; 2. Shri B. V. S. Rao; 3. Shri T. P. Subba Pakkala; 4. Professor U. R. Umarji, Director, Bureau of Economics and Statistics.

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PART IV

Statement of Accounts and Auditors' Report for the year 1975-76

AUDITORS' REPORT

We report that we have audited the Balance Sheet as at 31st March, 1976 of:

- (a) The Indian Statistical Institute and,
- (b) Other Funds.

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

The remarks referred to above are:

1. Though National Sample Survey Unit has been separated from the Institute with effect 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 & Expenditure Account for the year ended 31st March 1976 and the Balance Sheet as at that 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 account, 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 continue to be borne in our Asset Register, a rental being recovered from them. So long as the final decision is not reached, the assets are to be treated as being borne in our accounts. In this context, the 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 accounts. Every effort will be made to have the matter finally settled before the next year's accounts is closed.]

BALANCE SHEET

2. Fixed Assets

(a) Asset Registers were not maintained for Land Development. 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.
- (ii) Location of assets except furniture and fittings are not disclosed.
- (iii) Description of assets, e.g., Model, Identity Number, etc., are also not shown.

Italicized portion within brackets are the comments of the administration on the observation made by the Auditors.

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Further to our above report, we are to state that the Institute has appointed an outside agency to assist in preparation of fixed assets register. Accordingly, they have conducted the physical verification at Head Office, Baranagar, Delhi and Giridih. They have also made identification marks of furniture and fixtures of the above places and submitted a register stating the location and details with identification marks, etc. of furniture and fixtures from which the Fixed Assets Register has to be prepared. They have also requested the authority to fix up metal identification plates for identification of Equipment and Machineries which has not yet been done.

In addition to this, they have also requested the authority to set-up an appropriate committee to make a detailed report and decide regarding the obsolete/damaged/discarded assets, so that appropriate written-off measures can be taken and to get a detailed statement from NSSO regarding assets taken/given by them, without which final job regarding preparation of assets register cannot be taken up.

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

The outside agency appointed by the Institute has almost completed its job. The only thing that remains to be done is for the Institute to segregate and identify the articles according to the following three categories:

(i) articles which are obsolete and, as such, are to be condemned;

(ii) articles which can be made use of after some repairs or cannibalisation; and

(iii) broken parts of articles which cannot be identified with the original article or equipments.]

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

[Institute has already set up a Committee for this purpose and they are already on the job. It is expected that their report will be submitted within a month or two. After this is done, it will not take the outside agency much time to reconcile the difference between physical balance on verification with that which appear in our books of accounts, provided of course, the NSSO authorities confirm receipt of the stock already made over to them.]

(b) *[No comments.]*

(c) Certificates from the officer concerned regarding the existence and condition of the moveable assets as at 31st March 1976 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 furniture 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.

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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.

[This is dependent on the completion of the work by the outside agency. Apart from the actions as indicated by the Auditors, we have on our own submitted a complete list of articles lying with the NSSO at the time of take over and requested them to send back one copy, duly accepted, and this has been taken up at the higher level with the Government also. The Government have already issued necessary instructions to their respective NSSO Units. A separate certificate, location-wise, could not be given. The required information and comparison would be available only after the physical verification is completed by the outside agency referred to above.]

(d) *Land:* In respect of the following lands, possession certificates for items (i) to (ix) and grant certificates for some 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 B. T. Road
- (ii) 153 Gopal Lal Tagore Road
- (iii) 136, 160, 165 & 166/1, Gopal Lal Tagore Road
- (iv) 205 B. T. Road
- (v) 206 B. T. Road
- (vi) Delhi
- (vii) 202 B. T. 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.]

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(e) Library Building at Baranagar:

(i) Contractors' Payment and Architect Fees	..	Rs. 10,80,496.34
(ii) Preliminary expenses	..	Rs. 10,090.41
(iii) Building materials including charges	..	Rs. 8,46,531.47

The above-mentioned payments are included in the Library Building Account. But the works as regards the building is actually in progress and not completed, hence in our opinion, the amount should have been shown in the capital work in-progress.

[Since we have not charged any depreciation, the work being in progress, it is not of vital importance whether the expenditure is shown under the nomenclature "building" or under the nomenclature "building under construction and progress." This objection was not raised by the Auditors last year and we have only followed the practice as obtaining last year or in previous years. If this is really an accounting requirement and if the auditors insist on exhibition in the accounts as "Building in progress" we shall do so from next year's accounts.]

