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Palupre Balakrishnan : The short-run behaviour of prices and quantities in Indian industry. D. Mookherjee (ed.) *The Industrial Economy of India*, Delhi, Oxford University Press.

#### *Planning Unit*

Mukherjee, P.N. : The Indian state in crisis : Nationalism and nation-building, in *Social Movement, State and Democracy* (eds) Manoranjan Mohanty, Partha Mukherjee and Olle Tornquist, Sage Publications.

### Papers Read at Conference/Seminars/Symposia/Workshops

#### Theoretical Statistical & Mathematics Division

##### *Calcutta Unit*

Bandyopadhyay, S., Rao, A.R. and Sinha, B.K. : Methodology for studying social transformation : Use of Social Networks, *Symposium on Social Transformation : Different Dimensions*, ISI Girdih, 25-26 December 1993.

Chaudhuri, P., Kjeil Doksum and Alexander Samorov : Exploratory regression using conditional quantiles and their derivatives. An invited paper for the *Symposium on Robustness of Statistical Procedures and Inference* at the Statistics Section of Indian Science Congress, Jaipur, Jan. 1994.

Chaudhuri, Gopal : Modelling repairable system, *Workshop on Reliability and Survival Analysis*, ISI, Calcutta, 28.2.94-4.3.94.

Das, Ashish and Kageyama, S. : On generalized binary proper efficiency-balanced block designs. *Indian Science Congress*, Jaipur, Jan. 1994.

Das, Ashish and Sinha, B.K. : Optimal allocation of observations under experimental constraints : Resource scarcity and external force's intervention. *International Conference on Stochastic Modelling*, New Delhi, Jan. 1994.

Dasgupta, R. and Bhowmik, D. : Lower tolerance limit for atmospheric ozone layer, *Environmental Conference (PCM Birth Centenary)*, ISI, Calcutta, 20-22 Dec. 1993.

Dasgupta, R. : Moment bounds for strong mixing processes. *Indian Science Congress*, 3-8 Jan. 1994.

Dasgupta, R. : Modelling of material wastage by Ornstein Uhlenbeck process. *Conf. on Stochastic Modelling*, Delhi University, 10-12 Jan. 1994.

- Pal Chaudhuri, P. and Banua, Rana : CA based VLSI architectures for computing multiplications and inverses in GF(2<sup>m</sup>). *7th International Conference on VLSI design*, Calcutta, 5-8 January 1994.
- Prakasa Rao, B.L.S. : Address on : 'Associated sequences and inference problems' at the *International Conference on Stochastic Modelling* at New Delhi on January 10, 1994. (The paper was written jointly with Isha Diwan.)
- Prakasa Rao, B.L.S. : On 'Theory of competing risks' at the *Workshop on Reliability and Survival Analysis* ISI, Calcutta during March 1994.
- Raha, A.B. : Keynote address entitled "ISEC, Calcutta : The Pioneer Centre for Statistical Training of Government Sponsored Statisticians for Developing Countries of The Third World, mainly from Asia and the Far East", at the *First Scientific Meeting of the International Association of Statistical Education* (a body of International Statistical Institute) held at Perugia, Italy during 23-24 Augm 1993 in connection with the 49th biennial session of the International Statistical Institute held in Florence, Italy, 23 August to 2 September 1993.
- Rao, A.R. : Reciprocity in some networks arising in Social and Biological sciences, *Lecture Series on Frontiers of Anthropology*, ISI Calcutta, 8-11 December 1993.
- Rao, T.J. : Sampling methodology in Anthropology, *P.C. Mahalanobis Birth Centenary Lecture Series on Frontiers of Anthropology*, 8-11 Dec. 1993, Calcutta.
- Rao, T.J. and Kar, A. : Suitability of PPS extended sampling in two stages, *P.C. Mahalanobis Birth Centenary Symposium on Sample Survey : Theory and Methods*, 15-17 Dec. 1993. Calcutta.
- Sinha, B.K., Goswami, Aloke and Saha Ray, Rita : Choosing between two experiments : A Bayesian risk analysis. *International Conference in Linear Models*, Poland, June 1993.
- Tripathi, T.P. : Estimation of several domain proportions using inverse SRSWOR. Invited paper read at the *II International Symposium on Optimization and Statistics* held at Aligarh Muslim University during 2-4 November 1993.
- Tripathi, T.P. and Ahmed, M.S. : A general class of chain ratio and product estimators for population mean, Invited paper read at the *II International Symposium on Optimization and Statistics* held at Aligarh Muslim University during 2-4 November 1993.
- Delhi Unit*
- Bapat, R. B. : A matrix-vec theorem for partially oriented graphs. *Third Inter. Conf. on Lattice Path Combinatorics and Applications*, University of Delhi, 1994.
- Dewan, Isha : Associated sequences and related inference problems. *Inter. Conf. on Stochastic Modelling*, Delhi University, 1994.
- Karandikar, R.L. : Pathwise stochastic integration. *IAPS Conf.*, Pune, 1993 (Invited talk)
- Parthasarathy, T. : A solution to an old problem of Samuelson. *Oberwolfach Game Theory Meeting*, September 19-25, 1993.
- Roy, Rahul : Uniqueness of the unbounded components in Boolean models. *CLAPEM, Sao Paulo, Brasil*, July, 1993.
- Sengupta, D. : Invited talk at Indian Sc. Cong., Jaipur, 1994.



**Applied Statistics, Surveys & Computing Division**

*Biometry Research Unit*

Ganguly, S. : Changes on the Electrophoretic Pattern of LDH isozymes on different tissues of *Labeo rohita* fingerlings. 14th Annual Session of the Academy of Environmental Biology, Indore, 1993.

*Computer Science Unit*

Adhikary, Arun Kumar : The nearest proportional to size sampling design and its application to controlled sampling. P.C. Mahalanobis Birth Centenary Celebrations Symposium on Sample Surveys : Theory and Methods, ISI, Calcutta, December, 1993.

Adhikary, Arun Kumar and Basu, M.K. : Optimal controlled IPPS sampling plan. 81st Session of Indian Science Congress, Jaipur, during January, 1994.

Bhimasankaram, P. : Recent advances in computational methods for multiple linear regression. IASRI Conference, Tirupati, December 1993.

Pal Choudhury, P. : Cellular automata based VLSI architecture for computing multiplication and inverses in GF(2). Automation of MCM, PCB. AND, VLSI, 7th International Conference on VLSI Design, California, January, 1994.

Sengupta, Ashis : Directional data - models, statistical inference and applications. XIV Annual Conference of Indian Society for Probability and Statistics, Pune, December, 1993.

Sengupta, Ashis : Optimal robust invariant test for uniformity against wrapped stable mixture family. Invited lecture, Indian Science Congress, Jaipur, January, 1994.

Sengupta, Ashis : Test for independence in bivariate exponential models. Workshop on Reliability and Survival Analysis, ISI, Calcutta, February, 1994.

**Physical & Earth Sciences Division**

*Electronics & Communication Sciences Unit*

Das, J. and De, A. K. : Studies on tropical boundary layer meteorology at Banaras (Invited talk), MONTCLIM conference, National Institute of Oceanography & Atmospheres (NIOA) - Goa, 6-7, Dec. 1993.

*Geological Studies Unit*

Rudra, D.K. : The Kota limestone, India, presented in the seminar, Annual General Meeting 1993 of GLOBALS - IGCP 324 of Climatic and Tectonic Rhythms in Lake Deposits, Pennsylvania State University, USA, 1993.

Saha, D. : Some observations on brittle-ductile toggle. In National Seminar on "Progressive and Supposed Deformation", at Jadavpur University, 1993.

*Physics and Applied Mathematics Unit*

- Bandyopadhyay, P. : Knowledge, Ignorance and Quantum Uncertainty Invited talk given at the Conference on 'Causality in Physics and Philosophy', held at Jadavpur University, August 1993.
- Bandyopadhyay, P. : Gravity without the metric and topological gravity. *Int. Conferences on Mathematical Physics*, Calcutta, January 1994.
- Bhattacharyya, S. : Gamma-ray astronomy - Theoretical expectations versus the latest experimental reports - S. Bhattacharyya, A.C. Das Ghosh and Shilpa Chakraborty - *International Conference on Astrophysics and Cosmology*.
- Bhattacharyya, S. : Photoproduced showers - the cosmic puzzle and the particle physics connections - Diliman Roy, Shilpa Chakraborty and S. Bhattacharyya - *International Conference on Astrophysics and Cosmology*, 20-23 December 1993.
- Dandapat, B.S., Ray, P.C. : Formation of thin film on a rotating disk, *Ninth Mathematical Conference*, Rajshahi University, Bangladesh, 14-16 November 1993.
- Dandapat, B.S. and Ray, P.C. : Formation of thin film as a rotating hot/cold disk in microgravity condition. *Calcutta Mathematical Society*, September 1993.
- Dandapat, B.S. and Ray, P.C. : Nonlinear stability of thin heated liquid film and its rupture. (*Int. symp. on Math. Physics*, Calcutta Mathematical Society - January 1-7, Calcutta).
- Das, P.K. : Quantum Stochastic Flows : *International Symposium on Mathematical Physics*, January 1-7, 1994, Calcutta.
- Mandal, B.N. : On some Mehler Fock type Integral transforms involving associated Legendre functions. *Dix Mathematika Conference*, Bangladesh Mathematical Society, Rajshahi University, Rajshahi Bangladesh, 14-16 november 1993.
- Mukherjee, Soma : Supernova Collapse and Neutrino events - *International Symposium on Mathematical Physics*, January 1-7 1994, Calcutta.
- Mazumder, B.S., Bhowmik, N.G. and Woong, T. M. : Turbulence Generated in Rivers due to Navigation Traffic, 38th Congress of Indian Society of Theoretical and Applied Mechanics, IIT, Kharagpur, December, 9-12, 1993.
- Mazumder, B.S., Bhowmik, N.G. and Woong, T. M. : Distribution of turbulence fluctuation in Rivers due to Navigation Traffic. *Int. Conf. on Environmental Problems*, ISI, Cal. Dec. 20-22, 1993.

*Machine Intelligence Unit*

- Basak J., N. R. Pal and S. K. Pal : A Connectionist System for Handwritten Character Recognition. *Proceedings of IEEE Symposium on Intelligent Systems*, Bangalore, November, 1993, pp. 21-27.
- Basak J., Pal, N. R. and Pal, S. K. : A Connectionist Implementation of Hough Transform. *Proceedings of Third International Conference on Pattern Recognition & Digital Technique*, Indian Statistical Institute, Calcutta, December, 1993, 242-249.
- Basak J. : A psychologically motivated connectionist system for learning and recognition of multiple object. *81st Session of Indian Science Congress Association*, Jaipur, January, 1994.

- Bhandari D., Pal, N. R. and Pal, S. K. : Directed Mutation : A New Concept to Expedite Searching in Genetic Algorithms. *Proceedings of IEEE Symposium on Intelligent Systems*, Bangalore, November, 1993, 1-7.
- Bhandari D. and Pal, S. K. : Genetic Algorithms in Selecting Optimal Set of Weights in a Layered Network. *Proceedings of Third International Conference on Pattern Recognition & Digital Technique*, Indian Statistical Institute, Calcutta, December, 1993, 482-489.
- Chowdhury N. and Murthy, C.A. : Multidimensional data clustering using a modified version of *k*-means algorithms. *Proceedings of Third International Conference on Pattern Recognition & Digital Technique*, Indian Statistical Institute, Calcutta, December, 1993, 60-67.
- Mandal D. P., Murthy, C.A. and Pal, S. K. : Detection of Roadlike Structures from Remotely Sensed Imagery. *Proceedings IEEE Symposium on Intelligent Systems*, Bangalore, November, 1993, 179-185.
- Mandal D. P., Murthy, C.A. and Pal, S. K. : Utility of Multiple Choices in Analyzing remotely Sensed Imagery. *Proceedings of Third International Conference on Pattern Recognition & Digital Technique*, Indian Statistical Institute, Calcutta, December, 1993, 285-292.
- Pal S. K.: Fuzzy Recognition System : Concepts, Features and Recent Patterns. (Keynote Address), *Proceedings of 7th National Systems Conference, (NSC-93)*, Indian Institute of Technology, Kanpur, December, 1993, 617-647.
- Pal S. K., Bhandari, D., Harish, P. and Kundu, M.K.: Object Extraction using Cellular Neural Networks Incorporating Genetic Algorithms. *Proceedings IEEE Symposium on Intelligent Systems*, Bangalore, November, 1993, 199-204.
- Pal N. R. and Bezdek, J. C. : Assessment of clustering tendency and cluster validity : some fuzzy methods. *Proceedings of First Asian Fuzzy System Symposium*, Singapore, Nov 23-26, 1993, 444-449.
- Parui S. K., Uma Shankar, B., Dutta, A. and Dutta Majumder, D. : Unsupervised classification of Indian remote sensing satellite imagery. *Proceedings of Third International Conference on Pattern Recognition & Digital Technique*, Indian Statistical Institute, Calcutta, December, 1993, 68-74.

#### Biological Sciences Division

##### *Anthropometry & Human Genetics Unit*

- Chakraborty, M. : Social hierarchy and demography in some village populations of South 24 Parganas, West Bengal, India. *Lecture Series on Frontiers of Anthropology*, ISI, Calcutta, 8-11 December 1993.
- Deb, D. and Malliotra, K.C. : Changing pattern of forest management in South West Bengal : The Midnapore scenario. *Symposium on Social Transformation : Different Dimensions*, Giridih (ISI), 25-26 December 1993.
- Malhotra, K.C. : Dermalglyphics and primate evolution, *Lecture Series on Frontiers of Anthropology*, Calcutta, ISI, 8-11 December, 1993.
- Malhotra, K.C. : Emerging patterns of forest management and social transformation in India. *Symposium on Social Transformation : Different Dimensions*, Giridih (ISI), 23-26 December, 1993.
- Malhotra, K.C. : Endogamous Caste groups and tribals : Genetic studies. *India-Japan International Workshop on DNA Diagnostics*, SGPG Institute of Medical Sciences, Lucknow, 15-22 January 1994.

Mukhopadhyay, S. : Women, work and mental health. Lecture Series on Frontiers of Anthropology, ISI, Calcutta, 8-11 December 1993.

Roy, S.K. : A study on some physiological traits among the Oran tea garden labourers. Lecture Series on Frontiers of Anthropology, ISI, Calcutta, 8-11 December 1993.

*Biochemistry Unit*

Duttaputra, C., Bandyopadhyay, S., Bhattacharya, N., Dutta, S. : Cancer chemoprevention : Epidemiological findings from cytological cancer screening programme (CCSP). 37th All India Obstetrics and Gynaecology Congress, December, 1993.

**Social Sciences Division**

*Economic Research Unit*

Maiti, P. and Rao, Kavita R. : Explaining India's industrial growth, P.C. Mahalanobis Birth Centenary Conference on *Planning and Economic Policy in India*, Indian Statistical Institute, Calcutta, 1993.

Maiti, Pulakesh and Pal, M. : The process of exploration and exploitation of hydrocarbon : A stochastic modelling, P.C. Mahalanobis Birth Centenary Celebrations Symposium on *Sample Surveys : Theory and Methods*, Indian Statistical Institute, 1993.

Rakshit, M.K. : Trade and exchange rate policy with a binding foreign exchange constraint, Conference on *Planning and Economic Policy in India*, Indian Statistical Institute, Calcutta, 1993.

Rakshit, M.K. : Structural adjustment in India, Annual Conference of Bengal Economic Association, Presidency College, Calcutta, 1994.

*Linguistic Research Unit*

Bandyopadhyay, Debaprasad : Archaeology of Bangla grammar, paper presented at the Annual Conference of the Dravidian Linguistic Society at Kuppam, A.P. (Earlier simplified version of this paper was presented at Rabintra Bharati University on the occasion of Acharya Sunilkumar's Birth Centenary, 1991, in Bangla) (To be published in proceedings of XXI ACDLS, Dravidian Linguistic Society, International School of Dravidian Linguistic, Thiruvananthapuram, Kerala), July 1993.

Bandyopadhyay, Debaprasad : Cripped creativity, paper presented at the Social Science Congress, Bangalore, August 1993.

Bandyopadhyay, Debaprasad : Valency of Bangla verb and problem of compounding, paper presented at the National Conference-cum-workshop on *Lexical Typology* organized by Central Institute of Indian Language, Mysore and School of Language Development, Telugu University, Hyderabad, February, 1994.

Bandyopadhyay, Debaprasad : Quantitative planning of word and its formation, paper presented at the National Conference on *The Word Formation in Indian Languages* organized by the Linguistic Department, Osmania University, February 1994.

Chowdhury, Amitav : Measurement of bilingualism in the Indian context : Some methodological considerations. Paper presented at the Annual Conference of the Dravidian Linguistic Society at Kuppam, A.P. (To be published in proceedings of XXI ACDLS, Dravidian Linguistic Society, International School of Dravidian Linguistics, Thiruvananthapuram, Kerala), July 1993.

*Population Studies Unit*

Gaha Roy, S. : Demographic trends and situation in China and India, *Sino-India Workshop*, New Delhi, 1993, (Sponsored by the UNFPA, Indian Association for the Study of Population and Registrar General of India).

*Psychometric Research & Services Unit*

Banerjee, Surendranath : Prathamik Siksha Seba Chaitra-chairdree samajik o valgyanik sachetanata biseya oiki Samiksha, *Paschimanga Rajya Vigyan Congress*, Indian Institute of Chemical Biology, Jadavpur University, Jadavpur, Calcutta, 1994.

*Sociological Research Unit*

Bagchi, Dipak, Ghosh, T., Sasmal, T. and Sarkar, K. : Micro-watershed development in low productive agricultural system : Need for Agro-eco systemic approach, *Economic & Environment*, Delhi, 1994.

Bhattacharya, Debasish, Bhattar, Ramchandra and Chakrabarti, Prafulla : My village-Your village : Harmony & conflict - An exploratory study in two villages in Purulia, West Bengal, *Man & Environment : Bio-Cultural aspects with special reference to tribes of Eastern India*, Deptt. of Anthropology, C.U., Calcutta, 1994.

Chakrabarti, Prafulla : Who cares for the elderly ? Study of health management and care, *Health Management Care*, HNB Garwal University, Srinagar, 1994.

Chakrabarti, Prafulla : Explorations in value concept - an alternative approach, *Man and Environment : Bio-Social Approach*, Deptt. of Anthropology, Calcutta University, 1994.

Chatterjee, Arun and Chattopadhyay, Kumar : Paper presented at the Symposium on *Social Transformation : Different Dimensions at Giridih*, 1993.

Dasgupta, Atis : The permanent settlement of Bengal and the changing role of the zamindars in the peasant movements. *Two hundred years of land settlement and land revenue system in Bengal Burdwan*.

Dasgupta, Atis : The nature of Indian nationalism in Bengal : an alternative approach, National Seminar organized by Deptt. of Information & Cultural Affairs, Govt. of West Bengal, Calcutta 1993.

Dasgupta, Atis : The relevance of the religious heritage of the Fakir and Samnyasi uprisings, paper presented at the Symposium on *Social Transformation : Different Dimensions Giridih*, 1993.

Ghosh, Bholanath : Pleasures of field work : Some of our experiences, paper presented at the *81st session of the Indian Science Congress*, Jalpur, 1994.

Malii, Asok and Bagchi, Dipak : Agro-eco systemic perspective in social transformation, paper presented at the Symposium on *Social Transformation : Different Dimensions, Giridih*, 1993.

**Statistical Quality Control & Operations Research Division**

Arthanari, T. S. : A decision support system for silo sizing and mixing to improve outgoing quality of fertilizers, 13th World Conference on OR at Lisbon, July, 1993.

Arthanari, T. S. : Taguchi's minute analysis for life characteristics. *Industrial Statistics and Quality Improvement Conference*, Department of Mathematical Sciences, Oakland University, Rochester, Michigan, August 20-22, 1993 (invited talk).

- Arthanari, T. S. : Optimal designing of air pollution control experiments (ESP), Mahalanobis Birth Centenary Celebrations, ISI, Calcutta 2nd December, 1993.
- Bandopadhyay, A. : Talk on ISO - 9000, National Seminar on Value Engineering/Value Management, Calcutta, 19 November, 1993.
- Chakraborty, S.C. : Quality movement in India - the role, experience and plans of the Indian Statistical Institute, 4th National Convention of NIQR, Jaipur, October 1993 (invited talk).
- Chowdhury, K. K. : A paper was accepted for presentation in the 4th National Convention of NIQR at Jaipur.
- Dasgupta, T. and Roy, Somenath : A case study on cost audit : reduction of variation of weight of filled plates, NSVE/VM, Calcutta, 19 November, 1993.
- Ghosh, D. T. : A step towards productivity : a case study on optimum inspection interval for control of Bulk damage for high speed printing machine in a textile mill, National Seminar on Value Engineering/Value Management, Calcutta, 19 November, 1993.
- Mohan, S. R. : The linear complementarity problem and Degeneracy theory, Silver Jubilee conference in Mathematical Sciences, University of Delhi, 25-26 September, 1993 (invited talk).
- Mukherjee, S.P. : Optimum scheduling of crystallisers for production of hot presses Naphtholene, at the Seminar organised by OR Society of India (Calcutta Branch) on 29 January, 1993 (invited talk).
- Perumallu, P. K. : Workshop on Reliability and service Analysis in Calcutta held during February 28 to March 04, 1994 and presented a paper.
- Prasad, V. Rajendra : Response surface fitting by orthogonal polynomial, International Conference on Industrial Statistics on Quality improvement conference Rochester, Michigan, August, 1993.
- Ravindran, G. : An invited speaker at the International Workshop on Global Asymptotic Stability Jacobian Conjecture held at the department of Mathematics, University of Trento, Italy, during September 14-17, 1993.

#### **Library, Documentation and Information Sciences Division**

##### *Library (Bangalore)*

- Meera, B.M. : Wide area networks - A facilitator for Library resource sharing. Paper presented at the seminar on Library Networks in India, organised by DRTC and INSDOC, 12-13 August, Paper P., 1993.
- Ravichandra Rao, I.K and Krishnamurthy, M. : Library networks : Objectives, functions and requirements. Paper presented at the seminar on Library Networks in India organised by DRTC and INSDOC on 12-13 August, Paper L., 1993.

#### **Computer and Statistical Services Centre**

- Bagchi, A. : Dynafed - A dynamic federation of relational databases, Proc. fifth international conference on Management of data held at Calcutta, Dec. 1993 and also in Data management, New Dimensions & Perspectives, International Journal Services, (ISBN 81-900189-4-9), S. Bandyopadhyay (Editor), 113-128.
- Nandy, S.C. : On a new class of firing problems, in 3rd. national seminar on Theoretical Computer Science, held at Kharagpur, Jointly with K. Mukhopadhyay and B.B. Bhattacharya, June 16-18, 1993.

Pramanik, P. : Generating random 0-1 matrices with given marginals, in 3rd. International Conference on Lattice path Combinatorics and Applications, held at Delhi, Jan. 12-14, 1994.

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Note : Names of non-ISI authors have been indicated in New Courier Font.

## Part II. Visiting Scientists, Honours and Awards, Scientific Tours and Assignments

### 8. VISITING SCIENTISTS

A number of distinguished scientists from abroad and India 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 in the Institute to assist in the regular research and teaching programmes, while others came for short periods and gave lectures and seminars. Most of them were available for consultation by the faculty members of the Institute.

