

FIFTYFIFTH ANNUAL REPORT : 1986-87

Dr. Anil K. Bera, University of Illinois (10.7.86) : "Model Specification Tests Through Eigenvalues".

Dr. Somdeb Lahiri, University of Minnesota (10.9.86) : "An Integrability condition for Infinite Horizon".

Dr. P. K. Chaubey, Benaras Hindu University (18.9.86) : "Approaches to Poverty Studies in India : Some observations on Measurement Aspects".

Dr. Sukumar Nandi, Ashutosh College, Calcutta (24.9.86) : "A Monetarist Approach to Black Market Exchange Rate Determination : Econometric Study".

Dr. A. C. Mukhopadhyay, ISI, Calcutta (8.10.86) : "Methods for the Estimation of Discovery Cost for oil and Gas in India".

Dr. Abhirup Sarkar, ISI, Calcutta (29.10.86) : "A Ricardian Model of Trade with Demand Constraints".

Dr. Satya Ranjan Chakravarty, ISI, Calcutta (5.11.86) : "Relative Deprivation orderings and Welfare Dominance".

Dr. Sudhendu Biswas, University of Delhi (5.11.86) : "A competing risk theory approach to the outcome of nature of conceptions".

Dr. Dipankar Dasgupta, ISI, Calcutta (12.11.86) : "Administering Input Prices".

Dr. Neela Mukherjee, ICSSR Fellow (19.11.86) : "India's balance of payments and the international economic crises".

Dr. Nachiketa Chattopadhyay, ISI, Calcutta (26.11.86) : "On market structure and durability of durable goods".

Dr. Saumen Sikdar, Presidency College, Calcutta (2.12.86) : "Fiscal incentives for saving and expenditure, taxation".

Dr. Ravishankar Mukhopadhyay, Presidency College, Calcutta (10.12.86) : "Sequential bargaining with two buyers".

Dr. Ira Gang, Rutgers University (11.12.86) : "Allocating jobs under a minimum wage : Queues Vs. Lotteries".

Dr. Ira Gang, Rutgers University (17.12.86) : "Optimal subsidy policies in a dual economy with growth and unemployment".

Dr. Oz Shy, SUNY, Albany (17.12.86) : "Product cycle and trade".

Dr. Sajal Lahiri, University of Essex (18.12.86) : "Relationship between international terms of trade and national welfare Revisited".

Dr. V. A. Yashkin, Institute of Oriental Studies, USSR Academy of Sciences (24.12.86) : "Global economic problems".

Dr. D. K. Bose, State Planning Board, Govt. of West Bengal (20.1.87) : "Problems relating to estimation of fixed capital".

Dr. Prudip Maiti, ISI, Calcutta (28.1.87) : "Marketable surplus and the neo classical dual economy model".

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Dr. John Hurd, Director of the American Studies Research Centre, Osmania University (30.1.87): "Spatial model of income distribution in the U.S."

Mr. Gautam Bhattacharya, ISI, Calcutta (9.2.87): "Districtwise analysis of the causes of varying performance of agriculture in four states of India".

Dr. Nityananda Sarkar, ISI, Calcutta (18.2.87): "On comparison between the ordinary least square estimator and the mixed regression estimator in mis-specified linear models".

Dr. D. K. Bose, State Planning Board, Govt. of West Bengal (25.2.87): "Estimates of consumption—A comparison between NSS and official estimates".

Dr. Abhirup Sarkar, ISI, Calcutta (4.3.87): "A Keynesian model of North South trade".

Dr. Satya R. Chakravarty, ISI, Calcutta (11.3.87): "Extended Gini indices of Inequality".

Dr. N. Bhattacharya, ISI, Calcutta (25.3.87): "A re-survey of NSS households and measurement of changes in level of living".

### *Planning (Delhi)*

Dr. Prodeep Dubey (25.6.86, 27.6.86 & 30.6.86): "Efficiency properties of strategic market games".

Dr. Kaushik Basu (11.8.86): "Modeling finite supergames with uncertain termination".

Dr. K. Saradamoni (27.11.86): "A visit to China—Some reflections".

Ashok Kotwal (25.11.86): "Credit and insurance".

Bela Balassa (2.12.86): "Policy making for economic growth".

Sajal Lahiri (5.1.87): "Economic growth and national welfare under a monopoly distortion".

Prem Shankar Jha (7.2.87): "Punjab".

### *Demography Research*

'On estimating adult urban mortality from censuses in districts of West Bengal—The widowhood method, on 19 September 1986.

'Determinants of fertility decline in unfavourable socioeconomic environment: Examples in India and Bangladesh, on 15 October, 1986.

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4. PUBLICATIONS

The following publications were brought out during April 1986-March 1987.

A. *Sankhya* : The Indian Journal of Statistics and the Official organ of the Indian Statistical Institute.

*Sankhya*, Series A, Vol. 48, Parts 2 & 3

Vol. 49, Part 1

Series B, Vol. 48, Parts 1, 2 & 3.