(n) The payments to contractors and architects [Item No. (i)] includes Rs. 37,000.00 paid to Professor A. K. Banerjee and Rs. 2,040.00 paid as against Law charges [Item No. (ii)] but the same should have been shown under the head Advance Account.

In this connection, we further suggest that since M/s. Ballardie Thompson & Mathews (P) Ltd., have been appointed as architects 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.

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

(b) Building materials including charges Rs. 8,46,531.47 [Item No. (iii)] includes some stocks of materials not consumed as at 31.3.76. Hence, such stock amounting to Rs. 99,737.26 should have been shown as stock of building materials and it is further observed that the stores issued to contractors amounting Rs. 7,46,794.21 has not been fully consumed. Hence the unconsumed materials valued at Rs. 1,26,496.96 should have been shown as materials at site.

[The point raised here by the auditors has been disclosed in the fixed assets schedule (Schedule I)].

(c) Cost of library building also includes Rs. 20,899.55 being the difference on account of realisation from contractor against building materials supplied to them by the Institute, which we understand, is supplied at a lower rate than the cost of the materials purchased by the Institute.

[This difference is due to stipulations in the contract.]

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(f) *Sheds & structures:* (i) The written-down value of sheds and structures Rs. 57,786.80 on 203, B. T. Road and 153, Gopal Lal Tagore Road, do not give a true and fair view as at 31st March 1976 as the values of the sheds and structures demolished, are not according to the values ascertained by the management; steps, if any, taken by the management to ascertain the value of the demolished structures, were not, however, explained to us this year also.

[As commented upon in last year's audit report, the objections are 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 used would be a fruitless exercise. However, the auditor's observation is noted for our future guidance.]

(ii) The sheds and structures for UNTAA works at 5 R. N. Tagore Road (written down value as on 31.3.1976 : Rs. 1,72,657.58) have been constructed on the land possessed under rent requisition order.

[No comments]

(g) It is understood that in connection with the construction of the Electronic Computer Unit, certain items of furniture and equipments were lent to I.S.I.J.U. in earlier years.

[Noted. This will be taken care of in course of physical verification already undertaken by the outside agency.]

(h) *Soviet Printing Machines:* Soviet Printing Machines (written down value of item (L) Schedule I of the Institute Rs. 8,28,263.19) is being utilised by the Statistical Publishing Society. It was actually given by the Soviet Academy of Sciences as a gift to the Institute. The amount of Rs. 18,66,696.58 was taken as the value of the machine with the books of accounts and corresponding credit was made to the General Fund Account in 1970-71. We believe that the machinery is in existence from the report of the Committee on Auditors' Reports for 1971-72 accounts. It seems that a few items were damaged and at the present moment, there are some difficulties in utilising some items.

[No comments]

(3) *Investments:* Securities car-marked for the specific funds have been disclosed in the respective fund balance sheet.

[No comments]

4. *Advance on account of I.S.I.J.U.* (Item No. 3 on Asset side of the Institute's Balance Sheet): Advance made to I.S.I.J.U. Expenditure on joint project for the construction of Electronic Computer in Progress (excluding the value of furniture, equipments, etc., loaned to I.S.I.J.U. which are included in Schedule I) Rs. 7,62,329.27.

The above amount has been brought forward from 1968-69 onwards. No steps have been taken in spite of elaborate observation made by us in our last year's report on the above Joint Project.

[Advance on account of ISIJU (Item No. 3 of the Asset side of the Institute's balance sheet.) The Committee set up for the purpose is yet to submit its report. Steps have been taken to

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reactivise the Committee and give its final findings on the basis of which a final decision can be taken by the Council]

5. Amount claimed to be claimed from the Government of India: (Item No. 3.1, 3.2 of the Assets side of the Institute's Balance Sheet Rs. 55,59,667.40 and Rs. 87,480.49 respectively).

In the absence of relevant sanction or acceptance from the Government in respect of claims stated in the item 3.1 and 3.2 of the Institute's Balance Sheet, we are unable to give 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 formed by the Council will take steps for the above matter.

[The Arrear Claims Committee as formed by the Government of India to look into these matters have yet to formulate their final report. Necessary steps will be taken after receipt of this report.]

6. Amount recoverable from Government of Mysore (Item 5 of the Asset side of the Institute's Balance Sheet):

As mentioned in our last audit report, amount recoverable from the Government of Mysore in respect of Bangalore land requisitioned back by the Government of Mysore was Rs. 29,325.80 but as per confirmation given by Deputy Commissioner, Bangalore district, the amount standing to the credit of the Institute is stated to be Rs. 29,378.80. The portion of the said amount remains the same since 1967-68. There is a difference of Rs. 62/- which is still unadjusted this year also.