1. Agarwal, J.K., University of Texas, Austin, 27-29 December 1993, Electronics and Communication Sciences Unit.
2. Banerjee, Anurag, University of Catholique des Louvain, Belgium, 17 August 1993, Applied Statistics, Surveys & Computing Division.
3. Banerjee, Abhijit, Calcutta, 30 August - 5 September 1993, Planning Unit (Delhi).
4. Bandari, Lavcoch, 1 June - 31 July 1993, Planning Unit (Delhi).
5. Basu, A.P., University of Missouri, USA, 18 January 1994, Applied Statistics, Surveys & Computing Division.
6. Basu, Parantap, Fortham University, USA, 5 August 1993, Stat-Math. (Calcutta) Unit.
7. Bhaskar, T.G., IIT, Kanpur, 20-24 September 1993, Stat-Math (Delhi) Unit.
8. Bhattacharya, R.N., Indiana University, USA, 7 January 1994, Stat-Math, (Calcutta) Unit.
9. Bhutani, Kiran, R., University of Catholic, USA, 28-31 December 1993, Electronics and Communication Sciences Unit.
10. Biswas, Indranil, TIFR Bombay, 8 October 1993, Stat-Math. (Calcutta) Unit.
11. Blaikie, Peter, University of East Anglia, U.K., 10-26 November 1993, Agricultural Science Unit.
12. Borne, Harold, W., University of Maine, USA, 26 October 1993, Geological Studies Unit.
13. Bose, Amitava, IIM, Calcutta, Economic Research Unit.
14. Chari, Monoj, Louisiana State University, USA, 17 June 1993, Applied Statistics, Surveys & Computing Division.
15. Chatterjee, Kalyan, USA, 20 July - 11 August 1993, Planning Unit (Delhi).
16. Choudhuri, S.P., University of Harvard, UNDP, 28-31 December 1993, Electronics and Communication Sciences Unit.
17. Dasgupta, Anirudha, Pennsylvania State University, USA, 27 December 1993, Stat-Math (Calcutta) Unit.
18. D'Autilia, R., Department of Physics, University of Roma, Italy, 27-31 December, Electronics and Communication Sciences Unit and MIU.



19. Dockshatulu, B.L., NRSA, Hyderabad, 28-30 December 1993, Electronics and Communication Sciences Unit.
20. Deshpande, J.V., University of Poona, 1 March 1994, Applied Statistics, Surveys & Computing Division.
21. Deshpande, M.N., Institute of Statistics, Aurangabad, 8 November 1993, Stat-Math. (Calcutta) Unit.
22. Desai, C. Bipin, University of Concordia, Canada, 27 December 1993 - 2 January 1994, Electronics and Communication Sciences Unit.
23. Dharmadhikari, A.D., University of Poona, 15 and 18 June 1993, Stat-Math.(Calcutta) Unit.
24. Dreze, Jean, London School of Economics, July-August 1993, Planning Unit (Delhi).
25. Dutta, Somnath, University of Georgia, USA, 20 December 1993, Stat-Math. (Calcutta) Unit.
26. Engineer, H. Merwan, Canada, January- April 1994, Planning Unit (Delhi).
27. Evans, D.V., University of Bristol, U.K., 10-11 January 1994, Physics and Applied Mathematics Unit.
28. Faugeras, O., INRIA Sophia Antipolis, France, 3-6 August 1993, KBCS.
29. Flint, M.B.S., ODG - Consultant, February 16-17, March 5-6, 1993, Biochemistry Unit.
30. Gath, Isak, University of Technion Haifa, Israel, 27-31 December 1993, Electronics and Communication Sciences Unit.
31. Gesu, Vito, D., University of Palermo, Italy, 27-31 December 1993, Electronics and Communication Sciences Unit.
32. Guerra, F., University of Rome, Italy, 27 December 1993 - 1 January 1994, Electronics and Communication Sciences Unit, Physics and Applied Mathematics Unit and MIU.
33. Guerni, F., University of Rome, Italy, 6 January 1994, Stat-Math. (Calcutta) Unit.
34. Ghosh, Subir, University of California, USA, 12-13 January 1994, Applied Statistics, Surveys & Computing Division.
35. Gupta, R., IUCAA, Pune, MIU.
36. Hall, Bradford A., University of Maine, USA, 26 October 1993, Geological Studies Unit
37. Hungenshally, S., University of Griffith, Australia, 27-31 December 1993, Electronics and Communication Sciences Unit.
38. Isozaki, H., Osaka University, 6-14 September 1993, Stat-Math (Delhi) Unit.
39. Itaya, Jun-ichi, Japan, 9 February - 9 April 1994, Planning Unit (Delhi).
40. Jackson, C., University of East Anglia, 10 April - 1 May 1994, Biochemistry Unit.
41. Jain, S.K., University of Ohio, USA, November 1993, Stat-Math. (Delhi) Unit and 20-22 December 1993, Stat-Math. (Bangalore) Unit.
42. Janwa, H., Mehta Research Institute, Allahabad, 5-10 August, 1993, Stat-Math. (Bangalore) Unit.

43. Jones, Richard Palmer, University of East Anglia, 11-18 March 1994, Agricultural Science Unit.
44. Joshi, Arvind K., University of U. Pennsylvania, Philadelphia, 28-31 December 1993, Electronics and Communication Sciences Unit.
45. Kankova, Vlasta, Institute of Information Theory and Automation, Prague, 30 January-27 February, 1994, SQC Unit.
46. Kawaguchi, T., Japan, 2 July 1993, Stat-Math. (Calcutta) Unit.
47. Krause, Gerd M., Universitat Bielefeld, November 1993, Stat-Math (Delhi) Unit.
48. Kshirsagar, University of Michigan, 2-7 January 1994, Stat-Math (Delhi) Unit.
49. Kundu, Debasis, IIT, Kanpur, 27 July 1993, Applied Statistics, Surveys & Computing Division.
50. Kulkarni, Devadutta, 14-19 June 1993, Stat-Math (Delhi) Unit.
51. Kundu, Sublman, IIT Delhi, 5 July 1993, Stat-Math. (Calcutta) Unit.
52. Kushary, D., Rutgers University, 19 November-2 December 1993, Stat-Math. (Bangalore) Unit.
53. Kushary, Debasis, Rutgers University, USA, 19 November & 2 December 1993, Stat-Math (Bangalore) Unit, Applied Statistics, Surveys & Computing Division.
54. Laisenberg, M., University of Southampton, U.K., 28-31 December 1993, Electronics and Communication Sciences Unit.
55. Lucio, Fabrizio, University of Pisa, Italy, 27 December 1993 - 10 January 1994, Electronics and Communication Sciences Unit.
56. Maddali, Krishna, Institute of Mathematical Sciences, Madras, November 1993, Stat-Math. (Bangalore) Unit.
57. Majumdar, Suman, University of California, USA, 23 August 1993, Stat-Math. (Calcutta) Unit.
58. Mandal, S.G., University of Kansas, USA, 28-31 December 1993, Stat-Math. (Bangalore) Unit and 4 January 1994, Stat-Math. (Calcutta) Unit.
59. Marchant, Fathema A., University of Texas, USA, 27-31 December 1993, Electronics and Communication Sciences Unit.
60. Mardia, K.V., University of Leeds, U.K., 28-31 December 1993, Electronics and Communication Sciences Unit.
61. Meester, R.W.T., University of Utrecht, Netherlands, September-November 1993, Stat-Math (Delhi) Unit.
62. Miller, Sanjoy, MIT, USA, Electronics and Communication Sciences Unit.
63. Mitra, A.P., NPL, Delhi, 27-31 December 1993, Electronics and Communication Sciences Unit.
64. Mukherjee, Jayanti, Miles Canada Inc., Canada, 25 January 1994, Applied Statistics, Surveys & Computing Division.
65. Mukherjee, Rahul, IIM, Calcutta, 12 October 1993, Applied Statistics, Surveys & Computing Division.

66. Mukhopadhyay, N., University of Connecticut, USA, 27 May 1993, Stat-Math. (Calcutta) Unit.
67. Naastepad, Carla, Erasmus University, Rotterdam, 5-15 March 1994, Economic Research Unit.
68. Nandebam, S., JNU, December 1993 - March 1994, Planning Unit (Delhi).
69. Nair, Dinesh, University of Texas, USA, 27-31 December 1993, Electronics and Communication Sciences Unit.
70. Nara, T., University of Tokyo, Japan, 27 December 1993 - 2 January 1994, Electronics and Communication Sciences Unit.
71. Narasimha, R., I.I. Sc., Bangalore, 28-30 December 1993, Electronics and Communication Sciences Unit.
72. Nayak, Tapan K., George Washington University, USA, 6 January 1994, Applied Statistics, Surveys & Computing Division.
73. Novovicova, J., Institute of Information Theory and Automation, Academy of Sciences of Czech Republic, MTU.
74. Parson, L., University of Trondheim, Norway, 14 November-7 December 1993, Physics and Applied Mathematics Unit.
75. Parikh, Ashok, Enland, September-October, 1993, Planning Unit (Delhi)
76. Pattanayak, S., Sambalpur University, 27 May 1993, Stat-Math. (Calcutt) Unit.
77. Pathak, A.G., M.S. University, Baroda, 24-29 January 1994, SQC Unit.
78. Pearson, Roger, Oxford University, U.K., January 1994, Physics and Applied Mathematics Unit.
79. Piantano, Simo, University of Tampere, 25 November - 5 December 1993, Stat-Math (Delhi) Unit, 6 December 1993, Stat-Math. (Calcutta) Unit, December 1993, Stat-Math. (Bangalore) Unit.
80. Raghavan, T.E.S., University of Illinois, USA, 30 June - 3 July, 1993, Stat-Math. (Bangalore) Unit, July 1993, Stat-Math (Delhi) Unit.
81. Ramamoorthy, R.V., Michigan University, USA, 22 February 1994, Stat-Math. (Calcutta) Unit, December 1993, Stat-Math (Bangalore) Unit, September 1993, Stat-Math (Delhi) Unit.
82. Ram Murthy, M., McGill University, 14-18 September 1993, Stat-Math (Delhi) Unit.
83. Rao, Vemuganti, R., University of Baltimore, USA, 17 September 1993, Stat-Math. (Calcutta) Unit.
84. Ray, Debraj, Boston University, 31 January - 5 February 1994, Planning Unit (Delhi).
85. Rodotto, Vega, Fernando, 5-28 January 1994, Planning Unit (Delhi).
86. Rodensacker, Karsten, GSP, Munich, Germany, 26 December 1993 - 10 January 1994, Electronics and Communication Sciences Unit.
87. Roy, Siddharwar, University of Monash, Australia, 27 December 1993 - 12 January 1994, Electronics and Communication Sciences Unit.
88. Sabatini, Marco, University Degli Studi Di Trento, Italy, March-April 1994, Stat-Math (Delhi) Unit.

89. Sarkar, Abhinanda, Stanford University, USA, 7 September 1993, Applied Statistics, Surveys & Computing Division.
90. Sarkar, Palash, Computer Maintenance Corp. Calcutta, 28 September 1993, Applied Statistics, Surveys & Computing Division.
91. Saitar, Abdul, University of Griffith, Australia, 27-31 December 1993, Electronics and Communication Sciences Unit.
92. Sengupta, J., TIFR, Bombay, 13 April 1993, Stat-Math. (Calcutta) Unit.
93. Shah, Riddhi, TIFR, Bombay, 15 July 1993, Stat-Math. (Calcutta) Unit.
94. Shah, K.R., University of Waterloo, Canada, January-March 1994, Stat-Math (Delhi) Unit.
95. Singh, Nirvikar, Santa Cruz, 28 February - 10 March 1994.
96. Sinha, Debajyoti, University of New Hampshire, USA, 11 January 1994, Applied Statistics, Surveys & Computing Division.
97. Storm, Servaas, Erasmus University, 5-15 March 1994, Economic Research Unit.
98. Subbata, De. V., University of Bologna, Italy, January 1994, Physics and Applied Mathematics Unit.
99. Trivedi, Mohan, University of Tennessee, USA, 28-31 December 1993, Electronics and Communication Sciences Unit.
100. Varadhan, S.R.S., Courant Institute, New York, 22-24 December 1993, Stat-Math. (Bangalore) Unit.
101. Vemuganti, R.R., University of Baltimore, USA, 8.9.93-21.1093 (SQC Unit)
102. Yanagawa, T. Kyushu University, Japan, 10 December 1993, Stat-Math. (Calcutta) Unit.
103. Yoshida, M., Osaka City University, Japan, 2 April 1993, Geological Studies Unit.

## 9. HONOURS, AWARDS AND SPECIAL ASSIGNMENTS

Das Gupta, Somesh (Stat-Math) was elected as a member of the Executive Council of the West Bengal Academy of Science and Technology (1993-94), and also as a member of the Sectional Committee, Mathematical Sciences, Indian National Science Academy. He is the President elect for the Statistics Section of the Indian Science Congress, 1995.

Ghosh, J.K. (Stat-Math) has taken over as President of the International Statistical Institute at its Florence meeting in 1993. He was a Platinum Jubilee Lecturer in Statistics at the Indian Science Congress meeting in January 1994. He has also been awarded a National Science Foundation grant for 3 years.

Rao, B.L.S. Prakasa (Stat-Math) was elected Fellow of National Academy of Sciences.

Rao, S.B. (Stat-Math) acted as the Regional Co-ordinator, Mathematical Olympiad of NBHM for 1993 and INMO for 1994. He has also been appointed as the Regional co-ordinator of INMO for 1994.

Karandikar, R.L. (Stat-Math) was elected a Fellow of the Indian Academy of Sciences.

Senha, K.B. (Stat-Math) was elected a Fellow of the Indian National Science Academy. He was also the Chairman of PAC (Math. Sc.) of DST, Govt. of India.

Mukhopadhyay, Krishendu (Electronics) received the Young Scientist Award 1994 of the Indian Science Congress Association in January 1994, for his outstanding research contribution in the area of parallel and distributed processing, during the period of his research fellowship at the Electronics Unit.

Chaudhuri, B.B. (Electronics and Communication Sciences) received the M.N. Saha Memorial Award for the best applications oriented paper published in Journal of Institute Electronics and Telecom. Engg.

Basak, Jayanta (Machine Intelligence) has been awarded the ISCA Young Scientist Award in Computer Sciences for the year 1994 by the Indian Science Congress Association.

Pal, N.R. (Machine Intelligence) continued as an Associate Editor of Int. J. Approximate Reasoning and IEEE Tran. on Fuzzy Systems.

Pal, S.K. (Machine Intelligence) has been elected a Fellow of Indian National Science Academy and a Fellow of National Academy of Sciences, India. He has also been awarded the prestigious Jawaharalal Nehru Fellowship for the year 1993 to work on Neuro-Fuzzy Expert System. He has been awarded a certificate of recognition by National Aeronautics and Space Administration (NASA), USA, for his creative development of a technical innovation titled "Fuzzy medical axis transformation (FMAT) based processing System". He has been appointed an Associate Editor of IEEE Transactions on Neural Networks and continued as an Associate Editor for Far East Journal of Mathematical Sciences. He has also been awarded the 1993 Hari Om Prerit Vikram Sarabhai Research Award in the field of Electronics/Telecommunication/Informatics/Automation.

Bandyopadhyay, P. (Physics and Applied Mathematics) has been appointed the Editor for Theoretical Physics at Hadronic Journal and Hadronic Journal Supplement (USA). He has been awarded the foreign membership of the Italian Physical Society.

Bagchi, D.K. (Agricultural Sciences) become a member of the Faculty Council in Post-Graduate Faculty of Agriculture, BCKV, as Vice-Chancellor's nominee for the period 1993-1995.

Ghose, M. (Agricultural Sciences) was admitted as a Fellow of the Indian Botanical Society (IBS) in recognition of his contribution to Botany.

Majumder, Partha Pratim (Anthropometry and Human Genetics) was elected (i) a member of the Human Genome Organisation, London & Bethesda (USA), (ii) a member of the Executive Committee of Human Genome Diversity Project, Human Genome Organisation, London & Bethesda (USA), (iii) a member of Editorial Board of Human Biology, USA.

Malhotra, K.C. (Anthropometry and Human Genetics) served as (i) a short-term consultant to the World Bank on Forestry Development Project in Madhya Pradesh, March-May, 1993, (ii) an expert member of the team constituted by UNESCO, New Delhi on "Restoration of Degraded Ecosystems", May, 1993, (iii) a short-term consultant to Ministry of Health and Family Welfare and USAID/New Delhi to undertake mid-term evaluation of private Voluntary Organization Health Project (PVOH-II), January-February, 1994, (iv) was elected a member of the Executive committee of the International Union of Anthropological and Ethnological Sciences, 1993-98.

Bhattacharya, N. (Economic Research) served as a representative of ISI on the Governing Council of the NSS Organization, Government of India.

Pal, M.N. (Economic Research) acted as the Chairman of the Index Formulation Committee on Indian Foreign Trade Statistics, set up by the Ministry of Commerce, Government of India. The final report of the Committee entitled "Unified Bilateral Index Formulation System" has already been submitted to the Government of India.

Narayana, N.S.S. (Economic Analysis) acted as an external expert and member of the Research Advisory Committee of ISEC, Bangalore and was elected as Chairman of the Indian Econometric Society (Bangalore Chapter) in February, 1994.

Mukherjee, P.N. (Planning, Delhi) (i) ICSSR Representative on the Board of Management, Gandhian Institute of Studies, Varanasi, 1992 to 1995, (ii) Member Standing Committee on Publication Grants ICSSR, since 1991, (iii) Member, Editorial Advisory Committee, ICSSR Journal of Abstracts and Reviews for Sociology since 1991, (iv) Member, Advisory Council, Institute of Population and Integrated Development, Patna, 1993, (v) Member, Advisory Committee, Developing Countries Research Centre (DCRC) Department of Political Science, Delhi University, 1993.

Guha Roy, S. (Population Studies) acted as a consultant to the National Committee on Evaluation of Total Literacy Campaign Programme, Ministry of Human Resources Development, Govt. of India.

Arthanari, T.S. (Statistical Quality Control and Operations Research) attended the 13th World Conference on OR at Lisbon, Portugal and presented a paper which was considered for the III prize and was also honourably mentioned at the inaugural session.

## 10. SCIENTIFIC TOURS AND ASSIGNMENTS ABROAD

Chaudhuri, Probal (Stat-Math.) worked as Assistant Professor at University of Wisconsin, Madison, USA until May 1993 and visited the place again in March 1994. He visited and gave Seminars at University of Waterloo, Canada, University of Chicago, University of California at Berkeley, University of California at Santa Barbara, Solan School of Management at Mass. Inst. of Technology, University of Illinois at Urbana-Champaign and University of Illinois at Chicago.

Das Gupta, Somesh (Stat-Math.) presented invited seminar talks at University of California at Davis and at Stanford University in USA and at the Institutes of Statistics, National Chiao Tung University and National Tsing Hua University in Taiwan in October 1993.

Ghosh, J.K. (Stat-Math.) spent nearly six months during July-December 1993 as Visiting Professor at Purdue University, USA.

Purkayastha, S. (Stat-Math.) was a Post-doctoral Fellow at University of Toronto, Canada during September 1992 to June 1993. He also visited Rutgers University, USA during 4-6 May, 1993 and gave a seminar.

Raha, A.B. (Stat-Math.) attended the International Statistical Institute's 49th session in Italy from August 23 to September 02, 1993 on invitation from ISI, Netherlands, to represent ISEC's role and activities. He also delivered a keynote address.

Sinha, B.K. (Stat-Math.) visited on invitation, University of Tampere, Finland and University of Augsburg, Germany and worked there. He attended an International Conference held in Poznan, Poland as an invited speaker.

Balambramanian, K. (Stat-Math.) visited Mc Master University, Canada during May 20 to September 02, 1993.

Bapat,R.B. (Stat-Math.) visited the University of Victoria, British Columbia, Canada during March 21 to May 14, 1994. He also visited Brooklyn College and Rutgers University, USA and gave seminar talks during May 15-19, 1994.

Dey, Aloke (Stat-Math.) visited Mc Master University, Canada during May 01 to May 31, 1993 and University of Waterloo, Canada during June 01 to July 31, 1993. He also delivered seminar talks at the University of Guelph, Canada and Carleton University, Canada.

Karandikar, R.L. (Stat-Math.) visited Erasmus University, Rotterdam, Netherlands during April 01 to June 30, 1993.

Parthasarathy, K.R. (Stat-Math.) visited the University of Nottingham, U.K. during March-April, 1993. He also visited the University of Strasbourg, France during April, 1993.

Parthasarathy, T. (Stat-Math.) visited University degli di Trento during May 10 to July 08, 1993 and during September 10-17, 1993.

Roy, Rahul (Stat-Math.) visited University of Utrecht, Netherlands and ETH, Zurich in June 1993 and University of Sao Paulo, Brazil during July, 1993.

Sinha, K.B. (Stat-Math.) visited Universities of Beer-sheva and Tel Aviv, Israel during March 13 to March 30, 1993. He visited the University of Nottingham, U.K. during March 31 to April 30, 1993. During May 01, 1993 and June 16, 1993, he also visited the University of Geneva, Switzerland.

Pill, V. (Stat-Math.) gave lectures at the International Conference and Advanced Workshop on Arithmetic Geometry at Cairo, during September, 1993.

Sunder, V.S. (Stat-Math.), invited participant at the A.M.S. Conference on Hypergroups and their Applications, held at Seattle during August, 1993. Attended the CBMS Conference on Subfactors held at Eugene as an invited participant during August, 1993 and gave a lecture entitled "Obstructions to principal graphs". He also visited the University of California at Berkeley for a week during August, 1993 and the University of Iowa for two weeks during September, 1993 and gave two lectures on "Vertex models and integer index subfactors" and a colloquium lecture entitled "Hypergroups and Subfactors".

Choudhuri, A. (Applied Statistics, Surveys and Computing) visited University of Monbain, German, during 7-14 May, 1993 and presented two seminar talks. He also visited Carleton University, Ottawa, Canada, during May 15 to July 22, 1993.

Krishnan, T. (Applied Statistics, Surveys and Computing) visited the University of Queensland, Brisbane, Australia as Ethei Roy bowled Fellow during September 09 to November 03, 1993.

Mukhopadhyay, P. (Applied Statistics, Surveys and Computing) visited the University of Western Australia during June 16 to July 29, 1993 and delivered lectures in the same University and in the University of Curtin, Perth, Australia.

Chaudhuri, B. B. (Electronics and Communication Sciences) visited Michigan State University, University of Maryland, College Park, Rensselaer Polytechnic from November 01 to December 15, 1993 to deliver a series of lectures and to work on collaborative research.

Parul, S. K. (Electronics and Communication Sciences) attended a Summer School "Computer Vision and Analytic Geometry" in France during 01-05 June, 1993, with financial supports from CIMPA, France.

Rudra, D. K. (Geological Studies) attended on invitation the field seminar as well as the annual meeting 1993 of GLOFALS - IGCP 324 on Climatic and Tectonic Rhythms in Lake Deposits from 05 - 08 August, 1993, held in Connecticut and at Pennsylvania State University, USA. He attended the core workshop and field trip on lacustrine deposits of Newark basin organized by Soc. Econ. Paleont. & Mineral., USA, on 07 August, 1993 and the Palaeontological field excursion.

Kundu, M. K. (Machine Intelligence) attended the Summer School on "Man machine Interfaces", organized by CIMPA-INRIA-UNESCO, at Sophia-Antipolis (NICE), FRANCE, during June 21 - July 02, 1993.

Mandal, . P. (Machine Intelligence) visited the University of Osaka Prefecture, Osaka, Japan under the Japanese Government MONBUSHO scholarship scheme.

Mitra, S. (Machine Intelligence) visited RWTH, Aachen, Germany under Indo-German (DAAD) Fellowship on Ilen from November 1992. She is working with Professor H. Immermann on Neuro-Fuzzy Expert Systems.

Pal, N. R. (Machine Intelligence) organized and chaired a session and presented a paper in the First Asian Fuzzy Systems Symp., Singapore, 1993. He also delivered a lecture in the Institute of Systems Science, Singapore, 1993.

Uma Shankar, B. (Machine Intelligence) attended the Summer School on "Man-machine Interfaces", organized by CIMPA-INRIA-UNESCO, at Sophia-Antipolis (NICE), FRANCE, during June 21 - July 02, 1993.

Bhattacharya, Subrata. (Physics and Applied Mathematics) invited to organize workshop entitled Physics From Cymus x-3 in 2nd ICRC in Calgary, Canada during July 19-30, 1993.



**Dandapat, B. S. (Physics and Applied Mathematics)** visited Rajshahi University, Bangladesh from November 14-16, 1993 to attend 9th Mathematical Conference.

**Mazumder, B. S. (Physics and Applied Mathematics)** visited and delivered lectures at the University of Stuttgart, Karlsruhe and the University of Armed Forces, (Munich) (Germany) through the INSA exchange programme for four weeks in February, 1994. He also attended the workshop on Fluid Mechanics held at the International Centre for Theoretical Physics, Trieste, Italy during 07-25 March, 1994 and delivered lectures there.