B. *Technical Reports* : Twenty-two technical reports were issued from Statistics-Mathematics Division.

C. The following publication was brought out during the period.  
Review of the Indian Planning Process.

5. SCIENTIFIC PAPERS AND PUBLICATIONS

SCIENTIFIC PAPERS PUBLISHED

Theoretical Statistics and Mathematics

1. Bagchi, B. (with Sastry, N.S.N.) (1987) : Even order inversive planes, generalized quadrangles and codes. *Geometriae Dedicata*, 22, 137-147.
2. Bapat, R. B. (1986) : Applications of an inequality in information theory to matrices. *Linear Algebra Applic.*, 78, 107-117.
3. ——— (1986) : Inequalities for mixed Schur functions. *Linear Algebra Applic.*, 83, 143-149.
4. ——— (1987) : Two inequalities for the Perron root. *Linear Algebra Applic.*, 85, 241-248.
5. Bhatia, R. (with Mukherjee, K.) (1986) : On weighted lowdin orthogonalisation. *Int. J. Quantum Chemistry*, 29, 1775-1778.
6. Datta, B. (1987) : Characterisation of Fueter mappings and their Jacobians. *Indian J. Pure appl. Maths.*, 18(3), 201-214.
7. Ghoah, J. K. (with Mustafa, C. K.) (1986) : A note on the residual median process. *Can. J. Statist.* 14(3), 251-253.
8. ——— (with Sathu, Y. S.) (1987) : Convergence of Bhattacharyya bounds-revisited. *Sankhyā Ser. A*, 37-42.
9. Mathew, J. (with Nadkarni, M. G.) (1986) : Some spectral questions on Ergodic Actions of (+)  $Z_p$ . *Sankhyā Ser. A*, 109-118.
10. Mazumder, B. S. (with Mukherjee, A.) (1986) : Diffusion in an oscillatory channel flow. *Proc. 3rd. Asian Cong. of Fluid Mechanics*, Tokyo, Japan, Ed. Matsui, T., 262-265.

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11. Mitra, S. K. (1986) : The minus partial order and the aborted matrix. *Linear Algebra Applic.*, 83, 1-27.
12. ——— (with Krishnamoorthy, K.) (1986) : Cost robustness of an algorithm for optimal integration of surveys. *Sankhyā, Ser. B.* 48, 233-245.
13. Mukerjee, R. (1986) : Construction of orthogonal factorial designs controlling interaction efficiencies. *Comm. Statist. Theory Math.* 15, 1635-1648.
14. ——— (with Kageyama, S.) (1987) : An inequality for strongly resolvable designs. *J. Geometry*, 27, 24-28.
15. ——— (with Yanai, H.) (1986) : Factorial orthogonality in the presence of covariates. *Ann. Inst. statist. Math.*, 38, 331-341.
16. ——— (with Chatterjee, K.) (1986) : Some search designs for symmetric and asymmetric factorials. *J. Statist. Plan. Inf.*, 13, 367-383.
17. ——— (with Kageyama, S. and Bhagwandas) (1986) : Symmetry and classification of certain regular group divisible designs. *Graphs and Combinatorics*, 2, 15-20.
18. ——— (with Chatterjee, K. and Sen, M.) (1986) :  $D$ -optimality of a class of saturated main effect plans and allied results. *Statistics* (formerly a series of *Mathematische Operations forschung und Statistik*), 17.
19. ——— (with Huda, S.) (1986) : Optimal statistical designs with circular string property. *Comm. Statist. Theory Math.* 15, 1615-1626.
20. ——— (with Dean, A. M.) (1986) : On the equivalence of efficiency-consistency and orthogonal factorial structure. *Utilitas Math.*, 30, 145-151.
21. ——— (with Bhandari, S. K.) (1986) : Some relations among inequality measure. *Sankhyā, Ser. B.* 268-261.
22. ——— (with Kageyama, S.) (1986) : General balanced designs through reinforcement. *Sankhyā, Ser. B.* 380-387.
23. ——— (with Kageyama, S.) (1986) : Search for GD designs with small values of characteristics. *J. Jap. Statist. Soc.*
24. ——— (with Chatterjee, K.) (1986) : Linear trend-free orthogonal main effect plans. *Reports of Statistical Applications Research—Japanese Union of Scientists and Engineers*, 33, 1-8.
25. ——— (with Jimbo, M. and Kageyama, S.) (1986) : On cyclic semi-regular group divisible designs. *Osaka J. Math.*
26. ——— (with Khatri, C. G.) (1987) : Characterization of normality within the class of elliptical contoured distributions. *Statistics and Probability Lett.* 5, 187-190.
27. Mukherjee, A. (1987) : Higher order nondegenerate immersions of manifolds. *Topology and its Applic.*, 25, 129-135.