In spite of our last year's report, neither the receivable amount has been received as reported till date of our report nor any step appears to have been taken.

[Government have already been requested to expedite submission of this report and Government's recommendations thereon. Government have not yet settled the matter. Steps are being taken to sort out the difference.]

7. Stores (At cost): (Item No. 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 & Steel Materials, Cement & Bricks
- (ii) Other Building Materials.

The physical verification of both the categories were made on 31.3.76, result of which showed a net loss of Rs. 385.47 which is not separately shown in the account under the head of "Effect of Physical Verification of Building Materials."

It is further observed that the said account (Effect to Physical Verification of Building Materials : Rs. 18,780.76) is lying from earlier years and was not written off within 31.3.76.

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.

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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 effect of physical verification will be reflected in the next year's accounts after the responsibility for the loss is determined. The auditors have stated that conditions of some of the stores have deteriorated and some are unusable, but no effect has been given for any loss of value due to deterioration or obsolescence. An expert committee as already constituted, is on the job. We can take action only on receipt of the findings of that committee.]

8. Loans & Advances: (Item 6 of the Asset side of the Institute's Balance Sheet)

- (i) Festival Advance to workers Rs. 6,369.75. 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.
- (ii) Advance to suppliers & contractors : Rs. 3,82,482.54
- (iii) Suspense & other advance : Rs. 4,06,056.89
- (iv) Educational relief and other loans : Rs. 2,93,820.42
- (v) Security Deposit : Rs. 92,527.07
- (vi) Sundry Debtors (Partly recoverable) : Rs. 60,605.30

In spite of our last year's report, no separate books have been maintained for Advance to suppliers & contractors as such. However, advances to suppliers are recorded in Suspense Ledger. Some of the advances were given to suppliers against supply of goods or services 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
1971-72	M/s. Avery India Ltd.	Rs. 3,386.10

It is further observed that advances were given to suppliers against supply of goods or services which remain unadjusted for a long time and further advances were given. We give below few examples:

<i>Year</i>	<i>Amount unadjusted</i>	<i>Name of the parties</i>	<i>Amount paid during the year</i>
1974-75	Rs. 89,171.26	Garden Reach Workshop	Rs. 66,292.03
1974-75	Rs. 3,099.51	General Radio Co.	Rs. 2,743.57
1974-75	Rs. 2,054.90	Associated Builder	Rs. 4,791.89
1974-75	Rs. 21,782.59	Godrej & Boyce Mfg. Co. (P) Ltd.	Rs. 39,816.67

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[(i) Suggestions of the auditors are noted. If the amount is ultimately found to be irrecoverable, its write-off will be reflected in due course.]

(ii) Actually, these are not advances to suppliers and contractors, although these are shown as such in our book; a cell set up for this purpose made some progress in liquidating the old advances, but its impact was not felt very much due to addition or more items during the year under question.

Steps will be taken to activate the cell, so that a positive result can be reported within a reasonable time to the Council and the General Body of the Institute. A special cell will be set up to liquidate the old outstanding items within a period of six months.

(iii) The same cell will also look after the items referred to.

(iv, v & vi) Educational relief and other loans, security deposit and sundry debtors— we hope to be able to give a much better report next time.

The suggestion of the auditors for maintaining a separate register for advance to suppliers and contractors will be implemented as quickly as possible.]

Item No. 8:

(a) Suspense Account: Though the balances of the year under audit have been reconciled, the difference in this account amounting to Rs. 434.02 prior to 1975-76 have not been reconciled.

[This small amount of Rs. 434.02 has to be written off since, in spite of our best efforts, reconciliation could not be effected. Necessary proposal to the Council will be put up in due course.]

(b) Some of the balances are still unadjusted in the name of some deceased persons. No action appears to have been taken during the year under audit for adjusting the above balance in spite of our last year's report.

[Same as in (a) above.]

(c) It is also observed that some of the balances are appearing unadjusted in the name of some regular employees and some other accounts also lying unaccounted/unadjusted. Few instances are given below:

(i) Employees:

Dr. S. D. Tendulkar	Dr. 300.00	Cr. 1,309.40
B. K. Bhattacharyya		Dr. 272.92
Sudhir Ranjan Das		Dr. 6,949.30

(ii) Others:

Post Master, Hauz Khas		Cr. 310.00
Stock under Adjustment		Cr. 10,903.29
Salary advance		Dr. 4,297.00
Overtime advance		Dr. 207.28
Giridih Mess		Cr. 636.10
Cabinet Secretary, Government of India		Dr. 1,803.60

No steps have been taken to adjust the above balances.