**Roy, Sisir (Physics and Applied Mathematics)** visited Linköping University, Sweden and delivered a talk on Unsharp Measurement Theory. He also visited Los Alamos National Laboratory, USA, for a month.

**Bhattacharyay, N. (Economic Research)** taught and directed a joint SPC/SIAP Intermediate Level Country Course in Statistical Operations and Procedures (SOAP) at Port Moresby, Papua New Guinea, during 2-27 August, 1993, at the invitation of the Statistical Institute for Asia and Pacific (SIAP), Tokyo.

**Coondoo, D. (Economic Research)** served as a UNDP consultant and conducted a 4-week course on Statistical Operations at Majuro, Republic of Marshall Island during 07 March - 01 April, 1994 organised jointly by the Statistical Institute for Asia and the Pacific, Tokyo and the Government of the Republic of Marshall Islands.

**Raikhil, M. K. (Economic Research)** gave a presentation and participated in a Conference on Structural Adjustment in South Asia, held at University of California, Berkeley, USA in April, 1993. He gave a seminar on "Monetary Policy in a Developing Country" at Catholic University, Namur, Belgium, in April, 1993. He presented a paper on "Trade and Exchange Rate Policy with a Binding Foreign Exchange Constraint" at the Conference on Development Economics, held at the Institute of Social Sciences, the Hague, the Netherlands, in May 1993 and delivered a lecture on "Issues in Financial Liberalisation" in June, 1993 as one of the four lectures in connection with the Silver Jubilee of Centre for Developing Planning, Erasmus University, Rotterdam.

**Rao, K. Surekha (Economic Analysis)** visited in Department of Economics, Wesleyan University, USA in January, 1994.

**Mookherjee, D. (Planning Unit)** visited University of California, Berkeley to conduct joint research on Incentives and Co-ordination in Hierarchies with Professor Stefan Reichelstein.

**Ramaswami, B. (Planning Unit)** visited the Swedish University of Agricultural Sciences Uppsala, Sweden for research collaboration.

**Sen, Arunava. (Planning Unit)** visited Bellcore, during October to November, 1993 for research.

**Chodhury, Amitava. (Linguistic Research)** visited UK on invitation from Lancaster University, York University and the Gujrali Literary Academy, London. He presented a paper entitled, "Language attitudes of the Gujrals in Britain" at the 10th International Sociolinguistic Symposium held at Lancaster University from 23-25 March, 1994. He continued his work on a collaborative research programme with the Department of Language and Linguistic Science, University of York, and the Department of Language maintenance during 17-22 March and 26-31 March, 1994 respectively.

**Guha Roy, S. (Population Studies)** invited by the International Union for the Scientific Study of Population to participate and present a invited paper to the International Population Conference at Montreal, Canada during August - September, 1993.

**Bhattacharya, Debashish (Sociological Research)** Visited University of East Anglia for 10 weeks, University of Sussex for one day, University of Swansea, U.K. for two days.

Ghosh, Bholanath (Sociological Research) visited University of East Anglia for 10 weeks, University of Sussex for one day, University of Swansea, U.K. for two days.

Seetharama, S. (DRTC, Bangalore) visited as an examiner to School of Information Science (SISA) Addis Ababa, Ethiopia to conduct Viva Voce examination in June, 1993.

Ravichandra Rao, I.K. (DRTC, Bangalore) attended fourth International Conference on Bibliometrics Informetrics & Scientometrics at Berlin 11-15 September, 1993. He visited State Libraries in Berlin.

## 11. SCIENTIFIC ASSIGNMENTS IN INDIA

- Bana, Rana** (Stat-Math) gave a series of six lectures on Recursive Function Theory in the UGC sponsored School on Computer Mathematics at Utkal University, Bhubaneswar during 23-27 September 1993.
- Das Gupta, Somesh** (Stat-Math) presented a course of invited lectures on Multivariate Analysis at the UGC-sponsored Academic Staff College, Deptt of Statistics, Guwahati University in November 1993.
- Rao, B.L.S. Prakasa** (Stat-Math) organised a Symposium on Statistics and its applications in memory of P.C. Mahalanobis at Indian National Science Academy during October 1993. He continued as Editor of Publications, INSA till December 1993 and continues to be the Chairman, Mathematics and Statistics Research Committee of CSIR, Govt. of India.
- Rao, S.B.** (Stat-Math) delivered 6 lectures at UGC Refresher Course on Computational Mathematics held at Utkal University, Bhubaneswar, during 9 September - 4 October 1993 and also during 25 January - 2 February 1994.
- Rao, T.I.** (Stat-Math) gave lectures at University of Guwahati during 24-27 November 1993, in the UGC sponsored refresher course at ISI during January 24 to February 14, 1994, in the Workshop on Frontiers of inference from Finite Populations during 1-9 November 1993. He also gave Mahalanobis Birth Centenary Lecture at Utkal University, Bhubaneswar on 25 March 1994.
- Roy, A.K.** (Stat-Math) was appointed Chairman of an NBHM Committee to select research scholars for its awards in Mathematics.
- Sikdar, K.** (Stat-Math) gave a short Course on Algorithms and Computational Complexity in the Department of Math., Utkal University, during 2-10 October, 1993. He also worked on the Peer Review Committee for Course material on Symbolic Logic and Logic Programming developed by IIT Bombay faculty under a World Bank project.
- Sinha, B.K.** (Stat-Math) has been Editor, Calcutta Statistical Association Bulletin from 1993.
- Srivastava, S.M.** (Stat-Math) gave lectures in the UGC sponsored Refresher Courses on (i) Topology and Functional analysis at R.D. University, Jabalpur, (ii) Computer Mathematics at Utkal University, Bhubaneswar and (iii) Measure and Integral at Allahabad University. He also gave lectures in the School on Logic Programming and Related Topics at ISI, Calcutta.
- Tripathi T.P.** (Stat-Math) delivered a series of invited lectures at the Dept of Statistics, Aligarh Muslim University during 7 February - 5 March 1994 on the topics : (i) Unified theory of sampling for multivariate finite populations, (ii) Inference for finite population domains and (iii) Super population model based procedures. He also worked as a member of the Programme Committee of the II International Symposium on Optimization and Statistics held at Aligarh Muslim University during 2-4 November 1993 and chaired a session.
- Bhattacharya, Tilak** (Stat-Math) lectured at a Summer School at TIFR, Bangalore, during June 1993.
- Hande, S.N.** (Stat-Math) visited ISI, Bangalore during November-December, 1993.
- Parthasarathy, K.R.** (Stat-Math) delivered five lectures in the Department of Statistics, Calcutta University during February 1-4, 1994 under the UGC COSIST Programme. He was the President of the Association of Mathematics Teachers of India, Chairman, National Committee for Mathematics, INSA and Member, National Board of Higher Mathematics.

Roy, Rabul (Stat-Math) delivered talks at the Jawaharlal Nehru University, New Delhi.

Joshi, S.N. (Stat-Math) attended the National Seminar on statistical methodology and new applications, conducted by the Department of Statistics of the Bangalore University from Jan 27 to Jan 29, 1994.

Mishra, G. (Stat-Math) attended the 4th Discussion meeting on Harmonic Analysis held at I.I.T. Bombay during Feb. 1994.

Muthuramalingam, P.I. (Stat-Math) participated in the summer workshop organized by the Indian Academy of Sciences at Kodakkanal during August 24-August 30, 1994 and gave a talk on "A conjecture for some partial differential operators on  $L^1(\mathbb{R}^n)$ ". He also visited the M Sundaranar University at Tirunelveli and Madurai Kamaraj University and gave talks on "Spectral and Scattering theory for Partial Differential Operators" during January 1994.

Padmawar, V.R. (Stat-Math) attended the Symposium on Survey sampling, a conference held at I.S.I. Calcutta during December 1993 as a part of the Mahalanobis centenary celebrations. He also attended the National Seminar on statistical methodology and new applications, conducted by the Department of Statistics of the Bangalore University from 27-29 January, 1994.

Ramasubramanian, S. (Stat-Math) gave invited talks at the Mahalanobis birth centenary symposium on Probability and Statistics held in Trivandrum during June 1993, International Conference on Vistas in Modern Applied Mathematics held in Goa in December 1993 and the Third Ramanujan symposium on Stochastic processes and their applications held in Madras during January 1994.

Sitaram, A. (Stat-Math) gave the Platinum Jubilee lecture in the Mathematics section of the Indian Science Congress held at Jaipur in January 1994.

Sunder, V.S. (Stat-math) visited the Institute of Mathematical Sciences, Madras during July 1993 and gave a lecture on Vertex models and subfactors. He was one of the organizers of the summer school in IIT Bombay during May-June 1993 which was held as a part of the Mathematics Training and Talent search programme.

Sastry, N.S.N. (Stat-Math) gave a series of lectures in the summer school on Coxeter groups organized by the department of Mathematics of the Bombay University during May 1993. Gave 5 lectures on Finite simple groups and their geometries between March 21 and 25 at the Department of Mathematics, University of Poona. He was on the organising committee for the summer school on Coxeter groups.

Thangavelu, S. (Stat-Math) gave a series of lectures on spectral theory of Laplacians in the 8th annual meeting of Ramanujan Math. Sec. held at Sri Venkateswara University, during June 1993. Participated in the 4th discussion meeting on Harmonic Analysis held at I.I.T. Bombay during Feb. 1994 and gave a series of lectures on Harmonic analysis on Heisenberg groups. He also gave lectures on Fundamental solutions and hypoellipticity during the summer school on Geometric measure theory and partial differential equations, TIFR, Bangalore, June 1993.

Bhimasankaran, P. (Computer Science) visited C - MMACS, NAL, Bangalore in May 1993 and delivered invited lectures on Inversion Methods.

Bandyopadhyay, S. (Computer Science) acted as the Convener, Organising Committee for PCM Birth Centenary Symposium on Sample Surveys : Theory and Methods, held in ISI, Calcutta during 15-17 December, 1993.

Pal Choudhury, P. (Computer Science) has been (i) nominated by ISI to a program on Technological Forecasting in R and D conducted by NAARM and TIFAC during 13-21 July 1993 at Hyderabad, (ii) acted as UGC Visiting Fellow as per the invitation from Sambalpur University from 15 September to 1 November 1993.

Sengupta, D. (Computer Science) visited the Department of Statistics, University of Poona from 20-28 April 1993 under the MOU on expert exchange for research collaboration and again from 29 July to 4 August 1993 to take part as a teacher in the Workshop on Computer Applications in Statistics.

Sinha, B.P. (Electronics) acted as a member of the programme committee of the Third and the Fourth National Seminar on Theoretical Computer Science, held at IIT Kharagpur during June 16-18, 1993 and IIT Kanpur during June 9-10, 1994 respectively. He also chaired two sessions in the Third Seminar. He also acted as a member of the programme committee and chaired a session of the VLSI Design'94 conference, held in Calcutta during January 5-8, 1994.

Bhattacharya, B.B. (Electronics) acted as the tutorial co-chair, a member of the programme committee and a member of the organizing committee of the VLSI Design'94 conference, held in Calcutta during January 5-8, 1994.

Das, J. (Electronics and Communication Sciences) delivered an invited talk at MONTICIM conference, National Institute of Oceanography & Atmospheric, Goa on December 7, 1993.

Chaudhuri, B.B. (Electronics and Communication Sciences) delivered (i) an invited lecture on "image data compression" at an IEEE meeting in Calcutta on December 12, 1993, (ii) a series of lectures on "optical character recognition and optical geometry" at Visva Bharati University during 15-17 January 1994, (iii) a lecture on "fractals in image processing" at Advanced Data Processing Research Institute on February 2, 1994, (iv) a lecture on "texture analysis" at IIT Delhi on February 23, 1994, (v) an invited talk on Bangla OCR at the AKSHARA Int. Conf., New Delhi on February 25, 1994, (vi) an invited lecture on "texture synthesis by neural networks" at Int. Conf. on Artificial Intelligence at IIM, Calcutta on March 4, 1994.

Chanda, B. (Electronics and Communication Sciences) delivered a series of lectures on "Image processing and Analysis" in B. E. College (Howrah) in January, 1994.

Sengupta, P. (Electronics and Communication Sciences) delivered a series of lectures on "Object-oriented programming" in B.E. College (Howrah) in January, 1994.

Parui, Swapna Kumar (Electronics and Communication Sciences) delivered an invited lecture on "Visualization and Interpretation of 3D Medical Images" at the National Seminar on Medical Image Processing, held at Command Hospital, Calcutta, on November 20, 1993. He visited Defence Electronics and Applications Laboratory, Dehradun, during 17-22 April, 1993.

Saha, D. (Geology) delivered a series of ten lectures on "Deformation Mechanism; Behaviour of rocks under stress; Theory of brittle fracture", at Academic Staff College, Jadavpur University in connection with a UGC Refresher Course in Structural Geology, 22-25 March, 1994.

Roy Chowdhury, T.K. (Geology) was appointed member-convenor of the National Working Group for the International Geological Correlation programme 328.

Rudra, D.K. (Geology) continued as a member of the National Organising Committee for the 9th International Gondwana Symposium held during 10-14 January 1994 at Hyderabad.

Pal, S.K. (Machine Intelligence) gave invited talks at the Department of Applied Physics, Calcutta University in April 1993; at the Defence Electronics and Application Laboratory (DEAL) on June 10, 1993; at the Department of Electronics, Electronics Niketan, New Delhi on June 16, 1993; at the CMC, Hyderabad on November 23, 1993; at the ANNNSI - 93, BARC, Bombay on November 24-26, 1993; at the IEEE seminar on Image Processing and Computer Vision, Calcutta on December 17, 1993; at the Institute of Radiophysics and Electronics, Calcutta University on December 29, 1993; at the Academic Staff College, Calcutta University on January 14, 1994. He also gave a series of lectures at the Indian Association for Cultivation of Sciences, Calcutta and at the JNT University, Hyderabad on October 5 and November 22, 1993 respectively and a plenary talk at the Seventh National Systems Conference, IIT, Kanpur, December 24-26, 1993.

- Kundu, M.K. (Machine Intelligence) delivered a series of lectures at the Indian Association for Cultivation of Sciences, Calcutta, October 5, 1993.
- Murthy, C.A. (Machine Intelligence) delivered a series of tutorial talks at the J.N.T. University, Hyderabad (organised by IEEE), November 22, 1993.
- Uma Shankar, B. (Machine Intelligence) attended the course on "Geographic Information Systems for Natural Resources Management", sponsored by the UNESCO and DST, Govt. of India, held at the Centre of Studies in Resources Engineering, IIT, Bombay, during Oct. 18 - Nov. 12, 1993.
- Pal, N.R. (Machine Intelligence) delivered a lecture in the National Institute of Orthopaedically Handicapped, Calcutta, 1994.
- Bandyopadhyay, P. (Physics and Applied Mathematics) has been acting as the Editor-in-Chief of the Journal "Communications in Theoretical Physics" published by the Allahabad Mathematical Society. He has also been acting as the Editor-in-Chief of the Journal "Physics-Philosophy Interface" and as the Secretary of the Calcutta Centre for Advanced Study in Science and Philosophy.
- Bundapat, B.S. (Physics and Applied Mathematics) visited IIT Kanpur in connection with some collaborative work from March 21-31, 1994.
- Mukherjee, Soma (Physics and Applied Mathematics) visited Inter-University Centre for Astronomy and Astrophysics, Pune National Centre for Radio Astrophysics, NCRA, Pune, in July 1993 and March 1994 to undertake collaborative work. She also visited the Tata Institute of Fundamental Research (TIFR) March 1994 to attend the International Workshop on pulsars.
- Roy, Stair (Physics and Applied Mathematics) was invited as a Visiting Professor, Indian Institute of Astrophysics, Bangalore, for one month. He was also invited as a Visiting Scientist at the Institute of Mathematical Sciences, Madras.
- Bhattacharya, Subrata (Physics and Applied Mathematics) delivered an invited talk on May 22, 1993 at Birla Industrial Technical Museum on "Nature of Science and Science of Nature".
- Mandal, B.N. (Physics and Applied Mathematics) acted as a member of the University Grants Commission panel in Mathematical Sciences and the Secretary (Honorary), Calcutta Mathematical Society.
- Mazumder, B.S. (Physics and Applied Mathematics) has been invited to chair a session of Fluid Mechanics and Atmospheric Sci. at the 38th Congress of Indian Society of Theoretical and Applied Mechanics (ISTAM), IIT, Kharagpur.
- Dasgupta, Paramani (Anthropometry & Human Genetics) was appointed as a Guest Lecturer, Department of Anthropology, Calcutta University for the session 1993-94.
- Malhotra, K.C. (Anthropometry & Human Genetics) has been appointed member of editorial board of the Journals, (a) Journal of Human Ecology, (b) Journal of Human Genetics, and (c) Indian Journal of Human Genetics. He was invited as a resource person to deliver a series of four lectures at the Refresher Course in Anthropology, UGC sponsored, Utkal University, Bhubaneswar, February 1994. He was invited to deliver a special lecture on Genetics of Human Populations in India, Indo-Japanese Workshop on Molecular Genetics, Sanjay Gandhi Medical College, Lucknow, January 1994. He served as a member on the committee appointed by Indian Institute of Science, Bangalore to review Center for Ecological Sciences, November, 1993. He was invited to deliver a special lecture, Biometric Society of India, December 1993. He was appointed a member of Indira Gandhi Rashtriya Manav Sangrahalaya Samiti and a member of the Council from January 1994. He was invited as an expert to the Orientation Workshop for Regional Coordinators, National Aids Control Organisation, MOHPW, March, 1994, New Delhi. He was elected a member of the Executive Committee of the International Union of Anthropological and Ethnological Sciences, 1993-98. He was a member of the Advisory Committee for Participatory Forest Management, Indian Institute of Technology, Kharagpur, November, 1993.

- Majumder, Partha P.** (Anthropometry & Human Genetics) became a member of (i) the Advisory Board of Journal of Human Ecology, New Delhi, (ii) Governing Council of the Indian Society of Human Genetics, (iii) the Advisory Group Deptt. of Science and Technology & NRS, Govt. of West Bengal.
- Basu, A.** (Anthropometry & Human Genetics) was invited to deliver the P.B. Das Memorial lecture in Gershalli University in April 1993. He also gave a series of lectures on recent trends in Anthropology in Dibrugarh University, March 1994. He has been appointed a member of the Editorial Board, Journal of Human Ecology and has also been appointed a member of the Research Committee, Indian Anthropological Society.
- Gupta, R.** (Anthropometry & Human Genetics) has been appointed a member of the Advisory Board, Journal of Human Ecology.
- Tapaswi, P.K.** (Embryology) attended the International Symposium on Nonlinear analysis and applications, August 25-28, 1993, Waltair, Andhra University as invited speaker. He also chaired a session. He along with J. Chattopadhyay and Asit Kr. Ghosh attended the International Conference on Environmental problems, December 20-22, 1993, ISI, Calcutta and contributed papers on ecology and epidemiology.
- Rakshit, M.K.** (Economic Research) gave a lecture on "Problems of Teaching Macroeconomics to Indian Students" at the UGC Refresher Course for College and University teachers, held at Jadavpur University in January 1994. He gave a seminar on "What is Wrong with IS-LM for India" at Delhi School of Economics, in February 1994. He also acted as the Chairman in the Session on The Labour Surplus Economy at the Annual Conference of Bengal Economic Association held at the Presidency College, Calcutta, in March 1994.
- Sarkar, N.** (Economic Research) visited the Centre for Development Studies (CDS), Trivandrum, Kerala for three weeks during September-October 1993 and delivered lectures on Econometrics to the students of M.Phil. Course.
- Pal, M.** (Economic Research) assisted the External Evaluation Team for Literacy Campaign in the district of Murshidabad.
- Roy, B.** (Economic Research) attended the Fourteenth Annual Conference of the Bangiya Arthaniti Parishad, held at Presidency College, Calcutta during March 19 - 20, 1994. He also attended the Twentieth Annual Conference of the Socio-Economic Research Institute, held at Jadavpur University during November 19-20, 1993.
- Coondoo, D.** (Economic Research) participated in a two-day workshop on "Food Security and Public Distribution" at the Centre for Economic and Social Studies, Hyderabad during 16-17 September 1993 organised as part of the IDRC-UNDP Research Project on "Strategies and Financing for Human Development".
- Bose, Sanjit** (Economic Analysis) gave a lecture on "Kalecki's Contribution to Development Economics" in the UGC Refresher Course in Development Economics, ISECC, Bangalore, November 11, 1993 and another lecture on "Towards a Sociological View of Economics" at the Department of Economics, Vivas Bharati University, Santiniketan, West Bengal March 5, 1994.
- Balakrishnan, Pulapre** (Economic Analysis) was a Visiting Scientist at Centre for Development Studies, Trivandrum until February 1994 and is associated with a study group set up by RBI. He gave seminars on "Total factor - productivity growth in Indian manufacturing industry : A fresh look," at the Indira Gandhi Institute of Development Research, the ISI Delhi Centre, JNU, New Delhi and the EAU, ISI, Bangalore. He also gave four lectures on Inflation at the Gokhale Institute of Economics and Politics, Pune, in November, 1993, two lectures on "Issues in Macroeconomics" at the Indira Gandhi Institute of Development Research, Bombay in December 1993 and five lectures on "The Balance of payments and inflation" at the Centre for Development Studies, Thiruvananthapuram.

- Narayana, N.S.S. (Economic Analysis) gave two lectures each on "Computable general equilibrium models" and "Distributed Lag Models and Time Series Analysis" at the Institute for Social and Economic Change, Bangalore, November 18, 1993 and at the Institute for Social and Economic Change, Bangalore, January 28, 1994, respectively.
- Mukherjee, Dilip (Planning, Unit, Delhi) attended the conference at the Indira Gandhi Institute for Development Research, Bombay.
- Bandyopadhyay, Debaprasad (Linguistic Research) participated in the conference on William Carey on the occasion of Bicentenary Birth Celebration of Carey at Rabiindrabharati University in April 1993 and in the conference on the occasion of celebrating the eve of 15th C. Bangabada organized by Bangla Academy, Govt. of West Bengal, May, 1993. He was also selected to participate in an advanced five week course on Natural Language Processing - Teachers Training Programme held at Centre for Applied Linguistics, Hyderabad Central University during 1 February - 5 March 1994, sponsored by the Department of Electronics, Govt. of India and was involved in the development of Computational Lexicography of Indian Languages in the course.
- Guha Roy, S. (Population Studies) acted as a consultant to the National Committee on Evaluation of Total Literacy Campaign Programme, Ministry of Human Resource Development, Govt. of India.
- Majumder P.K. (Population Studies) was invited by the Population Council to participate in a Workshop on "Quality of Services provided by Public Health Clinics in rural India" held in New Delhi on 15 January 1994.
- Gupta, Rumki (Psychometric Research and Services) attended the National seminar organised by the Institute of Psychological Researches, Indian Institute of Science, Bangalore during May 24-26, 1993 and gave a talk on Effects of region, sex, prolonged deprivation (social and economical) and their interactions at academic achievement.
- Dutta Roy, D. (Psychometric Research and Services) gave a number of lectures on child development and educational psychology at All Yavar Zung National Institute for the hearing handicapped, Calcutta during 1 August to 30 October, 1993. He also gave a lecture on Research Methodology in Mental Retardation at Bikashayan, Institute for retarded children, Calcutta on 10 September 1993. He gave seminars on Awareness of organization's external environment, satisfaction with external environment and mental health of employees at IIT Kharagpur on 12 November 1993 and on State Anxiety during Antarctica Expedition at International Congress on Disaster Management and Emergency Care, organised by Apollo Hospital, Hyderabad on 27 February 1994.
- Gopinath, M.A. (DRTC Bangalore) gave lectures on (i) "Metropolitan City Library Networks at C-DAC", Bangalore, on 17 May 1993. (ii) Information Technology at the Institution of Engineers, Bangalore, 14 June 1993, (iii) "Expert System and Information Retrieval" under Indian Society for Technical Education at the Engineering College, Pondichery, 28 June 1993. (iv) Knowledge-base systems and Multimedia at the Osmania University, Academic Staff College, Hyderabad on 4-5 Feb. 1994. (v) Development of Colon Classification Ed.7 at the University of Poona, Academic Staff College, Pune, 7-8 Feb. 1994. (vi) Library resource sharing and cooperation. University Libraries under INFLIBNET Programme on 18 February 1994. He acted (a) as a Panelist on Scientific Information in Techno-economic progress at Young Scientists and Technologists Congress, 22 May 1993, (b) participated in the US-India World Net Dialogue on "Library Networking and Information Science Education," American Centre, Madras, 3-4 June 1993; and attended seminars/conference/workshop on (c) National Information Networks, DESIDOC, New Delhi, 9-12 Aug. 1993 and 16 Aug. 1993, (d) Regional Information Networks and ASTINFO Consultant's meeting, 27 Sept. 1993 to 2 Oct. 1993, (e) Disseminator on Information to end users Role of Librarians, University of Mysore, Mysore, 28 Oct. 1993. (f) Future of Classifications, Chairman of the Session, 7 June 1994. (g) Computer-Communication Networks for Library and Information Personnel, organised at Surajkund by Scientific and Industrial Research, Govt. of India, New Delhi, 23-31 March 1994. He also chaired (a) Conceptual Structure of Database INFOTEX 1993, Taj Residency, Bangalore, 29 Nov. 1993; (b) Library Automation Programme at the University Libraries



sponsored by the INFLIBNET, Ahmedabad , 19-20 Feb. 1994. He also acted as a resource person (a) Resource-base for Aeronautical Research & Development organised by the Aeronautical Society of India, Bangalore, 20-25 Jan. 1994 (b) DELNET Workshop on Network User services at Indian International Centre, New Delhi, 21-25 Feb. 1994.