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28. Natarajan, S. (1986) : Review of the book : "An introduction to the theory of large deviations" by D. W. Stroock, *Sankhyā, Ser. A*, 48, 411-416.
29. Parthasarathy, K. R. (1985) : Some additional remarks on Fock space stochastic calculus. *Seminaire de Probabilités*, LNM 1204, Springer Verlag, 331-333.
30. Parthasarathy, K. R. (with Steerneman, T.) (1986) : On parameter semigroups of completely positive maps on groups arising from quantum stochastic differential equations. *Boll. bn. math. ital.*, 6, 5-A, 391-397.
31. ——— (1986) : A remark on the paper "One martingale  $d'$  operateurs bornes non representable on integrale stochastique" by J. L. Journé and P. A. Meyer. *Seminaire de Probabilités*, LNM 1204, Springer Verlag, 317-320.
32. ——— (with Sinha, K. B.) (1986) : Boson-Fermion relations in several dimensions. *Pramana. J. Phys.* 27, 105-116.
33. ——— (with Sinha, K. B.) (1986) : Stochastic integral representation of some quantum martingales in Fock space. *J. Functional Analysis.*, 67, 126-151.
34. ——— (with Hudson, R. L.) (1986) : Unification of Fermion and Boson Stochastic Calculus. *Commun. Math. Phys.*, 104, 457-470.
35. ——— (with Steerneman, T.) (1986) : A tool in establishing variation convergence. *Proc. Am. Math. Soc.*, 15, 626-630.
36. Parthasarathy, T. (1986) : On the global stability of an autonomous system on the plane. *J. Math. Phys. Sci.*, 19, 189-97.
37. ——— (with Ramamurthy, K. G.) (1986) : An algorithm to find the smallest committee containing a given set. *Opsearch*, 23, 1, 1-6.
38. ——— (with Ravindran, G.) (1986) : The Jacobian matrix global univalence and completely mixed games. *Math. O.R.*, 11, 663-671.
39. Rama Murthy, K. (1987) : On sample path properties of semistable processes. *J. Multivariate Analysis*, 21, 139-157.
40. Ramasubramanian, S. (1986) : Hitting a boundary point by diffusions in the closed half space. *J. Multivariate Analysis*, 20, 143-154.
41. Rao, T. J. : Inference in survey sampling using random permutation models, a review.—*Jour. Oriasa Math. Soc.*, (Also Proc. of the Conf. held at Sambalpur conducted by I.S.P.S.).
42. Roy, A. K. (with Lima, A.) (1986) : Some results on intersection properties of balls in complex Banach spaces. *Studia math.* T LXXIII, 37-45.
43. Saha, G. M. (with Mitra, R. K.) (1986) : A simple approach to analysis of certain non-orthogonal data. *Sankhyā, Ser. B*, 368-372.
44. ——— (with Samanta, B. K.) (1986) : Orthobalanced block designs. *J. Ind. Stat. Assn.*, 25, 77-83.

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48. ——— (with Das, A. D.) (1986) : Incomplete block designs for asymmetrical parallel line assays. *Calcutta Statist. Ass. Bull.*, 35, 51-57.
47. ——— (with Pal, S. N.) (1986) : A note on a parametric relation of variance balanced block designs. *Calcutta Statist. Ass. Bull.*, 35, 95-97.
48. Sarbadhikari, H. (1986) : A one—one selection theorem. *Proc. Amer. Math. Soc.*
49. Sinha, B. K. (with Ahsanullah, M.) (1986) : On normality via conditional normality. *Calcutta Statist. Ass. Bull.*, 35, 199-202.
50. ——— (with Pantula, S. G.) (1986) : Linear Invariance and admissibility in sampling finite populations. *Sankhyā*, Ser. B, 48, 246-257.
51. ——— (with Sengupta, S. and Pantula, S. G.) (1987) : Some inferential aspects of finite population sampling with additional resources. *J. Statist. Plan. Inf.*, 16, 203-211.
52. ——— (with Rao, B. V.) (1987) : A characterization of Dirichlet distributions. *Jour. Mult. Analysis*, 18.
53. Sitaram, A. (with Shahshahani, M.) (1987) : The Pompeiu problem in exterior domains in symmetric spaces, *Contemporary Math.*, 63, 267-277.

Applied Statistics, Surveys and Computing

1. Arnab, R. (1986) : Optimal prediction for a finite population total with connected designs and related model based results. *Metrica*, 33, 79-84.
2. Bandyopadhyay, S. (with Banerjee, D., Basak, G., Dani, R. G. and Sd, D.) (1986) : Genetic studies on Cottonseed Oil. *Proc. Data Analysis Workshop in Life Sciences*, (Ed. T. Krishnan), 65-80.
3. Chakravorti, S. R. (1988) : Asymptotic distributions of two test statistics for testing independence with missing data. *Comm. Statist. Theory Meth.*, 15, 2, 571-588.
4. Chaudhuri, A. (1987) : Randomized response surveys of finite populations : a Unified approach with quantitative data. *J. Stat. Plan. Inf.* 15, 157-165.
5. ——— (with Adhikary, A.) (1986) : On the efficiencies of unbiased regression and regression-type estimators in finite population. *J. Indian Soc. Agric. Statist.*, 37(3), 261-270.
6. Gupta, S. K. (1986) : Dietary lipids and the incidence of Ischaemic Heart disease. *Indian J. Physiology and Pharmacology*, 10.
7. Krishnan, T. (with Adhikari, A. K., Roychoudhury, R. and Subbakrishna, D. K.) (1986) : Reference Range for Natural Killer Cell Activity in Indian Adults. *Proc. Data Analysis Workshop in the Medical Sciences* (Ed. P. P. Majumder).