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[Steps will immediately be taken to recover the net balance amount due from the workers in service.]

(d) Some of the Advances were given to employees against supply of goods/services, which remains unadjusted and further advances have been made to the same persons. We give below few examples:

<i>Year</i>	<i>Amount unadjusted</i>	<i>Name</i>	<i>Amount paid during the year</i>
1974-75	Rs. 400.00	Harichand	Rs. 1,500.00
1974-75	Rs. 270.00	Anup Mazumdar	Rs. 600.00
1974-75	Rs. 555.00	A. Prasanskar	Rs. 1,280.00
1974-75	Rs. 390.13	Suman Chakravarty	Rs. 1,050.00
1974-75	Rs. 3,250.00	Scholarship/Fellowship	Rs. 2,289.73

(e) Advances given during the year to employees for various purposes lying unadjusted/unaccounted during the year. Few examples are given below:

<i>Month of advance</i>	<i>Name</i>	<i>Amount</i>
April '75	Arun Das	Rs. 1,000/-
July '75	Biswanath Mukherjee	Rs. 1,500/-
July '75	Bimalendu Bhattacharyya	Rs. 1,000/-
Nov. '75	Monoranjan Guha	Rs. 6,000/-
July '75	Soumen Bose	Rs. 4,150/-
Jan. '76	Alokananda Mitra	Rs. 10,000/-
Jan. '76	S. L. Jain	Rs. 7,000/-
Jan. '76	T. S. Kutty	Rs. 15,000/-

(f) An amount of Rs. 2,930.24 is due from Dr. B. C. Das on account of rent receivable and the said amount still remains unadjusted.

(g) The following balances, appearing unadjusted in the names of two banks are cited below:

<i>Year</i>	<i>Name of the Banks</i>	<i>Balance</i>
1963-64	United Bank of India, Baranagar	Dr. Rs. 1,616.99
1967-68	State Bank of India	Cr. Rs. 1,000.00

[Suggestions given with regard to recovery of advances will be strictly adhered to.]

(h) *Education, Relief and Other Loans: Rs. 2,93,820.42*

We could not verify above account in the absence of confirmation letters from the persons concerned. Of the above includes Rs. 1,83,896.95 realisable from NSSO staff on account of Flood Relief Loan. In spite of remarks in our earlier report, no step has been taken for the realisation of the same.

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[It is really unfortunate that such a huge amount of Rs. 1,83,896.95 realisable from NSSO employees on the ground of flood relief loan still remains unrealised. From the Institute's side, every effort has been made to inform the NSSO, about the individual loan realisable from the employees, but no steps have been taken so far, as far as we know, to realise the amount or, even if realised, to remit the same to ISI. The only check which we are now exercising is to watch the recovery is at the time of retirement of NSSO employees; we do not issue an unqualified 'no demand' certificate unless we are sure that the amount realisable on this account has already been recovered and credited in our books.]

(i) *Security Deposit:* Receipts in some cases could not be produced before us for verification. In this connection it has been reported that the rented houses—9/B, Esplanade East, has already been vacated by the Institute but security deposit lying with the landlords of Rs. 5,931.36 has not yet been realised.

[Necessary steps have already been taken to realise the security deposit through the Government agency, namely, the Estate Manager through whom the building was originally requisitioned.]

(j) *Sundry Debtors: Rs. 60,605.30*

With regard to Sundry Debtors, we could not verify the said account in the absence of confirmation letters from the parties concerned and personal ledger of the said account. This includes 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 the Gun & Shell 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 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, i.e., last attempt would be made to realise the amount to the extent possible.]

9. *Advance for land:* (Item No. 8.9 of the Asset side of the Institute's Balance Sheet): Rs. 1,41,636.25.

(a) *Re: 106 B. T. Road: Rs. 29,799.38*

This advance is reported to have been paid on 22.1.58. In spite of observations made by the previous auditors on the above advance for land, no refund has been received by the Institute during the period under audit. However, the Institute has sent a solitary reminder to the Collector, Land Acquisition, on 23.3.74 (vide Assistant Secretary's letter no. 3057 dated 23.3.74). In our opinion, considering the amount lying for a long time, the Institute should take more vigorous steps to get the refund as early as possible.