## 12. BIRTH CENTENARY CELEBRATIONS OF PRASANTA CHANDRA MAHALANOBIS

The Birth Centenary of P.C. Mahalanobis, founder of the Institute was on 29th June 1993. The celebration of the centenary was one of the most notable features of the activities of the Institute during the period covered in the present report.

The preparations for the celebrations were initiated under the direction of the ISI General Body and the Council. The Council in its meeting of 15 June 1987 entrusted the Institute to work out a programme to highlight the life and works of Prasanta Chandra Mahalanobis and also resolved that such a programme may be linked up with the celebrations of the birth centenary of Professor Mahalanobis in 1993.

Professor Mahalanobis was an outstanding statistician, builder of the Institute, and a planner for the country and it was in these spheres of activity that he achieved his greatest success. He was also the Secretary of Visva Bharati, the Chairman of the U.N. Sub-Commission on Sampling, a reformer, a national planner and a science organizer, and much else. The impact of his work and personality cut across many disciplines and transcended national boundaries. It was therefore decided to organise the celebrations in a befitting manner.

It was felt that the celebration should be at three levels : international, national and institutional. Co-operation should be sought from the International Statistical Institute, The Royal Society, U.K., The Soviet Academy of Sciences, Indian Science Congress Association, the National Academy of Sciences, the Planning Commission and all other national and international societies and organisations with which Mahalanobis had been closely associated. The Institute proposed to hold a year long programme to celebrate the birth centenary. The Govt. of India sanctioned a special grant of Rs. 68.30 lakhs for the centenary celebrations.

It was decided that the following programme should be carried out during the centenary year.

1. Setting up of a museum-cum-archive at the residence of Prof. Mahalanobis in Amrapali on the ISI, Calcutta Campus.
2. Organising International Conferences at different centres of ISI with cooperation from International Statistical Institute and Royal Society, U.K. and publication of the proceedings of the conferences.
3. Publishing (a) A biography of Prasanta Chandra Mahalanobis (Professor Ashok Rudra agreed to write the biography. He was offered the National Fellowship by the Indian Council of Social Science Research, New Delhi) and (b) Popular biography of Mahalanobis in different Indian languages.
4. Publishing Selected papers of Mahalanobis.
5. Making one or more films on Mahalanobis and ISI.
6. Setting up three busts and one plaque of Mahalanobis (Busts to be installed at Calcutta, Delhi, Bangalore and plaque at Hyderabad).
7. Establishing Professorships, Fellowships etc. within ISI.
8. Introducing a national award (to be called Mahalanobis Prize) in Quality Control in cooperation with the CEI (Confederation of Engineering Industries) and the BIS (Bureau of Indian Standards).
9. Bringing out a special volume of *Sankhyā* (Mahalanobis Number) which will include reviews of topics to which Mahalanobis made substantial contributions.



29 June 1893

Prasanta Chandra Mahalanobis

28 June 1972



(From L to R) Professor B. L. S. Prakash Rao, Director, ISI, Shri P. N. Haksar, Chairman, ISI, Shri Gureekar Gaurav Minister of State for Planning and Programme Implementation, Professor M.G.K. Memon, President, ISI, Shri P. Narashimha Rao, Prime Minister, Shri Jyoti Basu, Chief Minister, West Bengal, Shri Pranab Mukherjee, Minister Commerce & Vice-Chairman, Planning Commission, Shri Sukh Ram, Minister of State for Communication.

10. Bringing out a Souvenir (with reminiscences, etc.) with the help of ISI Alumni Association.
11. Organizing popular/Technical lectures on Mahalanobis to be organised in different cities.

To guide the Programme of Centenary Celebrations, an International Advisory Committee was set up as follows:

Shri P.V. Narasimha Rao, Honourable Prime Minister of India, Patron-in-Chief,  
Shri Jyoti Basu, Chief Minister, West Bengal, Patron,  
Shri Pranab Mukherjee, Minister of Commerce, Government of India and Deputy  
Chairman, Planning Commission, Patron,  
Shri Girdhar Gomango, Minister of State (Independent Charge) for Planning and  
Programme Implementation, Government of India, Patron and  
Shri Sukh Ram, Minister of State for Communication, Government of India, Patron.

Other distinguished members included in the Advisory Committee were: Professor M.G.K. Monon, F.R.S., President, ISI, Shri P.N. Haksar, Chairman, ISI, Professor B.L.S. Prakasa Rao, Director, ISI, Professor C.R. Rao, FRS, Professor R.R. Bahadur, Professor G. Kallianpur, Prof. P.V. Sukhaima, Prof. C.N.R. Rao, FRS, Prof. P.N. Ray, Prof. Amartya Sen, Prof. A.P. Mitra, FRS, Prof. O. Siddiqui, FRS, Prof. M.S. Swaminathan, FRS, Prof. P.K. Bose, Shri Annada Shankar Ray, Prof. J.K. Ghosh, Dr. C. Rangarajan, Governor, Reserve Bank of India, Dr. G. Ram Reddy, Chairman, UGC, Dr.(Mrs.) R. Thamarajakshi, Secretary, Department of Statistics, Government of India, Prof. Subyashchi Bhattacharjee, Vice-Chancellor, Visva-Bharati, Prof. Gunnar Kulldorf, President, International Statistical Institute, Sir David Cox, representing Royal Society, London, Prof. Arnold Zellner, President, American Statistical Association, Prof. Mironuga Akaike, Director General, Institute of Statistical Mathematics, Japan, Prof. G.C. Dasgop, Director, USSR Academy of Sciences.

A Programme Committee was constituted with the following members to help in planning and implementing the celebrations:

Shri P.N. Haksar, Chairman, ISI, Director General, Central Statistical Organisation, Govt. of India, Chairman, Governing Council, NSS Organisation, Govt. of India, Vice-chairman, State Planning Board, Govt. of West Bengal, Vice-Chancellor, Calcutta University (or his nominee), Director General, Anthropological Survey of India, Director General, Indian Council of Medical Research, Director General, Department of Meteorology, Govt. of India, Principal, Presidency College (or his nominee), Prof. P.K. Bose, Prof. D. Basu, Prof. Akhok Rudra, Prof. D.K. Bose, Prof. J. Roy, Dr. T.S. Arthanari, Prof. M.A. Gopinath, Prof. J.K. Ghosh, Prof. B.L.S. Prakasa Rao, Prof. Somesh Dasgupta and Prof. N. Bhattacharya.

#### INAUGURATION OF PRASANTA CHANDRA MAHALANOBIS BIRTH CENTENARY CELEBRATIONS AND CONFERENCE ON PLANNING AND ECONOMIC POLICY IN INDIA ON 29 JUNE 1993

A special function was held at the Institute's headquarters in Calcutta on 29th June 1993 to celebrate the birth centenary of Prasanta Chandra Mahalanobis. Shri P.V. Narasimha Rao, the Honourable Prime Minister of India, inaugurated the function.

Professor M.G.K. Monon, President, ISI, in his address recalled the key role that Prasanta Chandra Mahalanobis played in the development of statistics, in the organisation of science and developmental planning. Shri P.N. Haksar, Chairman, ISI, paid a glowing tribute to Professor Mahalanobis and recalled his long association with Professor Mahalanobis and the Institute.

In his speech Shri P.V. Narasimha Rao dealt at length with the contributions made by Professor Mahalanobis in so many diverse fields of our national life. He stated that "the breadth of Professor Mahalanobis's interests was truly amazing" and emphasized that "Professor Mahalanobis was not only a scholar but also a patriot and a person of immense sensibility".

Shri Jyoti Basu, Chief Minister, West Bengal, while recalling the outstanding contributions of Professor Mahalanobis remarked that "because of the continued inequality in the distribution of productive assets that the crucial concept of Professor Mahalanobis relating to social distinction of planning through public sector investment in capital goods sector remained non-implemented". He concluded by saying "I think a time has come when from the national level a special recognition should be given to the ISI, in fitness to its tradition and excellence and as a part of the tribute that all of us collectively owe to Professor Mahalanobis".

Shri Prasad Mukherjee, Minister of Commerce, Govt. of India and Deputy Chairman, Planning Commission, while paying warm tributes to Professor Mahalanobis remarked that "Mahalanobis contributed to the evolution of the strategy and the path of development which has shaped in large measure the pattern of development and the structure of the Indian economy".

Shri Giridhar Gomango, Minister of State (Independent Charge) for Planning and Programme Implementation in his speech remarked that "Professor Mahalanobis was the pioneer of the statistical movement in the country. Quite early in the evolution of independent India, he perceived the crucial role of statistics in economic development". He concluded by saying "May the recollection and remembrance of the life and work of this internationally reputed statistician on the occasion of his birth centenary motivate the entire statistical community including this famous Institute, to rededicate themselves to attain higher achievements to the policy of his means".

Shri Sukhram, Minister of State for Communication, in his speech remarked that "Professor Mahalanobis has left an indelible mark on our national life by his pioneering work in the field of statistics and planning. It was through the effort of Professor Mahalanobis that statistics developed as a discipline and as a tool for policy formulation and planning in India."

Professor B.L.S. Prakasa Rao, Director, ISI emphasised the pioneering role of Professor Mahalanobis in developing statistics in India. Professor Rao remarked that "Professor's contributions were massive as the builder of ISI, Founder Editor of *Sankhyā*, Organiser of Indian Official Statistical System including the CSO and NSS, pioneer in application of statistical techniques to practical problems in agriculture, promotion of the Statistical Quality Control Movement and as the architect of India's Second Five Year Plan."

The complete speech of all the dignitaries are presented later.

#### **Issuing of Commemorative Postage Stamp**

Shri Sukh Ram, Minister of State for Communication presented to the Prime Minister the Commemorative Stamp of one rupee denomination, brought out by the Department of Posts and Telegraphs, Government of India, to mark the Birth Centenary of Prasanta Chandra Mahalanobis. The Honourable Prime Minister released the stamp during the inaugural function.

#### **Unveiling of Bust of Professor Mahalanobis**

A bronze bust of Prasanta Chandra Mahalanobis, sculpted by Prof. Sarbari Roychowdhury and mounted on a pedestal on the lawn adjoining Amrapali, was unveiled by Shri P.V. Narasimha Rao, the Honourable Prime Minister of India, on the same day.

#### **Inauguration of Archives-cum-Museum and Exhibition at Amrapali**

The Honourable Prime Minister, Shri P.V. Narasimha Rao inaugurated the Prasanta Chandra Mahalanobis Memorial Museum and Archives located in Amrapali. He also inaugurated an Exhibition on the life and works of Prof. Mahalanobis in Amrapali on the 29th June 1993. The Exhibition remained open for public viewing for a fortnight.

### **Documentary Film on Mahalanobis : "Tale of Savant"**

A celluloid coloured film on the life and work of Mahalanobis was produced by ISI on this occasion. Sri Buddhadev Dasgupta, eminent film Director, directed the film. The film was telecast on the Doordarshan National Programme on 29th June 1993.

### **Prasanta Chandra Mahalanobis : A Doyen of Indian Science**

A documentary film with the above title has been made by Calcutta Doordarshan. It was telecast on 31 August 1993.

### **Biography of Mahalanobis**

The biography of Prasanta Chandra Mahalanobis written by Professor Ashok Rudra, based on a project supported by ICSSR and ISI, will be published soon. A popular biography written in Hindi language by Prof. T.P. Tripathi has been published by the Institute.

### **Publication of Special Volume of *Sankhya***

A special Volume of *Sankhyā* has been published to commemorate the birth centenary of Prasanta Chandra Mahalanobis, founder-editor of *Sankhya*.

### **Remembrance Day organised by ISIAA and ISI Society in Calcutta**

The Indian Statistical Institute Alumni Association (ISIAA) and ISI Society jointly celebrated 4th July 1993 as Prasanta Chandra Mahalanobis Remembrance Day. Several associates of Mahalanobis, alumni and current students of ISI reminisced about the Professor, the Mahalanobis tradition and its continuation. A cultural programme was also organised.

### **Function organised by ISIWG and ISI Club in Calcutta**

The ISI Workers' Organisation and ISI Club jointly organised a function on 28th June 1993 in the Geology Auditorium. Sri Nirmal Chatterjee, M.P. and Sri Nripen Bandyopadhyay (a former Secretary of ISIWG) were the main speakers on the occasion. Professor M.G.K. Menon, President, ISI and Professor B.L.S. Prakasa Rao, Director, ISI also addressed the gathering. Sri Supriyo Tagore, Principal, Patna Bhawan, Visva Bharati, recited some of the relevant passages from the writings of Rabindranath Tagore and Professor P.C. Mahalanobis. Sri Ashoktani Bandyopadhyay and Smt. Parabi Mukhopadhyay presented a number of Tagore songs.

Smt. Madhuri Mahalanobis, wife of the brother of Professor Mahalanobis spoke briefly and graced the occasion by her presence.

### **Dedication of New Office Premises in Madras**

The Madras Unit moved into 110 Nelson Manickam Road, Aminji Karai, Madras - 600029 and in a function held on 25th June 1993, the new office premises was dedicated to Prasanta Chandra Mahalanobis. The function was inaugurated by Professor M.G.K. Menon, President, ISI, and presided over by Dr. S. Sankhik, Vice-Chancellor, University of Madras. The function was attended by several persons representing research organisations, universities, and industries. The speakers paid glowing tributes to Mahalanobis and recalled his pioneering role in organising Statistical Quality Movement in India and contributions to statistics and planning. On this occasion a video film "Quality : Our Own Heritage" was released by Dr. S. Sankhik, Vice-chancellor, University of Madras.

#### **Function Organized by Madras Unit**

A function was held at Madras on 29th June 1993 to celebrate the birth centenary of P.C. Mahalanobis. Sri P.C. Mathur, ICS (Retd.) gave a brief account of the efforts made by Mahalanobis in starting the Indian Statistical Institute. Several speakers while paying tributes to Mahalanobis recalled his contributions in the areas of planning for economic development, Statistical Quality Control, Large Scale Sample Surveys, etc.

#### **Function Organised by Trivandrum Unit**

A symposium on "Statistical Sciences for National Development" was organised by SQC & OR Unit, Trivandrum, jointly with NSSO, Kerala, Census Directorate, Kerala, Department of Economics and Statistics, Government of Kerala, Department of Statistics, University of Kerala, and Kerala Statistical Institute and Population Research Centre as co-sponsors. Dr. N.T. Mathew recalled his long association with Professor Mahalanobis. Dr. A.M. Mathai, McGill University, Canada, and Director of Centre for Mathematical Sciences, Trivandrum, extolled Professor Mahalanobis's contribution in securing the high status for Indian Statisticians. Sri K.C. Cherian, formerly of World Bank, recalled how the work for National Sample Survey was organised.

Functions were held on 29th June 1993 in Delhi, Bangalore, Giridih, Hyderabad and other Units of ISI in different parts of the country to mark the birth centenary celebrations of Professor Prasanta Chandra Mahalanobis.

#### **Symposia, Seminars, Lectures and Conferences**

A series of symposia, seminars, lectures and conferences formed an important feature of the Birth Centenary Celebrations of Prasanta Chandra Mahalanobis. These were organised in 1992-93 and 1993-94. During the current year the following conferences, lectures and symposia were organised.

(i) **Conference on "Planning and Economic Policy in India" 29th June - 1st July, 1993, Calcutta**

The Conference was inaugurated by Sri P.V. Narasimha Rao, the Honourable Prime Minister of India, on 29th June 1993. Dr. C. Rangarajan, Governor, Reserve Bank of India, delivered introductory address which was followed by the main sessions of the Conference.

The areas covered in the technical sessions included Indian Planning experience and lessons therefrom, current policy changes, industrial performance and technology policy and some specific issues of Indian planning process. In all, 24 papers covering these areas were presented and discussed by economists from the major centres of economic research in the country. A volume containing papers presented in the conference will be published soon.

(ii) **Special Lectures in Calcutta, 6th November 1993, Calcutta**

Professor P.V. Sukhatme, former Director of FAO and Adjunct Professor, University of Poona, delivered a special lecture entitled "A New Dimension to the Poverty Problem of the Country" on 6th November 1993.

(iii) **Lecture Series on Frontiers of Anthropology, December 8 - 11, 1993, Calcutta**

A Lecture Series on Frontiers of Anthropology was organised by the Anthropometry and Human Genetics Unit of the Biological Sciences Division during 8-11 December 1993 to celebrate the Birth Centenary of Professor Prasanta Chandra Mahalanobis and also to celebrate the Silver Jubilee of the Unit.



A lecture entitled "People of India : Interpretation from Demographic and the Mitochondrial DNA Evidence" was delivered by Professor Madhav Gadgil and a special lecture on "History of Anthropological Thought" was delivered by Professor Ramkrishna Mukherjee. The themes of the scientific sessions were : (a) Understanding Population Structure and Human Variation, (b) Genetics, Epidemiology, Health and Nutrition, and (c) Human Ecology and Adoption. Thirty participants from various parts of the country attended the programme.

(iv) **Symposium on Sample Surveys : Theory & Methods, December, 15-17, 1993, Calcutta**

A Three-day Symposium on Sample Surveys was organised at the Institute in Calcutta, during December 15-17, 1993. Professors Ramkrishna Mukherjee, D.B. Lahiri, N.C. Ghosh, D.K. Bose, J. Roy and many other close associates of Professor Mahalanobis were present.

The Inaugural ceremony was presided over by Professor N. C. Ghosh. Prof. D.B. Lahiri was the Chief Guest and addressed the delegates. There were over 50 delegates including visitors from the U.S.A., Canada and the U.N.

An account of Mahalanobis' work on Sample Surveys and its impact on current survey practice in India was presented. Some other topics discussed consisted of the theoretical foundations of survey sampling which concentrated on desirable sampling plans using techniques of experimental design, generalised estimators using sample weight functions and operational problems of large scale surveys in India along with a critical review of surveys conducted by NSSO and the Reserve Bank of India. Experiences of six countries in the Asia-Pacific region relating to timelines of survey-results were shared with the delegates. The importance of randomised response techniques for collecting data on sensitive issues was stressed and Bayesian and frequentist measures of uncertainty for small areas estimation were introduced and an overview of remote sensing techniques, their utility and applications were presented. Problems relating to demographic sample surveys with special reference to sample registration system and NSS enquiries on level of living formed the thrust area on the discussion session on special application areas.

A pre-symposium volume, containing the invited papers and abstracts of contributed papers, was released.

(v) **International Conference on Environmental Problems : Issues, Statistical Models and Methods, 20-22, December, Calcutta**

A three-day International Conference on the above topic was held in Calcutta during December 20-22, 1993. The focal themes of the Conference were :

Epidemiology, Genotoxicity, Industrial Safety, Hydrology, Air and Water Pollution, Statistical Ecology, Environmental Statistics, Environment in India and other developing countries, Role of administrative bodies in environmental statistics.

Besides these, there was a Panel Discussion on AIDS. The conference was inaugurated by Professor B.L.S. Prakasa Rao, Director, ISI and the Key-Note Address was delivered by Professor P.K. Sen of University of North Carolina-Chapel Hill, USA. Professor Sen spoke at length on environmental impacts and statistical perspectives of genotoxicity. About fifty scientists participated. USA, Canada, Germany, New Zealand and Japan were the foreign participating countries, besides Indian delegates from Universities, Engineering Institutes, Medical Institutions and Government Departments. The valedictory session was presided over by Professor J.K. Ghosh.

(vi) **Symposium on Social Transformation : Different Dimensions, December 25-26, 1993, Giridih**

A two-day Symposium was held at ISI, Giridih, during December 25-26, 1993. The objective of the Symposium was to understand the process of social transformation from diverse interdisciplinary perspectives for an efficient, prelate and comprehensive understanding of the phenomenon. About 50 scientists participated. The four technical sessions were on : (i) Social Transformation in historical dimension, (ii)

Methodology for studying social transformation, (iii) Agro ecological context of social transformation, and (iv) Process of social transformation. The Inaugural Address was delivered by Professor Ramkrishna Mukherjee. A Proceedings Volume will be published shortly.

- (vii) **Third International Conference on "Advances in Pattern Recognition and Digital Techniques"**, December 28-31, 1993, Calcutta

This international conference was organized by the Electronics and Communication Sciences Unit in ISI, Calcutta, during 28-31 December 1993. The Inaugural Session was presided over by Professor M.G.K. Menon, President, ISI and the Inaugural Address was given by Professor J.K. Aggarwal, President, IAPR. There were about 100 Indian participants and about 40 participants from North America, Europe and Japan. A total of 81 papers were presented, of which 17 were invited papers. There were 20 technical sessions covering areas of Computer Vision, Pattern Recognition, Speech and Music Processing, Image Processing, Natural Language Processing, Signal Processing, Neural Networks and Robotics, and also some current and potential application areas in engineering industries, biomedical sciences and atmospheric and environmental sciences.

One of the significant features of this conference was the indication of a new area of applications of pattern recognition and image processing in atmospheric and environmental sciences. This was highlighted by the Chief Guest, Professor A.P. Mitra, FRS, and also by Professor R. Narasimhan, FRS, Director, NAL, in his invited lecture.

A proceedings volume containing 84 papers presented to the Conference was also distributed during the Conference.