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8. Majumder, P. P. (1986) : Functional assessment of Knee and Ankle during level walking. *Proc. Data Analysis Workshop in the Life Sciences* (Ed. T. Krishnan), 21-54.
9. ——— (1986) : A Study on the pulmonary function of workers in the mica processing industries. *Proc. Data Analysis Workshop in the Medical Sciences* (Ed. P. P. Majumder), 1-31.
10. ——— (with Gupta, R., Mukhopadhyay, R., Bharati, B., Roy, S. K., Maasli, M., Sloan, A. W. and Basu, A.) (1986) : Effects of altitude, ethnicity-religion, spatial distance and occupation on adult anthropometric characters of Eastern Himalayan Populations. *Am. J. Phys. Anthropol.*, 70, 377-393.
11. Mukherjee, B. N. (with Sarkar, S. et al.) (1986) : Studies on the Estuarine Dipolegic Zooplankton arpmf Sagar Island. *Proc. Data Analysis Workshop in Life Sciences*, (Ed. T. Krishnan), 82-207.
12. Mukhopadhyay, P. (1986) : Estimation under linear regression models. *Metrika*, 33, 129-134.
13. ——— (with Padmawar, V. R.) (1986) : Estimation under two stage random permutation models. *Metrika*.
14. Sengupta, A. (1987) : Generalizations of Bartlett's and Hartley's Tests of Homogeneity using overall variability. *Comm. Statist.*, Ser. A.
15. ——— (1986) : On tests for the equicorrelation coefficient of a standard symmetric multivariate normal distribution. *Austral. J. Statist.*
16. ——— (1986) : On tests under order restrictions in deduction of dimensionality. *Advances in order restricted inference*, Springer-Verlag, 249-256.
17. ——— (with Gokhale, D. V.) (1986) : Optimal tests for the correlation coefficient in a symmetric multivariate normal population. *J. Statist. Plan. Inf.* 14, 263-268.
18. ——— (with Kundu, S. C.) (1986) : Reproduction of Indian Sand Whiting. *Proc. Data Analysis Workshop in the Medical Sciences*. (Ed. P. P. Majumder), 208-222.
19. ——— (with Vermeire, L.) (1986) : On locally optimal tests for multi-parameter hypotheses. *J. Amer. Statist. Assoc.*

Physical and Earth Sciences

Electronics

A. Digital Systems

1. Sinha, B. P. (with Bhattacharya, B. B. and Ghose, S.) (1986) : A parallel algorithm to compute the shortest paths and diameter of a graph and its VLSI implementation. *IEEE Trans. Computers*, C-35, 11, 1000-1004.

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2. ——— (with Bhattacharya, B. B., Ghose, S. and Srimani, P. K.) (1986) : A further note on Pascal graphs. *The Fibonacci Q.*, 24, 3, 261-267.

B. *Theoretical Physics*

1. Bandyopadhyay, P. (1987) : Non-Hermitian Operators, Localization Problem and the Conservation of Formion Number. *Int. J. theor. Phys.* 26, 131.
2. ——— (with Chatterjee P. and Bandyopadhyay A.) (1986) : SL (2, c) Gauge Theory and  $N = 1$  Supergravity. *General Relativity and Gravitation*, 18, 11, 1127.
3. ——— (with Hajra, K.) (1987) : Stochastic Quantization of a Fermi Field : Fermions as Solitons. *J. math. Phys.*, 28, 711.
4. ——— (with Chatterjee, P. and Bandyopadhyay, A.) (1986) : De Sitter Space, Torsion and  $N = 1$  Supergravity. *Nuovo Cimento B*, 94, 106.
5. ——— (with Chatterjee, P. and Bandyopadhyay, A.) (1986) : SL (2, c) gauge theory,  $N = 1$  supergravity and torsion. *General Relativity and Gravitation*, 18, 12, 1193.
6. ——— (with Mahato, P.) (1987) : Stochastic Geometry, Torsion and  $N = 1$  Supergravity. *Nuovo Cimento B*.
7. Bhattacharyya, S. (with Pal, P.) (1986) : Simple Leaky Box Model for Cosmic Ray Propagation.....and the  $\bar{P}/P$  Ratios. *Nuovo Cimento*, 9C(5) 961-983.
8. Kypriandis, A. (with Roy, S. and Vigier, J. P.) (1987) : Distinguishability or Indistinguishability in Classical and Quantum Mechanics. *Phys. Lett. A*, 119, 333-336.
9. Roy, B. (1986) : Shifted  $\frac{1}{N}$  Expansion for Energy Eigenvalues of the Exponential Cosine Screened Coulomb Potential. *Phys. Rev. A* 34, 5108.
10. Roy, S. (1986) : Stochastic Geometry and the Origin of Quantum Potential. *Phys. Lett. A*, 115, 256-259.
11. Roychoudhuri, R. K. (with Roy, P.) (1986) : Supergravity in Curved Space. *Phys. Rev.*, D 34, 1784.
12. ——— (with Bhattacharyya, S.) (1986) : Spatially Inhomogeneous Plasma with Negative Ions and Modified KdV Equations with  $z$  Dependent Terms. *Z. Naturf.* 41a, 601.
13. Sinha, M. (1986) : The Charge to Neutral Ratio of Hadrons in EAS and Multi-particle Production at High Energy. *J. Phys. G*, 647-651.

*Fluid Mechanics*

- 1 Chakraborty, A. K. (with Gupta, S. N., Majumdar, H. P.) (1988) : Some Remarks on the Weak Interaction Process in Stratified Turbulent Flow. *Indian J. Technol.*, 24, 549-552.



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2. Dandapat, B. S. (1987) : Finite Amplitude Convection in a Rotatory Porous Medium. *Z. Naturf.*, 42a, 13-20.