(b) *Re: Bustee Land adjacent to 123, Gopal Lal Tagore Road—Rs. 12,137/-* The position remains as it was in the last year. In spite of comments made by the previous auditors on the above, no follow-up action has been taken except one reminder has been sent by the Executive Officer in his letter No. C/6317 dated 20.3.73.

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(c) Land adjacent to Goopta Niwas—Rs. 5,652/-

This advance has been lying with the Collector of Land Acquisition Department (N), Alipore, as early as August, 1960.

(d) Re: 168, Gopal Lal Tagore Road—Rs. 3,744.03 : This advance relates to May, 1961. Only a reminder during the period under review has been sent on 23.3.74 (vide Assistant Secretary's letter No. C3855), dated 23.3.74.

[Although there is evidence of a solitary reminder having been issued to the Collector, several contacts were made with the Collector's office to expedite the matter. In fact, in one of the cases, we have been successful in realising our dues. Other cases are also being pursued in the same way but, may be, we have to take up the matter at a little higher level than the Collector. This is just to keep our records on the proper side.]

10. *Cash & Bank Balances:* (Item No. 16 of the Assets side of the Institute's Balance Sheet)

Certificate of the following banks confirming the balance as on 31st March 1976 were not made available to us:

- (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 balances figures, 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 bankers' statement it was found that the said account has been in operation in the name of Sri K. K. Banerjee instead of the Institute's own name.

[No comment is called for. The account has since been closed].

11. *General Fund* (Item No. 11 of the liabilities side of the Institute's Balance Sheet)

Out of the amount of Rs. 1,00,258.36 (Plan) and Rs. 7,56,395.11 (Non-Plan) have been charged in the Income & Expenditure Account as expenditure on Books and Journals (including cost of binding, etc.) (Item No. 6.1 of the Expenditure side of the Income & Expenditure Account of the Institute) and 95% i.e. Rs. 8,13,820.08 has been capitalised (vide item H of Schedule I of the Institute's Balance Sheet). The basis of the expenditure and capitalisation are not clear to us.

[No comments.]

12. *Deposits & Other Liabilities:* Rs. 48,56,403.50

(a) *Hospitality & Housing Committees:* Rs. 1,02,336.17 (Item No. 5.1 of the liabilities side of the Balance sheet).

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In spite of observations made by us in our previous reports for incorporating the accounts of the Hospitality Committee in the accounts, neither the defects have been rectified nor the credit balance adjusted by suitable adjustment during the course of our audit. In our opinion, immediate steps should be taken in this regard.

[This item will be taken care of in the light of the recommendations of the Arrear Claims Committee and Government's order thereon when received.]

(b) *Staff Income-tax and Annuity Deposit:* Rs. 53,089.79 (Item No. 5.2)

Out of the above balance Rs. 37,424/- represents the deduction of tax at source from the employees of the Institute: out of this amount Rs. 2,851/- approximately represents excess tax deducted at source which has to be adjusted/refunded, leaving the balance of Rs. 34,873/- not deposited with the appropriate authority in due time.

(c) *Library & other deposits:* Rs. 3,58,872.32 (Item No. 5.3)

The above balance represents deposits made for library and others by the members and the students lying with the Institute as on date of the balance sheet. In course of our checking, it was found that:

- (i) No system of periodical verification of books.
- (ii) There is no record of loss of books/withdrawals.

[Noted. Necessary verification of books will be made after the library shifts to the new composite library building.

The loss of books, or withdrawals of books, if any, will be reflected at the time of physical verification.]

(d) *Other liabilities:* Rs. 30,26,912.20 (Item No. 5.5)

Provision made against liability has been taken for payments made up to 30th June, 1976 for goods and services received by the Institute prior to 31st March 1976.

Amounting to Rs. 14,43,037.89 included in the above as provision for gratuity since 1969-70 to 1971-72. No provision for gratuity has been made since then.

In course of our routine checking, it was also observed that some payments have been made in the year under audit for the expenses of the past year for which no provisions were made in the past years.

[Regarding payment of gratuity of Rs. 14,43,037.89, it may be stated that Government is now releasing grant on the basis of actual payment of gratuity each year. The amount as shown above, would be adjusted on receipt of the final report of the Arrear Claims Committee.]

13. Excess of expenditure over Receipts of Miscellaneous Projects and activities on behalf of the Government of India and other bodies pending adjustments on settlement claim made/to be made (Item No. 4 of the Assets side of the Institute's Balance Sheet).