**SPEECH OF PROFESSOR M.G.K. MENON,  
PRESIDENT, INDIAN STATISTICAL INSTITUTE**

I am honoured as President of Indian Statistical Institute, to first of all welcome all of our distinguished guests who are assembled here today for this auspicious and solemn occasion, an occasion when we remember with the gratitude, Professor P.C. Mahalanobis - the founder, the architect, the creator of all that we see around us. Looking back on his life, and he was born exactly today morning in 1893 in Calcutta, one can only wonder at this person, in terms of how much he accomplished in a life time. It is given to very few to do as much as he did. He did it not because greatness was thrust on him but he achieved greatness through sheer power of his intellect, through dedication to the causes he believed in, through ceaseless work, a fighter for causes. If one just very quickly considers all that he did - he created this Institute, a great institution of which all those who are part of it can truly be proud. He created this in 1931, when Statistics was not known as a modern science in this country. He set up many other organisations. He conducted the first sample survey in Bengal in 1937. He set up the National sample Survey Organisation in 1950, the Central Statistical Organisation in 1951 and he prepared the draft plan frame of the Second Five Year Plan of India in 1955. He was responsible for one of the well-known international journal in Statistics - *Sankhyā*, which he started here in 1933. All these are living achievements, which continue to grow, to develop, to be of service to science and to this country. He accomplished great work in science. He was a physicist but one wonders when one looks at all of his accomplishments - the Mahalanobis distance, the interpenetrating network of sub-samples and first the two then the four sector planning models, his work on multivariate analysis and towards the end of his life, almost at his death bed, the work he was doing on frailite graphical analysis. He was elected a Fellow of the Royal Society in 1945. He did all of these on his own. It is not as though he was given an inheritance of this by working under somebody great. But he was associated with some of the greatest men we can think of in this century. In Cambridge, he worked with Srinivasa Ramanujan, the only genius this country has ever produced. He did talk of Philosophy and Mathematics. He was associated in Cambridge with people like John Maynard Keynes, the great economist, with Bertrand Russell, with Hardy, who took Srinivasa Ramanujan to Cambridge, with the greatest of the physicist of the Cambridge period who won Nobel prizes - J.J. Thompson, who discovered "Electron", C.T.R. Wilson with whom Mahalanobis had hoped to do his Ph.D. These were the influences on him from abroad. In India, he came from the same genetic stock - I am not talking of the stock of India, I am not talking of the stock of Bengal alone but from the same parentage derived through a few generations - from which came the great leaders of the renaissance of Bengal - Raja Ram Mohan Roy, Gurudev Rabindra Nath Tagore. They were all related directly to Prasanna Chandra Mahalanobis. Even here, as he set up the Indian Statistical Institute, it was a great Indian Institute dedicated to work in development in India. But in this Institute one could see the greatest minds in these fields who came - Ronald Fisher, Kolmogorov, Norbert Weiner, Shewart, Deming, J.B.S. Haldane - whose centenary we observed this year - Ragnar Frisch, the Nobel Prize winner. From East and West, from developed and developed countries, they all came here because in some sense it was a Mecca for Statistics and as Mahalanobis used to call "a key technology of the future" and they came here because of Professor. This is not the occasion to speak at length about his scientific work, about each one of these and I know those who speak after me would talk about some of these things. I would only like to conclude, by pointing out to all of us here that Mahalanobis, a great physicist, a great figure in culture, a close associate of Gurudev Rabindra Nath Tagore, the Secretary of Visva Bharati for 10 years, the founder of modern Statistics in India - generations of students who had followed him, was committed to the development of our nation. I only read one quotation from him "It is necessary to make the best possible use of domestic resources, for the manufacture of goods of high quality, at low costs, substitute such domestic manufacture for imported goods and sell such products abroad at competitive prices in the world market". Inherent in these words of the Professor are all the thoughts of using our own resources - our indigenous self relying development, of exports, of low costs, of high quality. The father of Statistical Quality Control - Shewart - visited many times here and these were developments which Professor was concerned with, in the days when one did not think of Quality on that scale, in the days of 1940's. Indeed Shewart's papers at the end of his life were not left behind in America in Bell Telephones Laboratory where he worked, but were gifted by Walter Shewart to Mahalanobis in Indian Statistical Institute, to find repose in what Shewart considered should be the place for Statistical Quality Control. And that was the regard in which Mahalanobis's Indian Statistical Institute was

held by one of the pioneers in Statistics. I would like now to conclude by saying that Mahalanobis had a vision, a dream and the only thing that all of us can do as we celebrate the centenary of this very great son of India is to ensure that dream can be fulfilled. Thank you.

**SPEECH OF SHRI P.N. HAKSAR,  
CHAIRMAN, COUNCIL, INDIAN STATISTICAL INSTITUTE**

I always found it a little hard to speak on occasions like this. When I asked myself why it is so - you will please forgive me if I were to make a public confession - I am not yet a professional mourner. I have tried in the course of my little life to try and endeavour to the extent one can to discharge one's obligations as one sees it. I can never forget the state of anxiety which Prof. Mahalanobis was sharing with his very close friend Pitambar Pant in 8, King George's Avenue, sometime in early '71 and as you all know, that he closed his eyes and stopped breathing in 1972. For a period of more than 21 years it has been my proud privilege to discharge obligations arising out of a labour of love. It is not always an easy task and, if I may say so with great respect that it is not made easier because in our country while we are engaged in soul stirring debate about centering round macro-economics, relation of macro with the micro-economics, all very legitimate concerns, I hardly ever hear a debate about the problem of building and maintaining institutions. And, if I may say so, it is not an illiterate person like me who is saying this but in this audience, I suppose, Nobel prize winners have certain legitimacy and I am quoting my friend - whom I happened to know - Simon Kuznets, Nobel laureate in that melancholy science called Economics. And Simon Kuznets said in the course of his acceptance speech of the Nobel prize that well thought nations which appears in the form of goods and services and I beg of you to kindly ponder over this, is that wealth is a complex interaction between ideology, technology and institutions. As we know we cannot live our social life, economic life, whatever life you live, whatever style you may see for yourself without your institutional props and some set of values. And the greatness of Prof. Mahalanobis was that he was a builder along with his life partner Smt. Rani Mahalanobis of this great Institution. It was born in 1931. Prasanta Babu and Ranjini had only one child and that child was baptised in 1931 as the Indian Statistical Institute. To this child they gave everything. Their hearts, their minds and their wealth. All this campus, all this property - if it were to be seen by real estate dealer, they will salivate like a dog does looking at the bone - crores worth of property. Amrapali is ours now. It was gifted to the Statistical Publishing Society which is set up for publishing journals of highest excellence in the area of science and mathematics and Sankhyā, if I may say so, is still the only Indian journal of science which is world renowned. So these things have endured the ravages of time. Since, you Mr. Prime Minister have graced this occasion, I shall be failing in my duty if I did not point out that we have to understand that Indian Statistical Institute is not an attached and subordinate office to the Government of India. And I might take this occasion to remind ourselves that when piloting the Bill for the Act of 1959, by which the Govt. of India took over the Indian Statistical Institute, Pandit Jawaharlal Nehru, endowed as he was with the unusual sense and sensibility, said in Parliament that he knows that science and the spirit of enquiry cannot flourish in governmental institutions and that's why he said that he had ensured that Indian Statistical Institute shall remain autonomous. He even went on to say that if the scientific establishments set up in his time - Bhabha Atomic Research Centre, Tata Institute of Fundamental Research, early essay in space by Vikram Sarabhai's great vision of founding the Physical Research Lab; if these experiments succeed, he said, there is no reason why autonomy should not be extended in ever widening circle. And so, on this occasion, when we have gathered together and you, Mr. Prime Minister, have graced this campus on this occasion and we are all truly grateful to you for being with us in this beautiful environment of chanting vedic hymns want to assure you that we on our part the scientific workers and non-scientific workers have taken a pledge that we shall never let down in any way the great institution which we have inherited from Prasanna Chandra Mahalanobis. It will be our privilege, our duty to hand over this institution but, as they say, since it is funded by Government and since you cannot clap in only one hand, it is necessary once again to sensitize ourselves with the problems of institutions which are dedicated, devoted to the realm of higher learning and therefore to the realm of culture. As you know long long time ago we human beings have been asking ourselves what is the difference between me and an animal and the answer is given long time ago that we have to learn and re-learn it and the answer is "*Teshong Na Vidya Na Topo Na Danam, Nanyang Na Shilong Na Guno Na Dharmaha, Te Mriyuloke Bhubiharavata, Manusyapurupena Mrigascharani!*". So, may be, in my old age and I must say that perhaps in this august audience there is no one who can claim to be older than I, but there is no virtue of just being old, so I would say - conclude by saying that we shall so long as we are in one way or other concerned, including Govt. over

which you Mr. Prime Minister preside, that we will all passionately concern ourselves in maintaining the simple definition of being cultured "*Vidya, Tapo, Dana, Na guna, Na shila Dhranaha*". Professor Prasanta Chandra Mahalanobis embodied within himself all these elements which make life worthwhile and we can assure you that both the academic staff and the non-academic staff - in our parlance with divide ourselves between scientific and non-scientific workers - we have a democratic organisation, we talk and we always try to solve our problems, howsoever difficult they are, by means of reasons and arguments. We can assure you Sir, that on this day, the 29th day of June 1993, on the hundredth year we are not assembled here to act in a mere ritual. I often say that we in India have a habit of burying those whom we love and respect by the wreath of flowers. No Sir, we assure you Mr. Prime Minister that we are dedicated to upholding the flag of excellence in this Institute, be it in the realm of mathematical statistics, statistical quality control and assurance and reliability, operations research, in the wide and varying fields where statistics is applicable - may be linguistic, may be psychometry, may be anthropometry with which he started. With this assurance, I am sure that all my colleagues who have given so much to this Institute both ordinary workers called non-scientific workers and scientific workers, will within their hearts take a pledge today that we shall live upto the standards, the banner held aloft by the name of Prasanta Chandra Mahalanobis. Thanking you,

**SPEECH OF PROFESSOR B.L.S. PRAKASA RAO,  
DIRECTOR, INDIAN STATISTICAL INSTITUTE**

It is a proud moment for me and for all of us here to welcome you to the Indian Statistical Institute on this occasion to celebrate the Birth Centenary of Professor P.C. Mahalanobis. Your gracious response to our invitation in spite of your heavy schedules is a source of great encouragement. The Indian Statistical Institute and Professor Mahalanobis are interlinked with each other and one is equivalent to the other as we say in Mathematics.

In India, Statistics as a Scientific discipline was practically unknown in the first quarter of this century. There was no teaching or research in Statistics at the Universities, no Statistical Society and no Journal of Statistics. The Official Statistical System of the country was poorly developed. A sudden spurt occurred around 1930 which soon placed India near the centre of the Statistical map of the world. This was done by a single man, Prasanta Chandra Mahalanobis, whose birth centenary we are celebrating today. The Indian Statistical Institute was founded by Mahalanobis in 1931 with facilities for high level research, training and execution of large-scale projects. *Sankhyā*, the Indian Journal of Statistics, was started in 1933. The new technique of estimating acreage and crop in 1937. Professor Mahalanobis was appointed Honorary Statistical Adviser to the Cabinet in 1949 and guided the Central Statistical Unit of the Government of India which was established that year and the Central Statistical Organization (CSO) formed later in 1951.

Another one of his greatest achievements was the establishment of the National Sample Survey in 1950. This is the largest Sample Survey Organization of its kind in the world and has been collecting valuable data, year after year, on various aspects of our National Economy. Its activities have earned considerable International acclaim.

The Indian Statistical Institute was recognised as an Institute of National Importance by an Act of Parliament in 1959. The training of technicians for Statistical Quality Control was started in 1945 and Quality Control Movement was launched in a big way in 1948. These achievements indicate that Professor's contributions to Statistics were multifarious.

Among his major contributions to the subject of Statistics per se, special mention should be made of the concept of  $D^2$ -Statistics known in the literature as Mahalanobis distance to measure the divergence between different populations and his work on large scale sample surveys. His work on anthropometry opened up a rich field of research in multivariate analysis.

Professor's contributions were massive as the builder of ISI, Founder and Editor of *Sankhyā*, Organizer of Indian Official Statistical System including the CSO and NSS, pioneer in the application of Statistical techniques to practical problems in agriculture, promotion of the Statistical Quality Control Movement and as the architect of India's Second Five Year Plan. No Statistician had more influence on the

entire Statistical profession spanning Universities, Research Institutes and Statistical Offices the world over. Professor was a Physicist by training, a Statistician by instinct and a planner by conviction. He was a multifaceted personality with a very wide range of interests.

In the context of present day criticisms of the performance of past Five Year Plans, we may recall the caution sounded by Professor regarding the difficulties of implementation of plans. To quote the words: "The logical consistency of the Plan-frame is not a sufficient guarantee of its feasibility in practice.... even if adequate financial resources can be raised, implementation may become difficult or impossible owing to rigidities in the existing system of administration".

ISI is celebrating the Birth Centenary of the Professor in a manner befitting the richness and diversity of his contributions. Professor would have been one hundred years old today, 29 June 1993, and today is the high point in an year long series of activities which began in December '92 and will end in December '93. A series of Scientific Conferences have already been held here and at different centres of ISI and some others are scheduled to be held at the end of this year. We are setting up an archive-cum-museum at the Professor's residence, 'Amrapali' to be inaugurated today by the Prime Minister. Professor Asbok Rudra had almost completed writing the biography of the Professor before his sudden passing away in October '92. Prime Minister will be unveiling the bust of the Professor today. A documentary film is in preparation.

As a part of the series of Conferences, we are now having the Conference on "Planning and Economic Policy in India" to be inaugurated by our Prime Minister today. Such a Conference assumes special importance in view of the recent liberalization measures adopted by the Government. Given the world wide revival of controversies around the issue of free market versus state controlled economies, it is now essential to assess the achievements and failures of Indian Planning and work out a desirable policy frame suitable for healthy growth of the economy in the coming decades. The basic objective of the Conference will be to focus on these and related issues.

More than two decades after the Professor passed away in 1972, ISI continues to remain as a centre of excellence in the country. Research and Training in the core areas of Statistics, Mathematics, Economics and Computer Science, and in other related fields have maintained their momentum and quality. The environment continues to be one where the Scientists enjoy considerable freedom and give their best. Additional campuses at Delhi and Bangalore along with a network of 11 units of the Statistical Quality Control and Operations Research Division spread all over the country enhance the reputation of ISI.

We in this Institute are grateful for the Prime Minister's presence in our midst this morning. I would like to thank Honourable Chief Minister, Shri Jyoti Basu, Honourable Ministers, Shri Pranab Mukherjee, Shri Giridhar Gomango and Shri Sukh Ram for accepting our invitation. I would also like to thank all the Distinguished Guests and fellow workers for attending this function. Thank you.

**SPEECH OF SHRI SUKHRAM,  
MINISTER OF STATE FOR COMMUNICATIONS**

It gives me great pleasure to be here to day at the inaugural function commemorating the birth centenary of Professor Prasanta Chandra Mahalanobis. Professor Mahalanobis was a physicist, statesman, planner and statistician. Indeed he was a man of the century with true scientific temper. I am specially happy to have this opportunity to participate in this centenary celebration with which my association is two-fold. I recall that in November last year, as the then Minister of Planning and Programmatic Implementation, I had accepted the invitation to be one of the patrons of Professor Mahalanobis' Birth Centenary Celebration Committee. It is indeed a happy coincidence that now as the Minister for Communications, I have the privilege of bringing out a commemorative stamp on Professor Mahalanobis on this occasion. I must complement the authorities of the Indian Statistical Institute for organising the celebration in a manner befitting the diversity and richness of the contribution of Professor Mahalanobis by way of holding an international conference, issuing an authoritative biography, setting up a museum and an archive and last but not the least releasing a documentary film on Professor Mahalanobis. I am sure that this will record for posterity, the real legacy of true scientific temper that Professor Mahalanobis has left behind not only for us in India but for all mankind. The commemorative postage stamp being issued by the department of Post today will also serve to preserve the memory of Professor Mahalanobis at home and abroad. Postage stamp apart

from being a payment of postage, serves as an effective medium for portraying a variety of subjects. These stamps though small in size are collected by philatelists and many others all over the world and are generally preserved for several years in the individual collection or in a museum. Thus these stamps and through them the subject of their design become an important source of knowledge for the posterity. Department of Posts issues such commemorative postage stamps every year on various themes including eminent personalities of national and international fame. In 1960 the department issued a commemorative stamp on Dr. M. Viswacwariiah whose contribution to planning and national development are well known. Commemorative stamps have also been issued in memory of great scientists like Homi J. Bhabha and Vikram A. Sarabhai who made pioneering contributions for bringing India in step with the modern world. Literateurs and social workers, educationists, freedom fighters and many other eminent men and women who sacrificed their lives for the country have similarly been commemorated through issue of stamps. Commemorative stamps being released today are in honour of another noble son of India born on this day exactly 100 years ago. Professor P.C. Mahalanobis has left an indelible mark on our national life by his pioneering work in the field of statistics and planning. Statistics as a science did not exist in India till the third decade of this century. It was through the effort of Professor Mahalanobis that statistics developed as a discipline and as a tool for policy formulation and planning in India. As a true visionary, Professor Mahalanobis was a great institution builder. He founded the Indian Statistical Institute and also contributed to the building of official statistical system in the country. Professor Mahalanobis will be particularly remembered for his close association with the Indian planning process particularly as the architect of our Second Five Year Plan which was an important milestone in the evolution of development in planning in India. He was a scientist and a cultural ambassador who worked for the international understanding and collaboration in scientific research. He received numerous national and international honours and distinctions for his contributions to the advancement of science, scientific and statistical research. He was also awarded with the "Padmabhibhusan" by the Govt. of India in recognition of his significant contributions to development and planning. Apart from his eminence as a scientist, Professor Mahalanobis was also a great lover of art and literature. His literary genius found expression through his philosophical essays in Bengali journals and in Sankhya of which he was the editor. He was closely associated with Gurudev Rabindra Nath Tagore and was one of the two secretaries of Gurudev's *Viswa-Bharati* when that unique educational institute was set up in Santiniketan. The commemorative postage stamp being issued today depicts Professor Mahalanobis against the background of Indian Statistical Institute. Appropriately the first day cover being issued along with the stamp today is illustrated with the picture of the Second Five Year Plan document together with now famous 'statistical formulae' evolved by Professor Mahalanobis known as the Mahalanobis Distance. I am thankful to the organisers for providing me this opportunity to be here today. It is indeed a matter of special pride for the Department of Posts that we have the honourable Prime Minister with us to formally release the commemorative stamp on Professor Mahalanobis. I would now request the Hon'ble Prime Minister to mark the formal release of the stamp by kindly accepting the first presentation album of the stamp. Thank you very much.

**SPEECH OF SHRI GIRIDHAR GOMANGO,  
MINISTER OF STATE FOR PLANNING & PROGRAMME IMPLEMENTATION**

It gives me great pleasure to participate in this function to commemorate the Birth Centenary of Prof. Prasanna Chandra Mahalanobis. I deem it a privilege and honour in my capacity as Minister for Planning & Programme Implementation and the Department of Statistics in the Central Government, to be able to pay my deeply felt homage and tribute to Prof. Mahalanobis, the greatest Statistician of India and one of the top Statisticians in the world.

Prof. Mahalanobis was the pioneer of the statistical movement in the country. Quite early in the evolution of independent India, he perceived the crucial role of statistics in economic development. He viewed statistics as a "key technology for increasing the efficiency of human efforts in the widest senses". Due to his endless efforts, there grew up in the country a whole generation of Indian Statisticians, probability theorists and planners.

Prof. Mahalanobis' contributions to statistics are fundamental and invaluable. A physicist by training, he recognized that knowledge was based on observations and measurements. To him, statistics was essentially an applied science and an integrated discipline. Its aim is to reach a decision on a probabilistic basis on

available data. His work in statistics was always associated with some field of application. His anthropometric studies led to the formulation of the concept of 'Mahalanobis Distance'. A rich field of research opened up in multivariate analysis. His early work in river floods is in the nature of Operations Research. He introduced the concepts of pilot surveys, optimum survey design, and interpenetrating network of sub-samples. He developed the cost and variance functions in the design of sampling.

Prof. Mahalanobis established that in underdeveloped countries, well organized sample surveys offered the most economical, the speediest, the most practical and the most scientific way of collecting data on various aspects of the economy. He felt the need for a permanent system for conducting sample surveys on a continuous basis. Such data would help in filling gaps in national income computation and for monitoring socio-economic progress. Prof. Mahalanobis will be remembered for his epoch making investigations on the technique of large scale sample surveys. The establishment of the National Sample Survey in 1950 was the culmination of his thinking and efforts in this direction. In line with his view that statistics should have a purpose, Prof. Mahalanobis developed econometric models for determining optimum investments in different sectors of the national economy, and was the architect of the Second Five Year Plan of India.

Prof. Mahalanobis made significant contributions to the development of the official statistical system in the country. He emphasised the need for continually using quantitative information in determining the course and pace of economic development. According to him, the approach of a statistician should be broad based and problem solving. He felt that a statistical system would be weak if it was not functional. In view of the importance of reliable statistics for economic policy, Prof. Mahalanobis stressed that an official system of statistical institutions and agencies should be built up. It goes to the credit of Prof. Mahalanobis who, as the Honorary Statistical Advisor to the Cabinet, established the institutional framework for a sound official statistical system in the country. The Central Statistical Organisation and the National Sample Survey, now constituting the Department of Statistics are his contributions for the development of a responsive and timely information flow for planning and policy formulation. Prof. Mahalanobis founded the Indian Statistical Institute with facilities for high level research, training and implementation of large scale project work. He launched the Sankhya, the Indian Journal of Statistics. The Statistical Quality Control and Operations Research Movement was started by him. He also organised research in computer software and hardware. The entire statistical system owes a deep debt of gratitude to Prof. Mahalanobis for his immense efforts in highlighting the indispensable role of statistics for policy formulation and monitoring of economic progress. He was indeed the Father of Statistics in India.

He was recipient of innumerable national and international awards and honours. He was beatifically honoured by the Government of India by conferring on him 'Padma Vibhushan' for his contributions to science and for his services to the country.

May the recollection and remembrance of the life and work of this internationally reputed Statistician on this occasion of his Birth Centenary motivate the entire statistical community including this famous Institute, to rededicate themselves to attain higher achievements to the policy of his memory.

The presence of the Hon'ble Prime Minister and other luminaries on this momentous occasion is in itself a fitting tribute to this great son of India. I am sure the Indian Statistical Institute will carry the torch of knowledge inherited from Prof. Mahalanobis. Thank you.



SPEECH OF SHRI PRANAB MUKHERJEE,  
MINISTER OF COMMERCE AND DEPUTY CHAIRMAN, PLANNING COMMISSION

I am indeed happy to have this opportunity of associating myself with this programme. Perhaps, the Indian Statistical Institute is the most appropriate forum where we can celebrate the centenary of Professor Mahalanobis. Today, when we are in the midst of the 8th Five Year Plan and having taken a decision of investment outlay to the tune of 798,000 crores of rupees, we are working out our formulations at the macro economic level with all the statistics readily available. These were not the days when we started our planning process in early 50's. Today we take it for granted, our rate of capital formation, rate of consumption, rate of savings, rate of literacy so on and so forth, because the institutional arrangements which were provided and in which this Institute took a leading role in the late 30's and developed it in late 40's and early 50's. We are grateful to Professor Mahalanobis not only for giving us a model of planning, but giving us a pioneer institution like Indian Statistical Institute. Whenever we talk of planning in India, two names come to our mind. One is Pt. Jawaharlal Nehru who gave us the societal objective of the planning. Another name is Professor Prasanna Chandra Mahalanobis who gave us well laid out strategy and which we call the Mahalanobis model. In the early 50's when, on the one hand, immediately after the second World War the Bretton Woods institutions like the World Bank and International Monetary Fund were trying to reconstruct the world economy, most of the neo-liberated countries in Asia, Africa and Latin America wanted to have a developmental model which is known as modern industrial sector. They wanted to have massive investment in the industry. The private sectors neither did have the capacity nor the resources to make such huge investment, where modern sector would develop. As a result, the state had to step in with massive investment proposals and effective intervention which gave birth to the concept of commanding height by public sector.

This "modern industrial sector", it was thought, would bring about a transformation in two ways. One, it would spread the modern technology along with supply of modern inputs over the economy and thus would be catalytic in modernising the entire economy. The economy would thus develop capability for higher productivity and fast growth. The other way was that the modern sector itself would grow and expand and thus envelope the entire economy replacing the traditional sector. This was the time of great expectations and bold ideas. These ideas enthused a sense of confidence among the poor countries. There was the expectation and the confidence that the poor countries could also develop and solve their problems of poverty over shorter periods of time than had been taken by most of the developed countries in their transition phases.

In his famous model of planning contained in his paper "The Approach of Operational Research to Planning in India" (1955) Prof. Mahalanobis concretised his ideas and detailed the parameters of that model so as to relate them to actual decision making on investment and allocations. Initially he envisaged a two sector model i.e. capital goods industry and the consumer goods industry. Later on he developed this two sector model into four - sector model.

In his four - sector model, the first one was the capital goods sector which he called basic investment goods. The second was the consumer goods sector based on modern technology which he called factory consumer goods. The third was the consumer goods sector based on traditional technology which he called household industries including agriculture. And the last one was the service sector. The first sector, in his scheme of things, had the prime importance. It included industries which produced machines and basic inputs like steel, cement etc. One point of his model was to show that if more investment is made in capital goods industries, the standard of living of the society will improve slowly at the beginning, but would progress at a much faster rate in the later years. Therefore, it was in the long term interest of the societies to divert more investment towards capital goods industry. No wonder he was the founder of the concept of perspective planning in the Planning Commission. The other very important point of a strategy inherent in this model was that by producing more of capital goods the economy ensured a higher level of investment, since capital goods could only be used for capital formation, which is investment. This in turn ensured a good pattern of allocation which was in the long term interest of the society. The other sectors as defined by him had also very specific roles to perform. The modern consumer goods industry though had a higher productivity, but had a higher capital output ratio and therefore more capital was needed for each unit of the output. Society, which was short of capital funds to start with, and which had decided to invest more in capital goods industry could not, from the very beginning, afford high investments in the modern consumer goods industry. This industry

was indeed only for very selected essential goods which could not be produced in the traditional consumer goods sector.