*Electronics and Communication Sciences*

1. Chanda, B. (with Chaudhuri, B. B. and Dutta Majumder, D.) (1986) : Some Modified Algorithms for Gray Level Thresholding. *Proc. 8th Int. Conf. on Pattern Recognition*, Paris, 984-986.
2. ——— (with Dutta Majumder, D.) (1986) : An iterative algorithm for removing the cloud cover in satellite imagery. *Proc. Platinum Jubilee Conf. on Syst. and Sig. Process.*, Bangalore, 362-366.
3. Datta, A. K. (with Ray, A. and Ganguli, N. R.) (1986) : An expert system for key syllable based isolated word recognition. *Proc. 8th Int. Conf. on Pattern Recognition*, Paris, France, 1, 51-53.
4. De, A. K. (with Das, J., Deb, N. C., Dutta Majumder, D. and Sen, A. K.) (1986) : Performance evaluation by window control mechanism. *Int. J. Systems Sci.*, 17, 10.
5. Dutta Majumder, D. (1986) : Functional and Technical Objectives of FGCS Research. *IFTI Journal Co.*, 67, 1-10.
6. ——— (1986) : Pattern Recognition, Image Processing and Computer Vision in Fifth Generation Computer Systems. *Sadhana*, 9, 2, 139-156.
7. Kundu, M. K. (1986) : Pixel modification using image topological properties for better data compression. *Proc. 8th Int. Conf. on Pattern Recognition*, Paris, France, 916-919.
8. ——— (with Pal, S. K.) (1986) : Thresholding for edge detection using human psychovisual response. *Pat. Recog. Lett.*, 4, 433-441.
9. ——— (with Rao, M. V. and Dutta Majumder, D.) (1986) : The new thinning technique based on distance measure. *Proc. Platinum Jubilee Conf. on Syst. and Signal Processing*, Bangalore, 370-373.
10. ——— (with Rao, M. V. and Chaudhuri, B. B.) (1986) : An efficient modified block coding technique. *Pat. Recog. Lett.*, 4, 8, 421-426.
11. Pal, S. K. (1986) : A Measure of Edge Ambiguity Using Fuzzy Sets. *Pat. Recog. Lett.*, 4, 1, 51-56.
12. ——— (with Chakraborty, B.) (1986) : Fuzzy Set Theoretic Measure for Automatic Feature Evaluation. *IEEE Trans. Syst. Man and Cybern.*, 16, 5, 754-760.
13. ——— (with Pal, N. R.) (1986) : Two Stage Segmentation Algorithm Incorporating Psychovisual Phenomena in Contrast-Homogeneity Measure. *Proc. Platinum Jubilee Conf. Syst. and Signal Processing*, Indian Inst. of Sci., Bangalore, 366-369.

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14. ——— (with Pramanik, P. K.) (1980) : Fuzzy Measures in Determining Seed Points in Clustering. *Pat. Recog. Lett.*, 4, 3, 159-164.
15. Parui, S. K. (with Sarma, S. E. and Dutta Majumder, D.) (1986) : How to discriminate shapes using the shape vector. *Pat. Recog. Lett.*, 4, 201-204.
16. Pathak, A. (with Pal, S. K.) (1980) : A Generalised Learning Algorithm Based on Guard Zone. *Pat. Recog. Lett.*, 4, 2, 63-69.
17. ——— (with Pal, S. K.) (1986) : X-ray Grammars in Syntactic Recognition of Skeletal Maturity from X-rays. *IEEE Trans. Syst. Man and Cybern.*, 16, 5, 657-667.

*Geological Studies*

1. Jain, S. L. (1986) : New pelomedusid turtle (Pleurodira : Chelonina) remains from Lameta Formation (Mastrichtian) at Dongargaon (Central India) and a reviews of pelomedusida from India. *J. Palaeont. Soc. India*, 30, 63-75.
2. ——— (1986) : Recent dinosaur discoveries in India, including egg-shells, nests and coprolites. *First Int. Symposium on Dinosaur tracks and Traces*, Abstr. (Ed. D. D. Gillette), Albuquerque, New Mexico, 17.
3. ——— (with Roy Chowdhury, T.) (1987) : Fossil vertebrates from the Pranhita-Godavari Valley (India) and their stratigraphic correlation. Gondwana 2 Six : (Proc. Sixth Int. Gondwana Symposium) Stratigraphy, Sedimentology and Palaeontology, Geological Monographs (American Geophysical Union) (Ed. G. D. McKenzie), 41, 219-228.
4. Rudra, D. K. (with Maulik, P. K.) (1988) : Trace fossils from the freshwater Kota limestone of the Pranhita-Godavari Valley, South Central India. Proc. XI Indian Colloq. on Micropal & Stratigraphy, Part II : Stratigraphy & Microplan. *Bull. geol. min. metall. Soc. India*, 54.
5. Saha, D. (1986) : Polyphase deformation of the Precambrian rocks near Kherwara, Udaipur district, Rajasthan. *Q. J. geol. min. metall. Soc. India*, 58, 2, 81-98.
6. ——— (with Ghosh, G.) (1986) : Tectonic setting of Proterozoic sediments around Samanpalli, Godavari Valley—a preliminary report. *Abstr. VI Convention, Indian Association of Sedimentologists on Sedimentation and Tectonics in Indian Subcontinent*; 82.

*Physics*

1. Gupta, A. B. (1980) : Cryosurgery and Dermatology. *Indian J. Derm.*, Special Issue. 94-104.
2. ——— (1987) : Photometric Measurement of casual level Sebum in Acne Vulgaris. *XV natl. Conf. IADV and L.*, Abstr., 1.

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3. ——— (1987) : Effect of Cleaners on Skin Surface PH. XV *natl. Conf. IADY and L*, Abstr., 2.
4. Mukherjee, S. (with Gupta, A. B.) (1987) : Response to thermal stresses in psoriasis of hand. XV *natl. Conf. IADY and L*, Abstr., 10.