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The above amount includes Rs. 6,09,815.38 from of India, for National Sample Survey Organisation (Information certificate from NSSO for the above amounts we could not verify the allocation of expenses incurred on by charges, telephone charges, etc.

{Steps are being taken for expeditious settlement

14. *Loans to other funds:* Rs. 5,28,000/- (Item No Balance Sheet).

Of the above amount, loans amounting to Rs. 3 butory Provident Fund without any resolution by the Cc

{Same as above. This was inescapable due to e amount paid has been substantially recovered.}

OBSERVATIONS ON DIFFEREN

(1) *Leave Salary Funds:* Dr. Rs. 1,55,555.75 P. (I Institute's Balance Sheet).

Unlike other fund, this fund has not neither its ow debit balance being the deficit one, represented by the loa but the accumulated revenue expenses made separately i this sort of funds without any resources and correspondi

(2) *Electronic Data Processing & Computation Uni*

With regard to the above item, we could not verifi firmation letters from the parties concerned and separatu amount has been outstanding for a pretty long time. The given below:

1968-69
1969-70
1970-71

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(4) Others:

(i) The following amounts of different funds instead of being invested are lying with the Institute's bank accounts. As per Schedule (VII) which are as follows:

<i>Fund</i>	<i>Amount as on 31st March 1976</i>
Electronic Data Processing & Computation Unit	Rs. 1,13,979.36
Honeywell H-400 Computer Unit	Rs. 14,942.12
Statistical Quality Control Development Fund	Rs. 17,02,464.62
Gratuity Fund	Rs. 2,30,000.00
1974 International Symposium Prize in Statistics Fund	Rs. 9,733.04
	Rs. 20,71,119.14

(5) Supervision Fee Fund :

- (i) No transaction appears to have been taken place during the year.
- (ii) Confirmation certificate regarding credit balance standing in the name of I.S.I. Small Scale Industries Experimental Unit of Rs. 14,910.37 was not made available to us for verification.

[The Arrear Claims Committee, in their final sitting, have reached certain conclusions by which most of the funds would ultimately be merged with the General Funds. Necessary action will be taken on receipt of the final report and Government's order thereon.]

OBSERVATION ON DIFFERENT PROJECTS

1. Communication Action Research (Family Planning Survey) carried out on behalf of Ministry of Health and Family Planning, Government of India

For this project, as per Schedule V; brought forward balance	Rs. 2,61,229.22
Current year's deficiency	Rs. 1,56,114.35
	Rs. 4,17,343.57

The amount is lying unrecovered since years back. In our opinion, steps should be taken by the authorities for the recovery of the said deficiency from the Government of India.

[Noted.]

2. Research and Planning Committee of the Planning Commission for Sociological Studies :

The balance of Rs. 23,755.14, as per Schedule V, being excess of expenditure over income, is brought forward from 1st April, 1967. From a scrutiny of the records made available to us, it appears that the work undertaken by the Institute, in respect of the project, had ended during the financial year 1966-67.

[Steps have been taken to revive the matter.]

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3. *Probability of Hospitalisation according to Age, Sex and diagnosis :*

The brought forward balance of Rs. 12,466.06 as per Schedule X, being excess of income over expenditure, dates at least as back as 1st April, 1972.

[Decision will be taken as quickly as possible.]

4. International Course on Management of Quality Control. As per Schedule X, balance of Rs. 17,826.55 being excess of Income over Expenditure, is brought forward from 1st April 1971.

For projects numbered (2), (3) and (4) above, we are of the opinion that the proper steps should be taken in this regard.

[Same as above.]

General Notes on Projects

Further to above notes, the accounting of activities of the different projects reveals the following facts:

- (1) Projects are mostly spread over a period of more than 3 to 4 years.
- (2) Receipt against Project expenses are re-imbursed lump-sum ad-hoc.

Since the amount recoverable on account of project or liability on account of payment are not accounted for in the Income & Expenditure Account, the said account do not reflect the correct state of affairs.

INCOME & EXPENDITURE ACCOUNT

(i) *Travelling Expenses:* Usually advances are given for travelling and debited to suspense account. Scrutiny of suspense account reveals that several advances were given for travelling expenses which remain unadjusted. Therefore, unless such advances are adjusted within the year the travelling expenses are shown in the Income and Expenditure account would not reflect a true and fair view of the said expenditure.