The traditional consumer goods sector industry had low capital - output ratio and therefore needed low investments. It was more labour intensive and therefore could provide more employment, which was also a very pressing need of the time. Thus in his scheme of things the traditional consumer goods industry, including agriculture would continue to provide wage goods and also adequate employment, whereas part of the labour force was busy in building up modern sector, and large part of the investment was required for the modern sector. In course of time, according to this strategy the modern sector could grow at a faster rate, and modernise the entire economy, thus completing the process of transformation.

Prof. Mahalanobis emphasised that unemployment and poverty could be removed only through rapid industrialisation. It was not enough to expand the production of textiles and consumer goods. It was necessary to increase the supply of energy, machinery and tools of production to create more employment. It was realised that to do this, a big country like India had to establish, as rapidly as possible, the basic steel, heavy machinery building and heavy electrical industries and chemical engineering. This would make it possible to produce capital and consumer goods of all kinds and thus extend industrial investments increasingly out of the domestic resources. Prof. Mahalanobis also believed that large investment in the basic industries would give rise to increase in demand for food, cloth and other consumer goods. He thought, in India it was possible and desirable to meet this demand by setting idle hands to work in the traditional way or in small scale industries to produce consumer goods and other necessities. This would also create more employment. Thus it can be seen that the ultimate goal behind his emphasis on basic industries was the removal of unemployment and poverty and he had envisaged a very supportive relationship between the modern and the traditional sector in the initial phases of development.

It is often believed that the strategy outlined by Mahalanobis neglected agriculture. It is really not so. I am quoting his own words "the advance of one step in agriculture would supply food and raw material for advance of one step in manufacturing sector which again, in its turn, would speed up irrigation and increase the supply of fertilisers and pesticides and help in the promotion of scientific research. It would lead to further advances in agriculture". Prof. Mahalanobis also appreciated that land reforms and the organisation of the village cooperatives were urgent and essential needs for increasing agricultural production. But the wisdom behind his strategy of development was that even for agriculture to break out of the low productivity syndrome, the support of modern heavy industries was absolutely called for. Dams had to be built up for irrigation and power, but the dams needed cement and steel in large quantities. Agriculture needed energy and chemical fertilisers which were the products of modern heavy industry. Thus, Prof. Mahalanobis clearly believed that agriculture and manufacturing industries in India were completely interlocked and economic progress depended on the advancement of both.

It was mainly due to the planning strategy evolved in the Second Five Year Plan, which was highly influenced by the model proposed by Prof. Mahalanobis, that India today could boast of a very diversified industrial structure and large pool of skilled man power and ample entrepreneurial capabilities. When the green revolution came in late '60s and early '70s, India had the wherewithal to take advantage of the new technology in agriculture. At least in some regions of the country we had assured supply of water due to irrigation schemes which could themselves be completed because of the availability of steel and cement. We had the supply of electricity and chemical fertilisers and it was on this foundation that the green revolution could take roots. For further spread of the green revolution we need to build up similar infrastructure in other regions, and we need more of the cement, the steel, the fertilisers and the turbines and railway rolling stock. It is mainly the lack of resources which has prevented establishment of close nexus between modern industry and modern agriculture.

The strategy of Indian planning, particularly as it was articulated in the Second Five Year Plan, has been subjected to very critical appraisal in recent times. A view has prevailed that it is this strategy which has been responsible for slow growth of the Indian economy. The inadequacies of this structural strategy, inefficient operation of the public sector enterprises and the philosophy of import substitution has all been held responsible for the slow growth of the economy.

However, I do not subscribe to this view. If we look back we would realise that perhaps the most important lacuna in our thinking about planning in the past was neglect of the role that the institutions and

particularly the people's institutions play. Also responsible for our poor performance has been our reluctance to decentralise the decision making and decentralise the process of planning adequately. It is now that we realise, with hindsight, the importance of non-economic factors in economic development.

The era in which Prof. Mahalanobis was thinking about planning was an era which had long experience of structural malady, that is, structural imbalances in the economy, which I already referred to was the outcome of the Second World War. We had an agriculture in which food production had been declining in absolute terms for more than seven decades. We had the experience of traditional industries having been completely wiped out by the onslaught of modern industrial products produced in our colonial master country England mostly and in some other western countries. We did not have enough of building blocks to start building up our own roads, irrigation projects and other wherewithals for economic progress. In fact the entire developmental thinking was in terms of structure of development or in terms of inter-sectoral relations. Whether it was the development theory propounded by Arbus Lewis, or the stages theory of Rostow or a large variety of other developmental models, they all thought in terms of inter-sectoral relations, and they all prescribed changing the structure of the economy. They emphasised relationship between modern and traditional sector. They emphasised relationship between capital formation and consumption. These are all the elements of economic structure. Therefore, they were all structural theories of development. Essentially Mahalanobis model of development was also a structural model of development which had incorporated the essence of development philosophy prevailing at that time into framework with quantitative estimations which helped in formulating a Plan in more concrete terms. It was widely believed that if there was enough investment there would be good growth. But today's experience clearly demonstrates that this is not correct. Hardly any theory paid attention to the efficiency in the use of capital in the form of material resources, human resources and fiscal resources. Therefore aspects of economic efficiency were also neglected. But what we have achieved with the help of these strategies still gives us a strong foundation from where we can leap further, if only we now reform our strategies in those very aspects where we find that they have been inadequate. And therefore, we have taken up the market oriented economic reforms and the institution building as the major tasks to be performed in the next phase of development and particularly during this 5 year plan. With these words, I thank you ladies and gentlemen.

**SPEECH OF SHRI JYOTI BASU,  
CHIEF MINISTER, WEST BENGAL**

I am indeed thankful to the Indian Statistical Institute for inviting me to this inauguration of the Conference on "Planning and Economic Policy in India" to celebrate the Birth Centenary of Professor Prasanta Chandra Mahalanobis with whom I had a good personal relationship. A very special occasion such as this makes one reflect and recall some of the outstanding contributions of Professor Mahalanobis in the sphere of ideas as well as in practice. I particularly recall Professor's contribution to the process of Indian Planning and to the discipline of Statistics, both in terms of theory and application. At the same time, I also recall his passionate efforts towards development of the Indian Statistical Institute, and particularly in achieving active involvement of scientists and workers of the Institute in translating some of his major ideas into practice.

In the conceptual framework of Indian Planning Process, Professor Mahalanobis brought into focus as early as in 1950s the crucial importance of investment in capital goods sector and infrastructural facilities for sustaining higher growth rate for Indian economy. Who would make this investment? The Private Sector then was not particularly keen on investments on such purpose. It is in this context that Professor Mahalanobis emphasised the significance of public sector investment in these spheres. Professor Mahalanobis had expected that through this process of public sector investment in the "core" sector, both self-reliance and social direction in the process of development and planning could be ensured in our economy.

Despite the emergence of some basic and heavy industries in the Public Sector, the progress towards the stated objectives was jeopardised because of the policies adopted at the national level. Extreme inequality in the ownership distribution of productive assets - primarily of land in agriculture and capital in industry - was allowed to continue throughout the country as a whole. According to National Sample Survey data available for the country as a whole, top 10% of rural households still own nearly 71% of landholdings. There is a similar concentration in the ownership of industrial capital in the hands of larger industrial houses. It is because of this ownership control of only upper income groups in rural and urban areas that these groups, over

the years, became the primary beneficiaries of public sector activities, and the concept of social direction of planning lost its meaning. To cite an example, of the total outstanding credit of the nationalised commercial banks, it is the top 3% of the size-class of loans which has accounted for nearly 77% of the total credit. In fact, it is because of this continued inequality in the distribution of productive assets that the crucial concept of Professor Mahalanobis relating to social direction of planning through public sector investment in capital goods sector remained non-implemented. Moreover, as a result of this continuation of inequality in asset distribution, the purchasing power of the vast majority of the common people in the country also remained inadequate and acted as the major bottleneck on the overall industrial expansion of our economy. At the same time, selective income increases of upper income groups started creating other distortions, including a rise in import bill often tilted in favour of luxury consumption goods or capital goods necessary to provide luxury goods to satisfy the sumptuary aspirations of these upper income groups. This sharp rise in import bill, coupled with inadequate growth in exports, has been the major factor behind the balance of payments crisis in our economy. Confronted with this crisis, the policy has been to take external loans in a repetitive manner resulting in a situation when the country is now being forced into an external debt-trap.

It is somewhat ironical and unfortunate that this present economic crisis which is a result, among others, of non-implementation of the concept of social direction of investment in the core sector as emphasized by Professor Mahalanobis, is again being used as an argument against the Mahalanobis strategy itself, and often by representatives of those upper income groups who have been the primary beneficiaries of non-implementation of the Mahalanobis strategy. Here I cannot but state that today a well-orchestrated propaganda is being carried on to denigrate this objective. It seems that self-reliance is regarded as a backward concept not relevant to the present day global situation.

It is in this context of present economic crisis that we have suggested an alternative approach to resolving the problem and also an alternative approach to planning. In our alternative approach, we have given a special emphasis on the concepts of self-reliance and social direction of investment - the concepts in which Professor Mahalanobis also wanted to attach special significance. But we intend to give emphasis on these concepts in a different way, by emphasising the prior need for reordering the unequal distribution of productive assets. This alternative approach has to begin with land reforms, and by giving proper place to small-scale industry in the overall industrial matrix. Planning in this alternative approach does not mean a system of centralised bureaucratic planning. It means a decentralised system of planning, where common people can democratically participate in the formulation and implementation of the plan schemes through elected Panchayats and Municipalities. My Finance Minister Dr. Asim Dasgupta will make a submission of our alternative approach in detail in course of seminar discussions tomorrow.

Professor Mahalanobis has also been the founding father of Statistics in our country. Here, he not only developed the necessary theory and techniques of sampling on the basis of which generalised inference could be scientifically made, but in fact applied his ideas in practice by organising the famous National Sample Surveys. In these remarkable efforts of translating theory into practice, as well as in pure theoretical research, the Indian Statistical Institute (ISI) has played the most crucial role, and I take this opportunity to pay my regards to the scientists, employees and all concerned with the ISI.

In the ISI, there has always been an important tradition - much encouraged by Professor Mahalanobis - of frank and direct interaction on important issues among all categories of staff cutting across hierarchy. To this tradition, has been added the growth of internal democracy in functioning. All this has created a vibrant atmosphere so essential for the academic pursuit and social relevance of an Institute of National Importance. We from the State Government turn to the ISI for neutral and professional evaluation of important programmes as well as for surveys. For the present, the ISI is carrying out an important evaluation of the mass literacy programme adopted by the State Government in several districts of our State. I could not follow exactly all that was being said by Sri Pranab Mukherjee. But what struck me was that tomorrow when the seminar is held, his speech should be available and it should be made available to us. We want to study it.

I think that a time has come when from the national level a special recognition should be given to the ISI, in fitness to its tradition and excellence, and as a part of the tribute that all of us collectively owe to Professor Mahalanobis. I thank you all.

**SPEECH OF SRI P.V. NARASIMHA RAO,  
PRIME MINISTER OF INDIA**

I am grateful for the honour accorded to me by the Indian Statistical Institute in asking me to inaugurate this Conference to commemorate the Birth Centenary of Prof. P.C. Mahalanobis. Prof. Mahalanobis stands as a colossus in the field of Indian intellect. In celebrating his centenary today, we pay homage to a person who worked tirelessly for the development of our country and symbolised India's efforts at building a modern nation.

2. The breadth of Prof. Mahalanobis's interests was truly amazing. In Cambridge, where he began his studies in mathematics, he was a contemporary and friend of the legendary Ramanujan and contributed in many ways to the shaping of Ramanujan's phenomenal contributions to mathematics. Later he blossomed into a remarkable polymath with brilliant contributions in the spheres of physics, statistics and economics. His sharp intellect and incisive analysis of contemporary issues won him many close friends including Pt. Jawaharlal Nehru who vested in him the leadership of our economic planning process. He was also a great inspiration to bright young people from India and abroad and it was his dynamism that turned the Indian Statistical Institute into an intellectual powerhouse. It is entirely apt that the Indian Statistical Institute should hold this impressive conference to celebrate Prof. Mahalanobis's birth centenary as it carries forward his great heritage.

3. Prof. Mahalanobis was a scholar, a patriot and a person of immense sensitivity to developments around him. He was a life-long friend and admirer of Gurudev Rabindranath Tagore and was amongst the few who really understood the importance of the poet's lectures on nationalism. He also played a prominent role in shaping the social thinking of the society around him and in the shaping of ideas of the Brahma Samaj of which he was a member.

4. Prof. Mahalanobis was primarily a physicist by training and began his career on his return from studies in England as a Lecturer in that subject in the Presidency College, Calcutta. His interests, however, soon turned to statistics, a science which was still in its infancy, as he saw in it a powerful instrument for tackling the complex economic problems of the country. Here of course, I would like to add that statistics is not as new to India, as alien to India, as sometimes is made out. In every village there is a statistician, there always has been. In my part of the country, the statistician of the village whom they called *parwari* or village officer was supposed to maintain as many as 39 registers for every village including rainfall, yields of rice and so on. It was very difficult to remember all these 39 subjects covered by the *Patwari's* *daftar* in a village. So why do we say that there has been no statistics at all, no idea, no concept of statistics? There has been very good idea of statistics at the grass root level. Now at the grass root level statistical organisation has been dismantled in some states. The village officer's office has been abolished. Today, we do not know which piece of land belonged to whom and the heads are breaking, day in and day out. This is the result of a kind of perverted view of the system that is existing. If you want to improve the condition of the people by all means do that but for heaven's sake, do not dismantle it completely and plunge villages into total anarchy. But this is what is happening in some of our states. It is a very strong system. It has been there at least since Todarmal's time, if not earlier. So we do not want to think that this is happening for the first time. But of course at a higher level where collation, collection are involved, naturally a new model had to come. India had a very much decentralised model in old days. Now that we have to start planning on a centralised basis it became necessary to have the Planning Commission to have models which one after another are to be examined including the important Mahalanobis model. So there is a tradition of statistics, statistical approach, maintenance of statistics in India. It needs to be updated, upgraded and made more sophisticated and then brought upto the level where it will be useful in present day circumstances.

5. One of his lasting contributions to the science of statistics was the development of the theory and techniques of large scale sample surveys. Given the vastness of the country, he realised that essential data on major variables such as agricultural output which are crucial for framing Government policy could be obtained inexpensively through the sampling process with only minor errors. His lifelong involvement with the sampling process helped India develop one of the finest economic and statistical data bases found anywhere in the world. The importance of collecting reliable data quickly for policy purposes cannot be over-emphasized. We are still confronted today with the problem of inaccuracies in predictions, as well as

delays in reporting of data in several crucial areas such as national income, prices, industrial production, trade statistics and so on. I hope that the Mahalanobis Centenary will spur those responsible for developing the nation's economic and statistical data base to devise methods of obtaining more reliable data quickly. This is also not new, let me remind you. For hundreds of years there have been certain rough and ready methods of assessing certain things at the village level. If you want to know what is the *Amarwari* yield, you do not have to survey the entire thing. You do not have to go from one survey no. to another survey no. of all the cultivated land in the village. There were methods by which sampling was done. A sample harvesting was done. It was quantified and finally it was reported that in this area this is the *Amarwari* production of an item, whether it is wheat or rice or whatever. Now this idea was there for hundreds of years. We have a *nyeye* - out of all the *nyeyes* that are known - called '*sikali pulaka nyeye*', that is, if you want to know whether in a big bowl in which you are cooking rice, the rice has been fully cooked or not, you do not have to put all the rice on the ground and start examining each grain. You just take one or two grains and say yes, now it is cooked. That is sample survey. It is done in every home. So all the concept is there. But the application of this concept to modern situation, new situation, unknown situation, let us say, that is not being done properly. So it is a problem of application, not so much of learning afresh.

6. Prof. Mahalanobis can be truly said to be the father of Indian statistics. He founded the Indian Statistical Institute in 1931 and devoted his energies to attracting the finest talents and expertise in developing the Institute. A galaxy of internationally reputed economists and statisticians have come on pilgrimage regularly to ISI having been drawn by the reputation and stature of Prof. Mahalanobis. The founding of the journal "Sankhya" has also been one of the major milestones in the development of statistics and scientific writing on social sciences, not only in this country but also internationally.

7. Prasanta Chandra Mahalanobis will be remembered most, however, for his seminal contribution to the approach adopted by India in the early years of our planning process. This approach emphasised stepping up of domestic investment as the key to rapid growth and employment generation, through the development of the domestic capital goods industry. The Mahalanobis Model, as this approach came to be known, has found its way into the basic texts of economics and became the paradigm of Indian development throughout. The lesson of the Mahalanobis Model, stressing the criticality of investment in the growth process is still as relevant today as in the early years of planning. You need growth, no matter where or wherefrom it comes. You cannot say if you need growth yesterday, we do not need it today. We need growth all the more today and all the time. The point is where do you get it from? How do you get it? How do you achieve it? That is the thing which we have to explore today. Even today, our country has to strive hard to achieve rates of investment higher than the current rate of 26% or so. The rates of investment of some of our fast-growing neighbouring countries to the east are at least 50% higher than ours, which explains to a great extent the difference in their better growth performance.

8. Prof. Mahalanobis' association with the Indian planning process helped India adopt a systematic and scientific approach to development earlier than most other developing countries. He saw that no country of our size and at our then level of development, facing unemployment, poverty and ill-health could develop without a clear identification of objectives and the best possible use of scarce resources for the maximum benefit of the people. The planning process was his solution to this optimisation exercise.

9. It is often asked whether, under the present circumstances when the philosophy of the market approach to development seems predominant, there is any relevance of the ideas of the early planners such as Prof. Mahalanobis. I would like to emphasize that our new economic policies which visualise a greater role for the private sector in our growth process also emphasize the importance of the role of the state as a crucial factor in our development. The state does not wither away simply because a little more investment comes from the private sector. Unemployment, under-employment, under-nourishment, ill-health and illiteracy, unfortunately continue to plague large sections of our people and the Government has to devote greater energy towards elimination of these problems. Those who today criticize the approach of our early policy planners fail to realize that our greater need for state involvement in the development process at that time was essential, when private initiative was weak or absent, when infrastructure was still highly undeveloped, and when resources of the magnitude necessary for rapid growth could only be mobilised through the efforts of the state. Then in any case no private entrepreneur would come and risk his money in infrastructure in those days. It was just not possible. We went from pillar to post. People did not respond. We went to other countries; people did not respond. It is only because of our friendship and the way we really tackled the problem of our own, our own basic industries that the Bhilai Steel Plant was started. We went round. They said we give you steel.

Why do you need a steel factory? So that was the overall approach of many countries who could have given us anything, but did not want to give us. This is something which is forgotten. Today they all sound very very noble, very very forthcoming, very ready to help. It was not so. Some of my friends - when I went to those countries - said that why do you need a vehicle factory anywhere in India. Take the vehicles. We are giving you off the shelf. Take the vehicle as many as you want it. It looked as if they were giving a very easy way out of our supply's position. The supply in regard to a particular thing is weak, we give you. That's it. That should do. Now this was something which had to be debunked by Jawaharlal Nehru, planners like Mahalanobis and we had to have our own industry. India is a very large country and no other country can sustain India for all time to come. Therefore, India has to stand on its own legs and that is where the idea of self reliance started. Self reliance means local investment, local enterprise. All this is part of one concept. So all the other parts of the concept were in place, the filling place and that is how in the initial stages of our planning process started.

10. It is true however that the role of the state must necessarily be adapted to the requirements of the times. And it's a simple switch. We are going to get a refinery, an oil refinery costing about 6 thousand crores. Just one refinery costing over 6 thousand crores, one steel factory costing five thousand crores. Now these are big investments. Normally this money would have had to be found by the Government from its own resources. That became impossible. So we went round asking for investment from outside, from inside, wherever it is coming from. In the infrastructure sector, we said we give first priority to infrastructure sector. We are not asking you to build schools here. What shall be saved if you build 100s of schools, 1000s of schools even. Nothing. Give me one steel factory from the private sector. The money which otherwise I would have to spend for the steel factory, because we cannot do without a steel factory. The country cannot. So I will be saving Rs.5,000 crores and Rs.5,000 crores would mean almost a school in every village in India or at least a few states. So the fields of education, health and human resource development were very badly neglected for no fault of anyone, because you did not have the money. Those things, those neglected areas would now be taken over by the government. Today it is possible for Mr. Pranab Mukherjee, at my request, to allot Rs.30,000 crores for rural development. This is nothing less than a miracle, nothing short of a miracle. He was able to do it because there is someone to substitute what he was doing until yesterday. It is that simple. There is no big philosophy involved in it. It is a question of how to husband your resources, where to get them from? So this is the switch that we have undertaken now. We hope that it is going to succeed. It makes sense. It makes eminent sense. It does not look illogical at all and you cannot do without the big industry. We cannot do without the investment in intensive industries. So someone has to come in those industries to take that place so that money is released for the people themselves and for programmes of human resource development. We expect now that the task of industrial production will basically be taken over or largely be taken over by the private sector while the challenges of hunger, malnutrition and illiteracy will have to be eradicated through greater Governmental effort. I do not see any big entrepreneur coming and asking to run all the school systems in a state, for instance. What will he get out of it. Nothing. They are not really programmes which give returns. The returns come after 15 years. Returns come after a long period and they come to the country, not to the person who is investing. Therefore, this long gestation programmes with no immediate returns do not attract the private sector. Let us face this fact. Even in education some people had made it a profession these days for money making. But that is not going to continue for too long. The Supreme Court has come heavily down on this tendencies. So that part is going to be stopped. It's not going to be any longer available. We will have to think over the avenues. In the last two years the Government has taken a major initiative in bringing about a reordering of the roles to be played by the public and private sectors. We have introduced new industrial, trade and fiscal policies to provide incentives to the private sector to foster rapid growth and bring our country to the forefront of technological attainments. Our fiscal and monetary policies are designed to eliminate the fiscal deficit and to convert it to a surplus so that the much needed resources for development can be generated, while at the same time inflation is curbed.

11. The problem of resource availability has to come to the centre stage as the most important single issue affecting our development effort. The demands on the limited resources available to the state continue to increase and it is not easy to find a solution that can accommodate all interests while at the same time maintaining a forward momentum in the economy. I am sure that if Prof. Mahalanobis were here today, he would have worked to find an optimal solution to this problem. Some of our most distinguished economists, planners and statisticians are present in today's gathering and it would be a fitting tribute to Prof. Mahalanobis' memory if those of you who have an interest in such matters could work on such ideas to help the country in dealing with this subject. Perhaps the ISI could organise some work on this vital issue.

12. The problem of expenditure reduction is not simple either. While on the question of elimination of export subsidies there is little controversy, with respect to other subsidies such as to agriculture, greater deliberation and examination is called for. We have, for instance, allowed some price concessions again for fertilizers this year as we found that a grave imbalance in consumption of different types of fertilizers appeared to be occurring which needed to be corrected. This was not at all anticipated two years back. In 1990-1991 we thought if you reduce, you reduce and that's good. It is not so. If you reduce in nitrogenous fertilizers, the input of nitrogenous fertilizers would become much more costly and there is a total imbalance in the input given to the fields, to the land which means over a period of 4 or 5 years there can be permanent damage to the humus content and other structure of your land, of the agricultural land. So it's a very serious matter and therefore, we have to consider it afresh and bring the balance back. Expenditure on the Public Distribution System will continue to be necessary as part of our anti-poverty programme, but it needs to be ensured that the poor do in fact receive the benefits under the scheme.