Biological Sciences

ANTHROPOMETRY AND HUMAN GENETICS

1. Basu, A. (with Roy, S. K., Mukhopadhyay, B., Bharati, P., Gupta, R. and Majumder, P. P.) (1986) : Sex bias in intra-household food distribution : roles of ethnicity and other socioeconomic characteristics. *Cur. Anthrop.* (Chicago), 27, 536-539.
2. Malhotra, K. C. (with Kamali, M. S. and Chakraborty, R.) (1986) : Diversity in palmar pattern ridge counts among 12 Iranian populations. *Am. J. Phys. Anthropol.*, 70, 443-455.
3. ——— (with Kamali, M. S. and Chakraborty, R.) (1986) : Ethnic variation in hypothenar triradii. *Homo*, 36, 260-262.
4. ——— (with Mukherjee, B. N., Reddy, A. P. and Vijayakumar, M.) (1986) : Pattern of social and geographical distribution of transferrin sub-type polymorphism in India. *Hum. Hered.*, 36, 113-118.
5. ——— (with Singh, K. S., Mukherjee, B. N., Walter, H., Lindenberg, P., Gilbert, K., Dannewits, A., Banerjee, S., Roy, M. and Dey, B.) (1986) : Genetic markers among Meiteis and Brahmins of Manipur. *India. Hum. Hered.*, 36, 177-187.
6. ——— (with Walter, H. and others) (1986) : Investigations on the variability of haptoglobin, transferrin and GC polymorphism in Assam. *India. Hum. Hered.*, 36, 388-396.
7. ——— (with Chakraborty, R. and others) : Gene differentiation among ten endogamous population groups of West Bengal, India. *Am. J. Phys. Anthropol.*, 71, 295-309.
8. ——— (with Reddy, A. P., Mukherjee, B. N. and Vijayakumar, M.) (1986) : *Am. J. Phys. Anthropol.*
9. ——— (with Reddy, M. and Chopra, V. P.) (1987) : Mating structure of the Vadde, a fishing community in Andhra Pradesh, India. *Biology and Society*, 4, 29-39.
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4. Mukhopadhyay, B. K.: *On a prospective approach to collect data on live births. Indian Social Science Congress Bombay, October, 1986.*

### *Economic Research*

1. Chattopadhyay, M.: *Class differentiation and agrarian mobilization. World Congress of Sociology, held in Delhi during 18–23 August 1986.*
2. Dasgupta, D.: *Administering input prices. Second Conference on Economic Theory and Related Mathematical Methods held at the Indian Statistical Institute (Delhi Centre), in February 1987.*
3. ———: *On the usefulness of high wages on the rate of private investment: the Keynesian story. Conference on Approaches to Issues in Economic Development, held at the Centre for Economic Studies, Presidency College, Calcutta in March 1987.*
4. Dhar, Arpita. (with Dattachoudhury, T.): *Export instability and trade policy: A case study of India. Conference on Approaches to Issues in Eco-*



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conomic Development held at the Centre for Economic Studies, Presidency College, Calcutta in March 1987.

5. Maiti, P. : Marketable surplus and the neoclassical dual economy model, *Conference on Approaches to Issues in Economic Development*, held at the Centre for Economic Studies, Presidency College, Calcutta, in March 1987.
6. Neogi, C. : Use of mobility matrix in the study of industrial concentration and structural change in the Indian corporate sector 1951-80. 24th *Indian Econometric Conference* held at Ahmedabad during 8-10 January, 1987.
7. Sengupta, A. K. : Non-traded inputs and the estimates of Effective Rate of protection. *Eighth International Input-output Conference* held in Japan during April 28-May 2, 1986.

*Planning (Delhi)*

1. Bhat, L. S. : Subregionalisation of the Himalaya. *Proceedings of the Rural Energy Conference for Integrated Mountain Development 1986*, Tata Energy Research Institute, New Delhi.
2. ——— : Spatial strategy for planning at the district level. 8th *Indian Geography Conference*, Srinagar, 1986.
3. Dutta, Bhaskar (Gangopadhyay, S.) : Optimum subsidy policies in a dual economy with growth and unemployment. (invited paper) 8th *World Congress of the International Economic Association*, Delhi, 1986.
4. ——— : Egalitarianism under incentive constraints. *Conference on Economic Models and Distributive Justice*, Facultes Universitaires Saint Louis, Brussels, Belgium, 1987.
5. Minhas, B. S. : Estimating food crop acreages and yields : Indian experience and its relevance in Africa (Read on Invitation). *Workshop on Statistics in support of African Food Strategies and Policies*, Brussels, 1986.
6. ——— : On the reliability of the available estimates of private consumption Expenditure in India. *Seminar of the The Indian Association for Research in National Income & Wealth*, Bhopal, 1986.
7. ——— : On the incidence of poverty in rural India (invited paper). *Seventy-Fourth Indian Science Congress*, Bangalore, 1987.
8. Mukherjee, Partha N. : Development dilemmas : Towards a conceptualisation of societal development. *National Seminar on Social Development : Processes and Consequences* organised by Department of Sociology, Punjab University, Chandigarh, January 8-10, 1987.
9. Ray, Debraj : On the measurement of undernutrition. *University of Warwick Summer Workshop in Economic Development*, June 1986.