[Noted. Steps would be taken to adjust the advances within the year as far as practicable.]

(ii) *Reimbursement of Medical Expenses:* It was observed as in last year that actual bill against which medical advances have been made to employees are not submitted promptly for necessary adjustments. As such, medical advances remain unadjusted for a long period, contrary to the rules for re-imburement of Medical Advances.

In course of our routine checking, it was also observed that the entries in the personal ledger maintained by the MERU are made only on payment of the bill. There is no system of recording the unpaid bill in the personal ledger.

[Noted. Medical advances are restricted to the minimum only when workers are admitted to recognised hospitals. The hospital authorities are requested to submit their bills direct to the office for necessary adjustment. In respect of advances which have been given in the past in the name of individuals, necessary steps are being taken to recover the amount from

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their salary, if they fail to produce adjustment bills within three months of the drawal of the advance.]

(iii) Stock of Stationeries, Consumable Stores, Laboratory Stores, Tools and minor Accessories, Cost of Card, Cabinet etc. are neither taken at the close of the year nor accounted for, though they are of negligible value. Accordingly, the purpose of these items in accordance with past practice, during the year are charged in full to the Income & Expenditure Account. As suggested in our last report, the Institute should look into the matter and if necessary, should review whether this old practice should be continued or not.

[The Institute has already examined this point and offered its remarks in the last report which is reproduced below. These are treated as consumable stores and as such the entire expenditure is charged to revenue account.]

(iv) A loan of Rs. 3,72,000.00 was given to I.S.I. Contributory Provident Fund, against which no interest has been charged from, unlike the previous year where the interest was provided for the loan taken from the same fund.

[The matter will be taken up with the Board of Trustees for at least giving us interest at the rate which they are earning.]

(v) *Re: Statistical Publishing Society:* In course of verification it has been observed that expenditure on different heads viz. electricity, telephone etc. is incurred by the Institute on behalf of Statistical Publishing Society. Finally, certain portion of the expenditure has been debited to Statistical Publishing Society as the expenditure incurred on behalf of them. In the absence of detailed information regarding the basis of allocation, we are opinion that the allocation of the expenditure are made on estimated basis.

[Allocation was not made arbitrarily but are made on pro-rata basis by the Electrical Maintenance Unit.]

(vi) *Special payment: 48 hours-scaled worker:* Included in salary is Rs. 4,598.31, being the payment made against special payment.

[Special payment was being withdrawn in a phased manner by adjustment with their yearly increments. It has been subsequently withdrawn in all cases excepting in the case of workers who have to perform fortyeight hours' duty.]

(vii) *Leave Travel Concessions:* This item includes advances to the extent of Rs. 1,04,787.40 against Leave Travel concessions. This amount remains unadjusted in the year, hence the Income and Expenditure Account for the said expenditure does not show a true and fair view.

[The amount has been booked as official expenditure on LTC because it is expected that Government would ultimately agree to accept journeys by and through conducted tours organised by private agencies. The decision is yet to come. If the decision is not according to our expectation, necessary decision will be taken from the Council as to how the advances given to them on this account will be adjusted.]

(viii) *Interest on short-term deposit:* Rs. 99,033.31: Item No. 2(2g) of the Income & Expenditure Account. The above amount is the income taken into account against the interest

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received out of the short-term deposit on fixed deposits which has been earmarked as capital grant for library building and other funds.

[No comments because this was done in the light of discussion held in the Section. 8(1) Committee meeting and also under Council's approval.]

GENERAL OBSERVATIONS

(a) Installation of internal audit system in view of the fast increasing activities of the Institute may help the statutory auditors to perform their duties more efficiently. However, it has been stated that internal audit system has been introduced in a limited way subsequently.

[Steps have already been taken to intensify internal audit.]

(b) The system of budgetary control leaves ample scope for improvement. There is no means of controlling the actual expenditure within the budgeted limits because of the fact that the budget proposals as estimated by the Institute are considered as authorisation for increasing expenditure although the excess of expenditure over income has been piling up years together the claims which are pending for acceptances from the Government for a considerable time. It is also observed that grants for specific activities/items are diverted and utilised to meet the excess of expenditure over income. However, it has been stated that Budgetary Control system has been introduced subsequently.

[The Accounts Department is being properly geared up to introduce effective budgetary control. The question of piling up of excess expenditure over income had not arisen since 1972-73 as will be apparent from Schedule XV annexed with Balance Sheet. Even excess of expenditure over income arose in 1975-76 only due to booking of III Pay Commission's arrear pay expenditure of Class I officers amounting to Rs. 2.5 lakhs approximately, in the current year, therefore, these remarks so far as these two years are concerned, are not correct.]