13. On the other hand, greater attention needs also to be paid to tax increases, through greater compliance and a better tax collection machinery. That is why we have announced a long-term policy of low and uniform tax rates, and begun to implement it in the fields of personal income tax, excise and customs. We shall apply the same principles of moderation and non-discrimination more broadly in the coming year. There are limits to the extent to which people can be taxed without attracting massive evasion and creating serious injustices between those who pay taxes and those who evade them; it is our intention to bring down taxation to below this threshold.

14. These are the kind of issues of equity, balance and fiscal correctness that we have to address and find practical solutions to. It so happens that in the wake of world wide changes which no one can resist, problems of the people including developmental problems have passed into a new era of finding pragmatic, workable solutions which seeks to test our solution which works best in resolving a particular problem. This is the kind of pragmatic approach, at least for sometime which we will have to take until we have the strength of what is generally called an ideology. The strength of an ideology which needs to be evolved and until that evolves we will have to be pragmatic. May be we shall hit and miss, but at the same time learn from our own mistakes and experience and that kind of pragmatism has become necessary in the interregnum. You cannot close your eyes to this need and stick to things which are no longer worth sticking to. We have, over the last two years attempted to apply this strictly objective approach to our own basic problems which remain today as they were in the early days, when Prof. Mahalanobis grappled with them. Growth, equity, employment and poverty reduction remain our most fundamental objectives, now, as they were decades ago when he undertook his pioneering work. These are hard realities today. They are neither to gloat over the changes that have come and changes that we have undertaken in order to meet the changes that have come. They are neither to gloat over nor to bemoan, but to manage and turn to our advantage. That is what we have to do when these very large massive worldwide changes come. You just cannot stand still and let them come, not do anything about it. You cannot stick to things which will not stand in the face of all these changes. We must ask what we have learnt in these decades and how we can move forward in the years ahead. Prof. Mahalanobis, a life long student would have been keen to know the answer today if he had been alive. That is, let us at least do that. Imagine what he would have done to the extent our imagination goes and do it. We could emulate him profitably, particularly at this time when notwithstanding some unavoidable, all knowing public pomposes you do not see too many persons claiming to know all the answers. So we go back to the formula '*Pranipatena Pariprasanna sevayet*'. Here the people are the guru. So we respect them '*pranipatena*'. '*Pariprasanna*' we investigate them, we question them about their problems and aspirations and meanwhile all the time serve them '*sevayet*'. So these are the things, old combinations in the new context. There is no other way we can serve this country. Thank you very much.



### Part III. Administration And Office Bearers

#### 13. GENERAL ADMINISTRATION

##### Administrative Services Division

The Administrative Services Division at the headquarters at Calcutta caters to the various needs of scientific workers of the Institute and provides necessary infrastructural facilities to enable them to carry out their research and academic activities. The Centres at Delhi and Bangalore, each having a number of science units, are also more or less self-sufficient in respect of administrative services and support provided to the scientists. The Division has different Units in Calcutta as mentioned below :

*Personnel Unit* : The Personnel Unit deals with all service matters like appointments, promotions, transfers, disciplinary action, retirement etc., in respect of all the workers of the Institute and maintains all the necessary service records. The Retirement Benefit Cell attached to the Unit deals with the admissibility and arranges payment of retirement benefit of workers like pension, death-cum-retirement gratuity etc.

*Accounts Section* : The Accounts Section along with Provident Fund Unit keeps the accounts of all financial transactions made by the Institute and is responsible for final closure of accounts and preparation of Income and Expenditure account and Balance sheet at the end of each financial year. The Provident Fund Unit maintains the account of provident fund of all individual workers of the Institute and deals with PF loans and withdrawals and final payments of PF balance.

*Estate Office* : The Institute has quite a big area of land and several buildings situated within its campus. The Estate Office looks after all the estates and properties of the Institute and also maintains regular conservancy services.

*Engineering & Electrical Maintenance Units* : The Institute has several buildings, sheds and staff quarters in its various campuses. These Units look after the regular day to day maintenance and ensure supply of electricity and water in the buildings. These units also take up new constructions.

*Medical Welfare and Reimbursement Unit* : The Medical Reimbursement Unit is entrusted with the checking of all medical claims submitted by the workers as per CSMA Rules and arranges payment thereof. The Medical Welfare Unit maintains a small dispensary with facilities of consulting general physicians and specialists for the campus residents and also for the workers residing nearby, and ensures free supply of medicines. At present there are three regular doctors and several part-time specialist doctors attached to the Medical Welfare Unit.

*Transport Unit* : The Unit is responsible for the running of Institute vehicles and regular maintenance thereof. The Institute has two buses for transporting its workers coming from distant parts of the city. It has also an ambulance to transport the ailing workers to the Govt. Hospitals for emergency treatment on recommendation of the doctors attached to Medical Welfare Unit.

*Telephone Unit* : The telephone Unit maintains and operates the Internal PBX system and also operates the External PABX system through which contact with the outside world is maintained. The Institute at present is having 18 P&T lines and a 200 lines PABX system which is inadequate to the increasing demand. The Institute is therefore going to acquire a modern 400 lines EPABX system and also install a small 56 lines EBABX separately at the residential campus during the current financial year.

*Central Stores Unit* : This Unit is responsible for procuring all the stationery and stores articles including furniture and materials required for day to day maintenance of building, water supply and electric supply etc. A small Tailoring Unit is attached to it.

*Binding Unit* : The Institute has a large Library. Books and journals are required to be bound regularly which is done by the Binding Unit. Besides, the Binding unit undertakes binding jobs as required by the various scientific and administrative units of the Institute.

*Security Unit* : As mentioned earlier, the Institute has a vast campus and several buildings and sheds. Maintenance of security of these buildings is of utmost importance. The Security Unit takes care of the security of the Institute's property.

*Director's Office and CAO's Office* : These two offices maintain the various important and confidential records, arrange to issue various circulars and administrative orders and cater to the needs of Director and the Chief Administrative Officer respectively on all matters. These units also keep liaison with other scientific and administrative units in the headquarters and also with the outlying centres and branches of the Institute.

*Central Office* : The Central Office is incharge of receipts and despatch/distribution of all correspondence, circulars/office orders etc., of the Institute. Arrangements for maintenance and services of all typewriters and duplicators of the Institute are centrally made by this unit.

*Public Relations Unit* : The Unit takes care of all sorts of public relations activities on behalf of the Institute. The Unit played a key role in highlighting the activities of the Institute in connection with the birth centenary of late Professor P.C. Mahalanobis through All India Radio, Doordarshan and various newspapers. Some of the important events which got elaborate media coverage were (i) "Media-Conference" in connection with the birth centenary of late Professor P.C. Mahalanobis held on 18 June, 1993, (ii) Birth Centenary programme of late Professor P.C. Mahalanobis held on 29 June, 1993, (iii) Regional Mathematical Olympiad held on 5 December, 1993, (iv) Lecture series on "Frontiers of Anthropology" during 08-11 December, 1993, (v) International Conference on "Advances in Pattern Recognition and Digital Techniques", held during 28-31 December, 1993, (vi) Twenty-eighth Convocation of the Institute held on 11 February, 1994, (vii) Special Seminar on "Central Budget 1994-95" held on 07 March, 1994, (viii) Annual Convocation of International Statistical Education Centre (ISEC) held on 29 March, 1994.

Besides these, the Unit issued a number of "Press-Release" during the year in connection with other important activities of the Institute. The Unit also played a significant role in producing a documentary film on late Professor P.C. Mahalanobis by Doordarshan which was telecast on 31 August, 1993 at 6-25 p.m. in channel I. A city tour was also organised by the Unit for the trainees of ISEC on 10 July, 1993.

Another important job of the Unit is to prepare and publish the Annual Report of the Institute each year under the guidance of an Editorial Board and organise the distribution of the same to the different Universities in India and abroad. Distribution of "ISI-News Letter" is also done by the Unit.

*Council Section* : The Institute is a registered society and there are quite a large number of Ordinary and Life members who are interested in the activities of the Institute. The Council section maintains the liaison with the members and keeps them posted with all current information, arranges despatch of *Sankhyā*, the journal of Statistics published by the Institute. The Council section also arranges the holding of various meetings of the General Body and also of the Council and Finance Committee of the Institute. This section is attached to CAO's office.

*Publication and Printing Unit* : The Unit was formed in August 1991 when the Statistical Publishing Society was formally taken over by the Institute. The Unit is now engaged in printing of all materials, including *Sankhyā* as required by the Institute. The Unit also accepts work from outside agencies on a selective basis. It also looks after the world wide distribution of *Sankhya*, Series A & B.

Apart from the Units mentioned above, there are some small cells like Budget Cell, Import Cell, Travel Cell and HBA Cell to take care of the specific needs of the Institute.

The Administrative Services Division also looks after the running of hostels for students, research scholars and ISEC trainees and also the running of Canteen for the workers and students of the Institute. It also maintains the Guest House to accommodate scientists and academicians, both from inside and outside the country, who visit the Institute for various academic pursuits. As mentioned earlier, the Division has two main Centres located at Delhi and Bangalore. The other outlying Units numbering eight are controlled directly by the headquarter at Calcutta. The Administrative Services Division takes the responsibility for all new construction activity of the Institute at its headquarter and also at outlying centres/branches. A brief report on the construction activity in the current year is given later.

The activities of the Administrative Services in the two Centres, namely Delhi and Bangalore, and in other outlying branches of the Institute are more or less the same but in a much smaller scale. Depending on the needs of the branches/centres the number of Units have been truncated and merged into fewer Units.

## 2. Staff of the Institute

The need of supporting staff for various scientific divisions as also for general administration has increased tremendously with the increase in research activity of the Institute. Increase of staff strength is also needed as a result of new construction activities like Senior Students' Hostel, Composite Library Building etc., at the headquarter and also academic blocks at Bangalore and Hyderabad. The Institute had to observe a complete ban, for a long time on recruitment of administrative staff as per Govt. directive which has resulted in reduction of staff strength on account of retirement on superannuation, death etc. Although the Govt. has already finalised the pay structure for the existing employees of the Institute, it has still not cleared the pay scales which will be applicable to the new entrants in various administrative positions and as a result no new recruitment from outside could be made. The Govt. has ultimately agreed to allow the Institute to recruit some staff in essential categories. However, with the depletion of staff strength and partial ban on recruitment, it has become increasingly difficult for the Administrative Services Division to maintain security, conservancy, and other services.

The following senior members of the staff worked in the posts indicated against their names during the year.

1. Professor B.L.S. Prakasa Rao, FNA, Director
2. Dr. S.C. Bagchi, Dean of Studies
3. Professor Bhaskar Dutta, Head, Delhi Centre upto 17.11.1993  
Dr. Aloke Dey from 18.11.1993
4. Professor M.A. Gopinath, In-charge (Admn. & Accounts),  
Bangalore Centre upto 7.6.1993  
Dr. T.S. Arthanari from 8.6.1993
5. Shri P.K. Bandyopadhyay, Chief Administrative Officer upto 31.7.1993  
Shri P.K. Bose from 2.8.1993 to 17.3.1994  
Shri G.H. Mandal from 18.3.1994

### *New Appointments*

List of workers (Scientific/Technical/Administrative) who joined the Institute during the year :

1. Shri Subrata Rath, Technical Officer (SQC) Gr. III
2. Dr. S. Thangavalu, Professor
3. Dr. Mousumi Bose, Lecturer
4. Shri Punam Kumar Saha, Programmer
5. Shri G. Krishna Prasad, Technical Officer (SQC) Gr. III
6. Md. Zafar Anis, Technical Officer (SQC) Gr. III
7. Shri Ashis Kumar Ghosh, Computer Engineer
8. Shri Arup Ray Chowdhury, Deputy Librarian
9. Dr. Jyotirmoy Sengupta, Associate Professor
10. Dr. (Mrs.) Armita Pal, Lecturer
11. Shri G.H. Mandal, Chief Administrative Officer

### **Retirements/Resignations**

List of workers (Scientific/Technical/Administrative) who retired from the service of the Institute during the year :

1. Sanat Kumar Bhattacharya, Associate Professor
2. N.S. Iyengar, Professor
3. K.P. Bhattacharya, Lecturer
4. S.M. Kansal, Professor
5. Swadesh Rn. Chakraborty, Accountant
6. Kamalendu Bhattacharya, Executive Officer (SG)
7. A.B. Gupta, Professor
8. Bimalendu Chatterjee, Maintenance Engineer
9. A.N. Nankana, Senior Technical Officer
10. Biswanath Mukherjee, Professor
11. S.M. Sundara Raju, Senior Technical Officer (SQC) Gr.I
12. Rameswar Kundu, D.P. Technician
13. Nikhilesh Bhattacharya, Professor
14. Sudhangshu Bimal Ghosh, D.P. Technician
15. Jaanendra Bikash Chowdhury, Executive Officer (SG)
16. (Ms.) Manjula Mukherjee, Professor
17. Ranvir Saxena, Administrative Officer
18. Mamindra Nath Paul, Professor
19. Bhola Nath Das, Associate Professor
20. Jogesh Mishra, Chief Librarian
21. Ranjit K. Naha, System Analyst Gr.II
22. C.R. Malakar, Professor
23. P.K. Basu, Technical Officer (SQC) Gr.I
24. B. Ramachandradu, Technical Officer (SQC) Gr.I
25. Ashis Kumar Sen, Computer System Engineer Gr.I

Numbers of workers in various groups as on 31st March 1994 :

(i) Scientific and Technical Group	- 500
(ii) Non-scientific Group	- 1100
Total :	<hr/> 1600 <hr/>

### **Budget and Finance**

For the year 1993-94, the Institute's budget was estimated to be Rs.1475.26 lakhs and Rs.1098.62 lakhs towards Non-Plan and Plan respectively at the BE stage. The Govt. after considering the report of the Section 8(1) Committee approved a sum of Rs.1301.70 lakhs (including internal receipts) and Rs.435.60 lakhs respectively for Non-Plan and Plan expenditures. At the Revised Estimate stage, the Institute sought for a grant of Rs.1430.90 lakhs and Rs.435.60 lakhs respectively in Non-Plan and Plan Estimates. The Govt. after considering the additional increase at RE stage approved a sum of Rs.1386.60 lakhs (including a grant of Rs.22.70 lakhs for the centenary celebrations of Prof. Mahalanobis) on Non-Plan. The Plan RE allocation was fixed at Rs.435.60 lakhs including a special capital grant for the Birth Centenary celebration of Prof. P.C. Mahalanobis. The Institute after maintaining tight budgetary control was able to contain its expenditure (with some amount of savings) within the budget allocation sanctioned by the Govt. The Audited Annual Accounts of the Institute for the year 1993-94 have been furnished in part IV of this report.

## Land and Construction

The following major activities were undertaken by the Institute during 1993-94.

### Calcutta

#### *New Guest House*

The civil work for the construction of the New Guest house is in progress. The expenditure incurred up to 4th R/A bill is about Rs.36.0 lakhs against work order value of Rs. 73,20,635.00. The work has been stopped as the contractor left the site all of a sudden. Negotiation is going on with the contractor to persuade him to start the work.

#### *Restoration of R.T.S. Building*

(a) First phase of restoration work, which include demolition and recasting of top floor and entire sun sheds along with allied works have been completed in all respects by 31 December 1993. Out of the revised estimated value of Rs.27.27 lakhs, payments, amounting to Rs.21,67,906.18 upto 5th R/A bill has been made. Final bill for the same is yet to be submitted by the contractor after finalisation of the rates of additional item of works.

(b) Separate agency was engaged for electrical installation work of R.T.S. Building. Tender value for this job was Rs.2,64,213.00. Work is likely to be completed within the first quarter of 1994-1995.

(c) After restoration of the top floor, fabrication work of partition walls on the same floor had been undertaken. This work is in progress. The expenditure incurred upto 2nd R/A bill is Rs.2,60,155.21 against work order value of Rs.5,70,881.57.

#### *Group 'D' quarter at Deluxe Garden*

Work order for Civil, sanitary and Electrical works has been issued recently. Tender value for the same is Rs.20,99,044.30.

#### *Group 'C' type quarter at Gupta Nivas*

M/S. Ghosh, Bose & Associates has been engaged as consultant for 'C' type quarter at Gupta Nivas. Conceptual plan for the same was submitted by the consultant which was approved by the Institute. Now drawing of the working plan etc., is in progress.

#### *Deep tubewell at Delux Garden and 202 B.T. Road*

Three tenders were received after inviting notice through newspapers. Scrutiny report of the Consultant has just been received. Tender amount of lowest bidder is Rs.75,038.50.

#### *Face lifting work of all buildings on the occasion of the birth centenary of Prof. P.C. Mahalanobis*

Face lifting work of some of the buildings were undertaken and duly completed during the current financial year.

### Delhi

The Centre did not take up any major construction work during the financial year. Construction of boundary walls, stores shed and waterproofing of the Library and Canteen buildings were taken up. The drainage and street lighting system were also taken up. The total cost was within Rs.5.00 lakhs. The work of the construction of additional floors on the bank building could not be started due to some technical problems. It is now proposed to construct a small Administrative block in the campus.

**Bangalore**

After completing the preliminary work of appointment of Architects, drawing and designing of the additional floors, contract has been awarded for the construction work. Necessary amounts of cement and steel to start the work have also been procured. The work started in full swing from the middle of the current financial year and the progress of work was quite satisfactory.

#### SOCIETY TYPE ACTIVITIES

*Membership : April 1993-March 1994*

During the period 154 Persons were elected as ordinary members of the Institute and 34 ordinary members became life members.

The membership position as on 31st March 1994 is as follows:

Ordinary Members	- 1003
Life Members	- 382
Institutional Members	- 14

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*Finance Committee Meeting :* Two meetings of the Finance Committee were held during the year on 24 August 1993 and 4 November 1993. In the meeting of 24 August 1993, the Committee recommended the RE 1993-94 and BE 1994-95 (Plan & Non-Plan) and also recommended revision of rates of stipends to the students to the Council. The Committee in its meeting on 4 November 1993 considered and recommended the Annual Report including the Audited Statement of Accounts for the year 1992-93.

*Council Meeting :* Three meetings of the Council of the Institute were held during the year on 25 August 1993, 5 November 1993 and on 10 February 1994 and various important decisions on both Administrative and Academic matters were taken. In the meeting of 25 August 1993, the Council considered and approved the recommendation of the Finance Committee on RE for 1993-94 and BE for 1994-95 in respect of both Plan and Non-Plan Estimates. The Annual Report including the Statement of Audited Accounts for the year 1992-93 were considered by the Council in its meeting of 5 November 1993 and approved. In the meeting of 10 February 1994, the Council approved the recommendation of Academic Council for award of Degrees/Diplomas to the students at the ensuing convocation.

A list containing the names of the President of the Institute, Chairman and Members of the Council of the Institute and also lists of members of different committees constituted by the Council are given in this report.

*Annual General Meeting :* One Annual General Meeting was held on 9 November 1993. In this meeting of 9 November 1993, the Annual Report alongwith the Audited Statement of Accounts for the year 1992-93 were considered and adopted by the General Body. The report of the Library Committee was also taken up for discussion by the members in the said meeting.

**LIST OF MEMBERS OF THE ACADEMIC COUNCIL AND OF DIFFERENT COMMITTEES OF THE INSTITUTE AS ON 31 MARCH 1994.**

**List of Members of the Academic Council of the Institute**

1. B.L.S. Prakasa Rao, Director - Chairman
2. S.C. Bagchi, Dean of Studies - Convener

*Theoretical Statistic and Mathematics Division*

3. Somesh Das Gupta, 4. A.K. Roy, 5. T.J. Rao, 6. S.B. Rao, 7. B.V. Rao, 8. Bikash Sinha, 9. A.R. Rao, 10. G.M. Saha, 11. J.K. Ghosh, 12. T.P. Tripathi, 13. T.K. Chandra, 14. Y.R. Sarma, 15. K.R. Parthasarathy, 16. T. Parthasarathy, 17. K.B. Sinha, 18. R. Bhatia, 19. Ajoke De, 20. A. Sitaram, 21. R.B. Bapat, 22. K.P.S.B. Rao, 23. V.S. Sonder, 24. T.V. Hazarav. 25. R.L. Karandikar. 26. T.S.S.R.K. Rao\* 27. D. S. Thangavelu.

*Applied Statistics, Surveys and Computing Division*

28. Ajay Kr. Adhikari, 29. Arjit Chaudhury, 30. Sunil K. Pal, 31. T. Krishnan, 32. Shibdas Bandyopadhyay, 33. A.C. Mukhopadhyay, 34. P.S.S.N.V.P. Rao,\* 35. S.R. Chakraborti.

*Computer and Statistical Services Centre (CSSC)*

36. S.C. Kundu, 37. Aditya Bagchi.

*Physical and Earth Sciences Division*

38. P. Bandyopadhyay, 39. Rajkumar Roychowdhury, 40. B.N. Mandal, 41. M.K. Chakraborti, 42. B.P. Sinha, 43. Malay Kr. Kundu\*, 44. Subrata Bhattacharya\*, 45. Ashoke Dutta, 46.J. Das, 47. B. B. Chaudhuri, 48. B.S. Mazumdar, 49. B.B. Bhattacharya, 50. B.S. Dandapat, 51. Sankar. K. Pal, 52. T. Roychowdhuri, 53. A.K. Chandhuri, 54.D.N. Ghosal.

*Biological Sciences Division*

55. A. Basu, 56. K.C. Malhotra, 57. S. Maital, 58. P.P. Majumder\*, 59. B. Karmakar, 60. P.K. Taparwi.

*Social Sciences Division*

61. Robin Mukherjee, 62. D. Coondoo, 63. Pradip Maiti, 64. Milir Kr. Rakshit, 65. Prasanta Kr. Majumder\*, 66. Amila Majumder\*. 67. Biswanath Bhattacharya, 68. S. Guba Roy, 69. Satya R. Chakraborty, 70. Abhirup Sarkar, 71. Parkash Chandor, 72. D. Dasgupta, 73. Anil Sharma, 74. P.N. Mukherjee, 75. Bhaskar Dutta, 76. Dilip Mukherjee, 77. Subhasish Gangopadhyay, 78. M.R. Saluja, 79. N.S.S. Narayana, 80. Sanjit Bose. 81. N.S. Iyengar.

*Statistical Quality Control and Operations Research Division*

82. R.J. Pandey, 83. T.K. Chakraborti, 84. S.P. Mukherjee, 85. S. Sengupta, 86. Anup Majumder, 87. S.K. Majumder, 88. S.R. Mohan, 89. Sadhan Chakraborty, 90. K.K. Banerjee, 91. B.K. Pal, 92. K.N. Anand, 93. A.K. Chaudhuri, 94. Somnath Ray\*, 95. Arvind Soti, 96. S.S. Handa, 97. Y.R. Rao, 98. N.T.V. Ranga Rao, 99. J. Venkatasubrah, 100. A.L.N. Murthy\*, 101. C.V. Krishnamurthy, 102. T.S. Arthanand, 103. P. Lakshmana, 104. V. Gopalan.

*Library Documentation and Information Sciences Division*

105. M.A. Gopinath, 106. I.K. Ravi Chandra Rao, 107. S. Seetharama.

*Member-Secretary, ISEC*

108. A.B. Raha.

*Head, SQCT & P Unit*

109. D.T. Ghosh

*Secretary, Examination Committee*

110. P. Bhimasankaram.

\* Representative selected by the Divisional Committee of Scientific Workers.

**List of Members of Different Committees of the Institute**

**(A) Finance Committee**

(1) Director (Ex-officio Chairman), (2) Shri A.K. Adhikari, (3) Dr. P.K. Bose,+ (4) Shri Dilip Sengupta, (5) Dr. N. Bhattacharyya, (6) Dr. D.K. Bose, (7) Dr. P.N. Roy, (8) Shri P.K. Chatterjee, (9) Dr. Robin Mukherjee, (10) Shri Swapan Seal, (11) Dr. T. Krishnan, (12) Dr. S.B. Rao, (13) Chief Administrative Officer, (14) Head, Delhi Centre or his nominee, (15) In-Charge, Bangalore Centre, (16) Govt. Representative (Dept. of Statistics), (17) Govt. Representative (Ministry of Finance), (18) Head, SQC & OR Division, (19) Shri S.S. Panja (Non-Member Secretary).