#### INDIAN STATISTICAL INSTITUTES

10. ———: Adapting the undernutrition. *UNU/WIDER Conference on Food and Hunger, Helsinki, 1988.*
11. ———: Learning-by-doing and increasing returns to scale. *Second Conference on Economic Theory and Related Mathematical Methods, I.S.I. Delhi, February 1987.*
12. Sarasdamoni, K.: Women's empowerment: The Chinese experience. *All India Seminar on Utilization of Women Power for Development*, organised by Kerala Sociological Society, 1986.
13. ———: Human resource development: Changing characteristics of women's participation in the labour market. *Conference on Pattern of Female Employment: The Asian Experience*, organised by UNESCO, U.N. International Research and Training Institute for Advancement of Women, I.S.I. and Nehru Memorial Museum, New Delhi, 1986.
14. Sarma, Atul (with Ram Kewal): Income, output and employment linkages and import intensities of manufacturing industries in India. *24th Annual Conference of the Indian Econometric Society* held in Ahmedabad during January 8-10, 1987.
15. ——— (Chetty, V. K., Pradhan, B.): Money, debt & taxes: Some implications for Growth and Distribution. Seminar on *Approaches to Issues in Economic Development* organised by Centre for Economic Studies, Presidency College, Calcutta, during March 6-8, 1987.
16. Verma, S. D.: The problem of accommodation in railway travel. *International Conference on Transportation System Studies*, New Delhi, 1986.

#### *Economic Analysis (Bangalore)*

1. Iyengar, N. S. (with Vani, B. P.): The Extreme disparity ratio and its economic applications—An illustration from NSS data. 1986 Australasian meetings of the Econometric Society, Melbourne, August 24-26, 1986.

#### *National Income*

1. Roy, Biswanath: Distribution of wage income in some consumer goods industries in India. *27th Annual Conference of Indian Society of Labour Economics* at University of Mysore during 11-13 April 1986.
2. ———: Industrial Policy and trade union activities in West Bengal. *28th session of the Indian Labour Economics Conference* held at Trichirapalli, Tamilnadu during January 16-18, 1987.
3. ———: Problems of Public Sector resource mobilisation in West Bengal. *7th Annual Conference of Bangiya Arthaniti Parishad* held at University of Calcutta during 7-8 March 1987.

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4. Majumdar, Krishna : International inequality in the development indicators. 24th Indian Econometric Conference held at Ahmedabad during January 8-10, 1987.
5. ——— : Wage share in a developing economy with special reference to India. 28th session of the Indian Labour Economics Conference held at Triohirapalli, Tamilnadu during January 16-18, 1987.
6. Roy, Bina : Growth of national income and capital formation in India during the period 1850-51 to 1900-01. Accepted for the 20th Conference of the International Association for Research in Income and Wealth, to be held in Rome, Italy, 23-29 August 1987.

*Pre-Census Population Studies*

1. Bhattacharya, D. : Glimpse on the sociological writings in Bengali upto 1900. 49th session of the Indian History Congress, Srinagar, 7-10 October 1986.
2. Deb Roy, Rama : Some aspects of Economic Drain in India During the British Rule. 49th session of the Indian History Congress Srinagar, 7-10 October 1986.

*Sociology*

1. Biswas, S. K. : What future awaits the aged of northeast India? *Proc. Workshop on North-East India 2000 A.D. : A perspective for Futurology*, North-East India Council for Social Science Research, Shillong, 3-5 April 1986.
2. ——— : What type of residence the urban retired expect ? *Proc. National Seminar on Population, Family and Culture, National Organisation for Family and Population Welfare*, Bhubaneswar 21-23 May 1986.
3. ——— : A comparative study of employment situation of the aged. *Research Committee on Sociology of Ageing, XI—World Congress of Sociology*, Delhi, 18-22 August 1986.
4. ——— : Health care of the elderly in rural Bihar. *Third National Conference on Ageing*. Hyderabad, 26-28 November 1986.
5. Bandyopadhyay, S. (with Donald von Eschen) : Caste, class mobility and development : an empirical challenge to stand and theory. International Seminar on *Social Change in South Asia*, organised by Bangladesh Sociology Association, Dhaka, 18-20 March 1987.
6. ——— : (with Donald von Eschen) : The impact of a social movement : The left Front in power in West Bengal. International Seminar on *Social Change in South Asia*, organised by, Bangladesh Sociology Association, Dhaka, 18-20 March 1987.
7. Chakrabarti, P. (with Bhattacharya, D. and Chakraborty, Ajita) : Neurosis and role-conflict of women. 39th Annual Conference, Indian Psychiatric Society, Calcutta, 7-10 January 1987.

#### INDIAN STATISTICAL INSTITUTE

8. Chattopadhyay, K. : Some thoughts on social ecology and societal development. International Seminar on "Environment and 21st Century", held at Institute of Oriental and Orissan Studies, Cuttack, during 12-15 December 1986.
9. Dasgupta, A. K. : Perception of rebel peasants in Bengal during the early colonial period. Post-Session of the XI-World Congress of Sociology, at ISI, Calcutta, 26-28 August 1986.

#### *Psychometry*

1. Ghosh A. : A study of managerial skill in two different functional groups of managers. 24th Annual Conference of Indian Academy of Applied Psychology, held at Waltair in March 1987.