(c) The proceedings of the Minute Book are not written on the Minute Book but are typed on separate sheets and pasted on the Minute Book.

[No comments.]

7 March 1977

Sd/- S. N. GUHA & Co.
Chartered Accountants

INDIAN STATISTICAL INSTITUTE

Annexure 1

Re: AUDIT OF DELHI BRANCH FOR THE YEAR ENDING 1975-76

We have audited the Trial Balance as at 31st March 1976 of your Delhi Centre, and subsequent to our discussion at Head Office we submit our observations below:

There is no local Asset Register. Under the circumstances, the assets shown in the physical verification list could not be checked with any Asset Register to find out shortage/excesses, if any.

A local Asset Register should be prepared at an early date and kept in the Delhi Office.

There are also some Fixed Assets, lying in I.S.I. rented premises which are now under N.S.S.O. occupation. Though separation of N.S.S.O. from I.S.I. had taken place on 1st June, 1972, the Asset/Liability position, of I.S.I. vis-a-vis N.S.S.O. has not yet been finalised. This will, naturally, lead to complications whilst finalising I.S.I. Balance Sheet as at 31st March, 1976.

The Institute should look into this aspect as early as possible and take suitable steps for necessary adjustments.

[Preamble: Same remarks as already offered in respect of Baramagar office.]

RENT RECEIPTS

A/c No. 392/95

Rent paid for the Premises occupied by N.S.S.O. (Office) up to the period December, 1975 amounted to Rs. 56,567.74. The above amount has neither been treated as receivable nor any amount has been realised till the date of the audit.

[Rs. 56,567.74 is included within Rs. 1,36,842.93 shown in our Accounts of 1975-76 as receivable from N.S.S.O., hence audit comment on this issue is not correct.]

LIBRARY AND READING ROOM

Physical verification by the Institute of Library Books in September 1973 and December 1974 has revealed losses of Rs. 489.25 and Rs. 367.36 respectively.

In our opinion such loss should have been written off

[Suggestion noted. However, necessary action will be taken after conducting an up-to-date physical verification.]

CASH IN HAND

We have checked the physical verification of Cash in hand as on 28th December, 1976 which has agreed with the balance shown in the Cash-Book.

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TENDERS

Purchase of Furnitures

The Institute has purchased furniture amounting to Rs. 19,000.00 (approx.) in the financial year 1975-76 (up to the date of auditing Rs. 75,000.00 approx). Our observation regarding the verification of Tender papers/documents are as follows:

(1) Two different tenders were invited:

(a) One for the purchase of Students Hostel Beds, Chairs, Desks, Book Shelf and Class Room Chairs amounting to Rs. 76,000.00 approximately.

The above tenders invited on a limited or protected basis by offering invitation to six firms for the first group of items and to five firms for the second group of items and few orders have been given to two firms against the first group and as well as second group who have submitted tenders for both the group of items.

Considering the amount involved (about Rs. 75,000.00) for an educational institution like the I.S.I. is huge, a wide invitation through newspapers with large circulation should have been made, alternatively in the case of limited or protected invitation it should have been to fairly large numbers of firms instead of five or six firms, and from the Central Government enlisted Contractors.

[Suggestion noted for future guidance.]

RENT

House No. Y-22 Hauz Khas

From October, 1974 to March, 1976 rent amounting to Rs. 5,175.00 has not been accounted for. It is understood that the said premises is under the possession of the Landlord since the case is pending at the Court.

[Auditor should have insisted Delhi office to provide Rs. 5,175/- either as actual liability or as contingent liability. Since our 1975-76 accounts are already closed, necessary provision will be made in the next year's Account.]

H.T. Connection A/C 729

An amount of Rs. 73,508.00 has been paid to the Delhi Electric Supply Undertaking during the year under audit on an estimated demand from D.E.S.U. No details/basis etc. have been obtained for our verification for the exactness of the expenditure. So actual liability on this account could not be ascertained.

[Delhi office is trying to obtain break up of the sum of Rs. 73,508/- from Delhi Electric Supply Undertaking.]

Advance against Cement Rs. 32,213.56 A/C. 781

An amount of Rs. 40,000.00 was paid to the Bharat Overseas (P) Ltd. towards purchasing cement but of which only cement valued Rs. 7,786.44 have been supplied neither the balance