+ Died on 10.11.1993

**(B) Journal Committee**

**Editors: *Sankhyā*, Series A and Series B**

Dr. B.L.S. Prakasa Rao, Dr. C.R. Rao, Dr. G. Kallianpur, Dr. K.R. Parthasarathy, Dr. S. Dasgupta.

**Co-Editors: *Sankhyā*, Series A**

Dr. Arup Bose, Dr. Bimal Kumar Sinha, Dr. Mohan Delampadi, Dr. Probal Chaudhuri, Dr. R.L. Karandikar.

**Co-Editors: *Sankhyā*, Series B**

Dr. Bikas Kumar Sinha, Dr. Dipankar Coondoo, Dr. Probal Chaudhuri, Dr. S.R. Mohan, Dr. T.J. Rao.

**Advisory Members**

Prof. Arjit Chaudhuri, Prof. Aman Ullah, Prof. D. Basu, Prof. D. Dasgupta, Prof. G. Jogesh Babu, Prof. J.K. Ghosh, Prof. J. Roy, Prof. J. Seihuraman, Prof. Malay Ghosh, Prof. M.N. Pal, Prof. N. Bhattacharyya, Prof. R.R. Bahadur, Prof. S.K. Chatterjee, Prof. S.K. Mitra, Prof. S.S. Shrikhande, Prof. S.R.S. Varadhan.



**Managing Editors**

Prof. R.L. Karandikar (*Sankhyā*, Series A); Prof. T.J. Rao (*Sankhyā*, Series B)

**(C) Examinations Committee**

1. Prof. S.K. Chatterjee (Chairman), 2. Prof. A.C. Mukhopadhyay, 3. Prof. B.B. Chaudhuri, 4. Prof. Bikas Kr. Sinha, 5. Dean of Studies, 6. Prof. D. Coondoo, 7. Prof. K.C. Malhotra, 8. Dr. S. Dasgupta, 9. Dr. S. Gaha Roy, 10. Dr. Y.R.K. Sarma, 11. Officer-in-Charge, Training Division, CSO, 12. Dr. P. Bhimasankaran (Secretary-Convenor).

**(B) Works Advisory Committees**

**(a) Baramagar : Calcutta**

1. Dr. P.K. Bose (Chairman, Died on 10.11.1993), Dr. P.N.Roy (Chairman from January, 1994) 2. Dr. Aditya Bagchi, 3. Prof. Ashok Dutta, 4. Dr. Bhabani P. Sinha, 5. Chief Administrative Officer, 6. Dr. S.R. Chakraborty, 7. Dr. S.B. Rao, 8. Shri Sanjay Sinha, 9. Shri Swapan Seal, 10. Shri Taras Maitra, 11. Outside Expert, to be co-opted by the Chairman of the Committee, 12. Outside Architect, to be co-opted by the Chairman of the Committee, 13. Shri A. Mukherjee (Convenor).

**(b) Delhi**

1. Shri S.C. Bose Mullick (Chairman), 2. Shri B. Majumder, 3. Shri C.B. Gupta, 4. Chief Administrative Officer, 5. Prof. Dipankar Dasgupta, 6. Head, Delhi Centre, 7. Shri Om Prakash, 8. Shri S.S. Hada, 9. Dr. S.C. Kochar, 10. Prof. T. Parthasarathy, 11. Shri D.N. Sabharwal (Convenor).

**(c) Bangalore**

1. Mr. T.R. Satish Chandran (Chairman), 2. In-Charge, Administration and Accounts, 3. Head, DRTC, 4. Head, Stat-Math Unit, 5. Head, Economic Analysis Unit, 6. Executive-in-Charge, SQC & OR Unit, 7. Mr. C.R. Ramesh, 8. Chief Administrative Officer, 9. Shri L.R.K. Prasad (Non-Member Secretary).

**(d) Madras**

1. Dr. P.K. Bose (Chairman, Died on 10.11.1993), 2. and 3. Out side Experts to be co-opted by the Committee, 4. Shri C.R. Prasad, 5. Chief Administrative Officer, 6. Shri C.Y. Krishnamurthy (Convenor).

**(e) Hyderabad**

1. Professor T. Navneeth Rao (Chairman), 2. Shri T.L. Shankar, 3. Dr. T.V. Hanurav, 4. Chief Administrative Officer, 5. Shri V. Narayana (Convenor).

**(E) Ph.D./D.Sc. Committee**

1. Director (Chairman), 2. Prof. A.K. Roy, 3. Prof. A. Sitaram, 4. Prof. B.V. Rao, 5. Prof. Bhaskar Dutta, 6. Dr. D. Dutta Majumder, 7. Dean of Studies, 8. Prof. J. Roy, 9. Prof. J.K. Ghosh, 10. Prof. K.R. Parthasarathy, 11. Prof. N. Bhattacharyya, 12. Prof. S. Dasgupta, 13. Dr. A.R. Rao (Convenor).

**(F) Technical Advisory Committees of different Divisions**

**I. Theoretical Statistics and Mathematics Division**

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Professor M.G. Nadkarni, Centre for Advanced Study in Mathematics, University of Bombay, Vidyanagari Marg, Vidyanagari, Bombay-400098, 3. Professor S.K. Basu, Indian Institute of Management, Diamond Harbour Road, Joka, South 24 Parganas, 4. Professor B.K. Kale, Department of Statistics, University of Poona, Pune-411007, 5. Professor S.R. Adke, Department of Statistics, University of Poona, Pune-411007, 6. Professor M.S. Raghunathan, School of Mathematics, T.I.F.R., Colaba, Bombay-400005, 7. Professor S. Sridharan, School of Mathematics, T.I.F.R., Colaba, Bombay-400005, 8. Professor S.G. Dani, School of Mathematics, T.I.F.R., Colaba, Bombay-400005, 9. Dr. Alladi Sitaram, Professor-in-Charge (Convener).

**II. Applied Statistics, Surveys & Computing Division**

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Professor S.R. Adke, Professor of Statistics, Pune University, Pune-411007, 3. Professor S.P. Mukherjee, Conventary Professor, Department of Statistics, Calcutta University, 35, Ballygunge Circular Road, Calcutta-700019, 4. Dr. S. Radhakrishnan, Director, Institute for Research in Medical Statistics (ICMR), Sathyamurthi Road, Chepoot, Madras-600031, 5. Dr. H. Vijayaditya, Director, National Informatics Centre, Electronics Commission, E-Wing, Pustpa Bhawan, Madangir Road, New Delhi-110062, 6. Professor C.K. Mustafi, Professor of Statistics, Indian Institute of Management, Diamond Harbour Road, Joka, Calcutta-700027, 7. Dr. S.N. Ray, Director-General, Central Statistical Organisation & Ex-officio Additional Secretary, Department of Statistics, Government of India, Sardar Patel Bhawan, Parliament Street, New Delhi-110001, 8. Professor J.J. Ghosh, Department of Biochemistry, University College of Science & Technology, 35, Ballygunge Circular Road, Calcutta-700019, 9. Dr. S.R. Chakraborty, Professor-in-Charge (Convener).

**III. Physical and Earth Sciences Division**

1. Dr. B.L.S. Prakasa Rao, Director (Chairman); 2. Professor B.L. Deekshatulu, Director, National Remote Sensing Agency, Balanagar, Hyderabad-500037, 3. Professor B.R. Nag, Institute of Radio Physics and Electronics, Calcutta University, 92, Acharya Prafulla Chandra Road, Calcutta, 4. Professor Somnath Biswas, Department of Computer Science and Engineering, Indian Institute of Technology, Kanpur-208106, 5. Professor Mohit Kr. Roy, Department of Computer Science and Engineering, Jadavpur University, Calcutta-700032, 6. Professor Prem Kumar, Department of Mathematics, Indian Institute of Technology, New Delhi-110016, 7. Professor P. Neyogi, Department of Mathematics, Indian Institute of Technology, Kharagpur-721302, 8. Professor A.N. Mitra, Department of Physics, Delhi University, Delhi-7, 9. Professor Brahmamanda Das Gupta, Theoretical Nuclear Physics Division, Saha Institute of Nuclear Physics, Salt Lake, Calcutta, 10. Professor A.K. Saha, Department of Geology, Presidency College, Calcutta, 11. Professor S.N. Sen, Department of Geology, Calcutta University, 35, Ballygunge Circular Road, Calcutta, 12. Professor Mahadeb Adhikari, Acharya Prafulla Chandra Roy Professor of Agricultural Chemistry, College of Agriculture, Calcutta University, Calcutta, 13. Dr. Dhiraj Kumar Rudra, Professor-in-Charge (Convener).

**IV. Biological Sciences Division**

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Professor H. Sharat Chandra, Director, Centre for Cellular and Molecular Biology, Hyderabad-500007, 3. Professor J.J. Ghosh, Department of Biochemistry, University of Calcutta, 35, Ballygunge Circular Road, Calcutta-700019, 4. Professor Anil Kumar Gupta, Head, Agricultural Management, Indian Institute of Management, Vastrapur, Ahmedabad, 5. Professor T.M. Das, Dean of Faculty (Reid), Agriculture Department, University College of Science, 24A, Circular Garden Reach Road, Calcutta-700023, 6. Professor D.P. Mukherjee, Department of Anthropology, University of Calcutta, Ballygunge Circular Road, Ballygunge Science College, Calcutta-700019, 7. Professor B.M. Das, Department of Anthropology, University of Gauhati, Gauhati-781014, 8. Dr. Prem Narain, Director, Indian Agricultural Research Statistics Institute, Library Avenue, New Delhi-110012, 9. Dr. Kamala Krishnaswamy, Deputy Director, National Institute of Nutrition, Hyderabad, Andhra Pradesh, 10. Dr. A.B. Roy, Professor, Department of Mathematics, Jadavpur University, Calcutta-700032, 11. Professor J.C. Misra, Department of Mathematics, Indian Institute of Technology, Kharagpur-721902, 12. Dr. Narendra Singh, Reid, Scientist,

C.P.T.R.I., Sajana, 164, Brindavan Extension, 1 Stage, Mysore-570020, 13. Professor Sivatosh Mookherjee, School of Life Sciences, Jawaharlal Nehru University, New Mehrauli Road, New Delhi, 14. Dr. (Ms.) Chandraksha Duttagupta, Professor-in-Charge (Convener).

#### V. Social Sciences Division

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Professor Ramprasad Sengupta, Centre for Economic Studies and Planning, Jawaharlal Nehru University, New Mehrauli Road, New Delhi-110067, 3. Professor Dhirsh Bhattacharya (Former Head, Department of Economics, Calcutta University), Shibnath Shastri Housing Society, Gariahat Road, Calcutta-700029, 4. Professor Ranjit Sau, Indian Institute of Management, Diamond Harbour Road, Joka, Post Box No.16757, Alipore Post Office, Calcutta-700027, 5. Professor B. Ramakrishna Reddy, Dean of Studies, School of Language Development, Telugu University (Telugu Bhavanam), Hyderabad-500007, 6. Dr. B.P. Mahapatra, Dy. Registrar General, Language Division, 2344, A.J.C. Bose Road, Nizam Palace, 17th floor, Calcutta-700010, 7. Professor Ashish Bose, Jawaharlal Nehru Fellow (1990-92), 1-1777, Chitla Ranjan Park, New Delhi-110019, 8. Professor K.B. Pathak, Officiating Director, International Institute for Population Sciences (IIPS), Govandi Station Road, Deonar, Bombay-400088, 9. Professor Amrita Chatterjee, 35, Biswabhar Banerjee Lane, Koonagore, Hooghly, 10. Professor Purulima Mathur, Department of HSS, Indian Institute of Technology, Delhi, 11. Professor Surajit C. Sinha, Co-ordinator, Paribrajak Mandal, Udyachal Shyambal, Santiniketan-731235, 12. Professor Barun De, Professor of History, Centre for Studies in Social Sciences, 10, Lake Terrace, Calcutta-700029, 13. Dr. Dipankar Coondoo, Professor-in-Charge (Convener).

#### VI. Statistical Quality Control and Operations Research Division

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Shri K.P. Mathur, General Manager, Corporate Quality Assurance, Bharat Heavy Electricals Ltd., 306, Vikram Tower, Rajendra Place, New Delhi, 3. Dr. N.K. Jainval, Institute for System Studies and Analysis, Metcalfe House, New Delhi, 4. Shri K.R. Parameshwar, Former Director General, BIS 8138, Sector B, Pocket 11, Nelson Mandela Road, Vasant Kunj, New Delhi-110037, 5. Dr. Subir Chowdhury, 50/11, Gorcha Road, Calcutta, 6. Dr. S.P. Mukherjee, Centenary Professor, Department of Statistics, Calcutta University, 35, Ballygunge Circular Road, Calcutta, 7. Dr. D.K. Gupta, Chairman & Managing Director, Hindustan Cables Ltd., 9, Lala Lajpat Rai Sarani, Calcutta-700020, 8. Professor S.C. Chakraborty, Head, SQC & OR Division (Convener).

#### VII. Library Documentation and Information Sciences Division

1. Dr. B.L.S. Prakasa Rao, Director (Chairman), 2. Dr. V.A. Kamath, 'Mineendia', 1/9, 2nd floor, Off Mahakall Caves Road, Andheri (E), Bombay-400093, 3. Dr. Sarjugal Sahay, Director, Institute of Library Science, Bhagalpur University, Bhagalpur-7, 4. Dr. Pulin Barua, Professor & Head, Department of Library and Information Science, Golapbag, Burdwan University, Burdwan., 5. Sm. Kalpana Dasgupta, Librarian, National Library, Belvedere, Calcutta-700027, 6. Dr. P.K. Mahapatra, Head of the Department of Library and Information Science, University of Calcutta, College Street, Calcutta-700073, 7. Dr. J. Misra, Chief Librarian (Convener).

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# INDIAN STATISTICAL INSTITUTE

## SIXTYSECOND ANNUAL REPORT : 1963-64

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## INDIAN STATISTICAL INSTITUTE

### Part IV. Statement of Accounts and Auditors' Report for the year 1993-94

#### AUDITORS' REPORT

We have audited the attached Balance Sheet of Indian Statistical Institute as at 31st March, 1994, of (a) General Fund and (b) Other Funds, and the annexed Income & Expenditure Account for the year ended on that date.

The Balance Sheet and the Income and Expenditure Account as referred to above and as produced before us for verification are in agreement with the books and accounts and records maintained by the Institute.

Special attention is invited to Schedule X, Note 1-Fixed Assets, Note 4-Loans and Advances, Note 5-Addl. D. A. Deposit, Note 8-Medical Reimbursement, Bonus and a portion of D.A. Note 9.3 and 9.5-S.Q.C. and our observations in Annexure forming part of this Report.

Subject to the above, in our opinion and according to the information and explanations given to us, the said accounts read with the Notes on Accounts (Schedule X) give a true and fair view of the state of affairs of the Institute as at 31st March, 1994 and its Income and Expenditure for the year ended on that date.

10 Old Post Office Street  
Calcutta, 3rd October, 1994.

*For N. C. MITRA & Co.*  
*Chartered Accountants*

INDIAN STATISTICAL INSTITUTE

BALANCE SHEET

As at 31st March 1963		Fund and Liabilities	As at 31st March 1964		As at 31st March 1964	
Rs.	P.		Rs.	P.	Rs.	P.
22,55,31,478.59		1. GENERAL FUND : As per Schedule VII .. .. .			22,51,04,412.18	
		2. OTHER FUNDS : As per Schedule IV Omnia (including Directors Contribution Fund Indian Statistical Institute Distributory Provident Fund and General Provident Fund .. .. .)			8,08,72,175.04	
7,50,000.00		2.1 GRANT-IN-AID FOR FLOOD ADVANCE TO STAFF : As per last account .. .. .			7,50,000.00	
48,56,000.00		2.2 GRANT-IN-AID FOR HOUSE BLDG. ADVANCE TO STAFF : As per last account .. .. . Add : received during the year .. .. .		48,50,000.00 5,00,000.00	53,50,000.00	
5,22,582.03		2.3 INTEREST ON HOUSE BUILDING ADVANCE REALISED FROM STAFF : .. .. .		7,53,238.77	60,83,238.77	
1,77,87,807.43		4.1 DEPOSITS AND OTHER LIABILITIES : As per Schedule VIII .. .. .			1,44,50,341.02	
81,054.53		4.2 ADDITIONAL EMOLUMENTS COMPULSORY DEPOSIT : .. .. .			81,068.53	
2,46,071.50		5. EXCESS OF RECEIPTS OVER EXPENDITURE IN RESPECT OF PLAN REVENUE GRANT : For the year 1967-68 .. .. . For the year 1961-62 .. .. . For the year 1959-60 .. .. . For the year 1963-64 .. .. .		2,46,071.50 87,190.00 8,28,145.00 0,32,055.00	2,46,071.50 87,190.00 8,28,145.00 32,055.00	
		Less : Recovered during the year .. .. .		21,85,081.50 7,15,000.00	14,40,091.50	
40,93,251.80		6. EXCESS OF RECEIPTS OVER EXPENDITURE IN RESPECT OF MISC. PROJECT ACTIVITIES As per Schedule V .. .. .			41,05,372.32	
45,18,840.53		7. BALANCE WITH ORINDLAYS BANK PLC (OVERDRAFT)  BALANCE WITH UNITED BANK OF INDIA (OVERDRAFT) .. .. .			— —	
4,45,891.50		8. EXCESS OF RECEIPTS OVER EXPENDITURE IN RESPECT OF GRANT RECEIVED FROM GOVERNMENT OF INDIA (NON-PLAN) 1957-58 .. .. . 1962-63 .. .. . 1963-64 .. .. .		846.54 891.50 1,00,722.78	846.54 891.50 1,02,360.88	
78,42,652.74		9. EXCESS OF RECEIPTS OVER EXPENDITURE IN RESPECT OF PLAN CAPITAL As per Schedule IX .. .. .			78,06,682.11	
29,87,18,702.81		10. NOTES ON ACCOUNTS As per Schedule X enclosed .. .. .			23,15,04,012.43	

This is the Balance Sheet referred to our Report of same date.

10 Old Post Office Street,  
Calcutta-700 001.  
2nd October, 1964

S. SENGUPTA  
Accounts Officer

S. S. PANJA  
Accounts Officer



SIXTYSECOND ANNUAL REPORT : 1966-64

AS ON 31ST MARCH 1964

As at 31st March 1966		Property and Assets				As at 31st March 1964	
Rs.	P.					Rs.	P.
<b>1. FIXED ASSETS :</b>							
5,89,77,099.56		As per Schedule I	..	..	..	5,89,76,818.14	
18,74,74,838.51		As per Schedule IA	..	..	..	18,76,84,163.56	24,68,60,771.70
<b>2. INVESTMENT AT COST :</b>							
		Interest accrued on above	..	..	..	24,80,000.00	
			..	..	..	70,109.08	
14,37,094.63		As per Schedule II	..	..	..		24,90,109.63
5,70,790.36		<b>3. STOCK OF SUNDRY MATERIALS :</b>	..	..	..		6,41,578.83
68,803.82		<b>4. REGIONAL PROVIDENT FUND COMMISSIONER</b>	..				68,803.82
<b>5.1 LOANS AND ADVANCES :</b>							
39,13,339.76		As Per Schedule III	..	..	..	29,17,883.58	
1,04,44,882.87		Statistical Publishing Society	..	..	..	1,80,06,775.97	1,80,18,828.85
		Others	..	..	..		
65,84,965.00		<b>5.2 HOUSE BLDG. ADVANCES TO STAFF :</b>	..	..	..		60,64,001.00
<b>6. NET ASSETS ON OTHER FUNDS :</b>							
1,87,71,796.22		As per Schedule IV Contra (excluding Director's Contributory Provident Fund and General Fund)	..	..	..		2,06,78,178.04
<b>7. EXCESS OF EXPENDITURE OVER RECEIPTS OF MISC. PROJECT AND ACTIVITIES ON BEHALF OF THE GOVERNMENT OF INDIA AND OTHER BODIES :</b>							
15,84,863.78		As per Schedule V	..	..	..		17,15,863.08
<b>8. EXCESS OF EXPENDITURE OVER RECEIPTS IN RESPECT OF NON-PLAN REVENUE EXPENDITURE GRANT :</b>							
65,53,873.84		As per Schedule IXA	..	..	..		29,79,873.84
<b>9. EXCESS OF EXPENDITURE OVER RECEIPTS IN RESPECT OF PLAN REVENUE :</b>							
1,38,067.77		1968-67	..	..	..	1,38,067.77	
1,48,740.00		1968-69	..	..	..	1,48,740.00	
2,75,210.00		1969-80	..	..	..	2,75,210.00	
1,73,870.00		1960-81	..	..	..	1,73,870.00	8,36,647.77
<b>10. CASH AND BANK BALANCE :</b>							
5,30,606.33		As per Schedule VI	..	..	..	4,70,364.78	
2,16,81,487.98		Cash in hand	..	..	..	68,32,233.14	74,92,664.98
		Cash at Bank	..	..	..		
3,69,720.36		<b>11. ISI PRINTING AND PUBLICATION UNIT</b>	..				18,18,062.60
<u>18,87,16,798.31</u>						<u>23,15,64,912.43</u>	

This is the Balance Sheet referred to our Report of even date.

G. H. MAUDAL  
Chief Administrative Officer

B. L. S. PRAKASA RAO  
Director

N. C. MITRA & Co.  
Chartered Accountants

INDIAN STATISTICAL INSTITUTE

Income and Expenditure Accounts

Previous Year				Expenditure	Current Year			
Plan Rs.	P.	Non-Plan Rs.	P.		Plan Rs.	P.	Non-Plan Rs.	P.
<b>SALARY AND ALLOWANCES</b>								
13,01,100.00		7,37,79,871.83		1. Salary and Allowances .. .. .	17,54,580.00		8,54,96,519.54	
—		75,48,033.14		1.1 Pension, graded relief & commuted value of Pension .. .. .	—		1,12,72,762.18	
15,84,850.00		23,99,937.09		2. Overtime Allowance .. .. .	18,06,160.00		23,36,094.81	
—		43,065.00		3. Children Education Allowance .. .. .	—		47,016.00	
—		11,50,706.41		4. Employer's Contribution to Provident Fund .. .. .	—		9,46,068.49	
—		91,68,909.45		5. Gratuity Payment .. .. .	—		97,45,857.57	
3,43,840.00		2,02,814.00		6. Visiting Professors, Foreign Scientists, Fellows etc. .. .. .	4,70,155.00		1,74,565.66	
66,216.00		42,01,851.89		7. Scholarship, Stipend and other assistance to trainees .. .. .	71,810.00		45,59,538.54	
<b>NON SALARY ITEMS</b>								
—		10,93,374.10		8. Leave Travel Concession .. .. .	—		11,21,481.40	
50,186.00		10,41,338.20		9.1 Reimbursement of Medical Expenses .. .. .	35,780.00		13,72,161.28	
81,060.00		13,62,869.04		9.2 Medical Welfare to Staff, Students, Research Students, Research Scholars etc. .. .. .	63,980.00		8,88,443.43	
8,14,270.00		17,24,515.84		10. Travelling Expenses .. .. .	5,23,000.00		15,74,862.86	
1,06,000.00		7,17,107.84		11. Printing and Publication .. .. .	3,19,640.00		7,72,763.72	
4,30,100.00		3,33,337.98		12.1 Society type activities (entertainment and conference expenses) .. .. .	1,85,500.00		3,81,661.12	
—		1,38,428.96		12.2 Examination expenses .. .. .	—		1,65,700.43	
43,50,880.00		66,06,863.11		13. Books, Journals, etc. .. .. .	36,74,380.00		66,13,747.81	
6,66,185.00		41,21,768.37		14. Repairs, Replacement and Maintenance of Office Equipment, Computers and accessories etc. .. .. .	3,49,655.00		29,95,373.98	
11,77,050.00		28,27,822.93		15. Stationery Consumable Stores, Advertisement, Insurance, Labour charges, conveyance and petty expenses .. .. .	15,89,175.00		22,51,518.82	
15,91,532.00		44,69,151.01		16. Postage, Telegram etc., Telephone, Electricity charges etc. .. .. .	22,42,700.00		49,06,093.66	
<b>1,28,37,166.00</b>		<b>13,38,09,104.28</b>			<b>1,36,78,678.00</b>		<b>18,37,23,943.40</b>	