#### **Statistical Quality Control and Operations Research**

1. Chakraborty, S. C. : An approach to reorganisation of Statistical education in schools. National Seminar on curriculum for Higher Secondary Education. Delhi.
2. Date, M. (with Soman, R. and Kulkarni, N. M.) : Optimisation of process parameters in the manufacture of a pesticide to increase yield and improve quality. National Convention of the IAQR at Pune held in December 1986.
3. Hands, S. S. : Quality improvement of rotor bars—A case study. International convention of Quality Circles organised by the Korean Standards Association, Seoul during October 1986.
4. Iyer, V. Narayana : Quality Audit'. One-day Quality Management Seminar jointly organised by the Kerala State Productivity Council and Kerala Management Association on 27 November 1986.
5. Lakhmansamy, M. V. : Challenge of Quality. : Seminar on Quality improvement and Quality problems sponsored by the National Productivity Council, Bombay and the Govt. of Maharashtra on 18 November 1986.
6. Lakshminantham, P. R. : QC Circle promotion in developing countries—Maladies and Remedies. International Convention on Quality Circles organised by the Korean Standards Association, Seoul during October 1986.
7. Mukherjee, S. P. : The control of incidence of defect in case of defects interface : Sent for presentation at the ICQC 1987 Tokyo to be held during 20-23 October 1986.
8. Majumdar, S. K. (with Banerjee, K. K.) : Study on improving the functional performance of a selected model of ceiling fan. Accepted for presentation at the ICQC 1987, Tokyo to be held during 20-23 October 1986.
9. Mohan, A. : Improvement of yarn quality through optimisation of blow Room performance. National Convention of the IAQR Pune held in December 1986.

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10. Nankana, A. N. : Quality systems organising to prevent errors and defects. Seminar on Quality Assurance and Improvement-Today and Tomorrow Organised by IAQR at New Delhi.
11. Pal, B. K. (with Mahagoankar, G. S., Bhattacharjee and Ray, Rana) : Composition and process optimisation to improve yield of a porcelain shell. Seventh National Convention of IAQR at Pune held in December 1986.
12. Rau Y. R. : Quality strategy for export growth. Seventh National Convention of IAQR at Pune held in December 1986.
13. ——— : Quality cost reporting—An introspection. International Conference Quality Control to be held during 20-23 October 1987 at Tokyo, Japan.
14. Sett, Ranjan. : Time series forecasting of monthly tea production in India. Seventh National Convention of IAQR at Pune held in December 1986.
15. Sundara Raju, S. M. : Approach to Q. Systems and improvement : Conference of Applied Statistics, Madras Centre held in October 1986.
16. ——— : Quality assurance and automated technology. Top Management Seminar, Hindustan Teleprinters and Dept. of Telecommunication held in November 1986.
17. Venkatappaiah, J. : Reliability improvement through minute analysis. 40th ASQC Conference at Anaheim, California, USA during 19-21 May 1986.

Library, Documentation and Information Sciences

1. Bhattacharyya, G. : Foundations of library cataloguing. *Workshop on Library Techniques*, organised by the Central Board of Secondary Education in Bangalore during 10-21 February 1987.
2. ——— : Integrated approach to information services. (key-note address). *Workshop on Information Service Management in ICAR Institutes*, organised by the National Academy of Agricultural Research Management, Hyderabad, 8-11 July 1986.
3. ——— : Study of subject for information work and service. *Seminar on Study of Subjects for information Work and Service*, organised by Govt. Polytechnic for Women, Bangalore, 21-22 December 1986.
4. ——— : Universe of knowledge ; structure and development : Its relevance in MLISC curriculum in view of recent developments in library and information science. *National Seminar on Universe of Knowledge* organised by Osmania University, Hyderabad, 25-28 November 1986.
5. Gopinath, M.A. : Criteria for evaluation of hardware and software for micro-computer usage in libraries. *Workshop on Microcomputer application to libraries*, Madras, 17-22 February 1987.

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6. ——— : Education for Library and Information Science : Inputs from computer-communication technology. *Seminar on Library Automation*, organised by the Madras Library Association, held at CLRI, Madras, 19-20 June 1986.
7. ——— : Syntactic modelling for information retrieval. To be presented at the *Seminar organized by Society of Information Science* to be held at CFTRI, Mysore, June 1987.
8. ——— : Towards development of a new design for knowledge representation in KBMS. *DRDO Seminar on Defence Science Information Network*, held at Delhi during 17-18 February 1987 under the auspices of DESIDOC, Delhi.
9. Ravichandra Rao, I. K. : Training programmes to develop manpower in the area of applications of microcomputers to library and information field, *IASLIC Seminar held at BHU* during 28-31 December 1986.
10. ——— : Use of computers in cataloguing. To be presented at the *Seminar on Library Automation* organised by the Madras Library Association held at CLRI, Madras during 19-20 June 1987.
11. Seetharama, S. : Information strategies for rural development. *International Seminar on Development Communication* held at Pune during 12-14 August 1986.
12. ——— : Role of information analysis and consolidation in the repackaging of information. To be presented at *UGC Sponsored Symposium at Rewa*, 1987.
13. ——— : Teaching library and information science : Teaching styles and methods. *National Seminar on Library and Information Science Education in India : New Perspectives* held at Trivandrum during 10-12 December 1986.
14. ——— : Towards zero-based budgetting in specialist libraries and information centres. *IASLIC Seminar* held at BHU during 27-31 December 1986.
15. ——— : Financial planning of libraries and information centres. *IASLIC Seminar* held at BHU during 27-31 December 1986.

#### PROJECT REPORTS SUBMITTED

##### Applied Statistics, Surveys and Computing

1. Adhikari, A. K., Bandyopadhyay, S. and Pal, S. K. : A Study of fishermen in West Bengal 1985-86. (Printed by Reprography Unit, ISI), pages 1-317.  
*Planning (Delhi)*
1. L. S. Bhat : "A study on strategy for integrated Rural Development—A case study of North Kanara District", a project sponsored by the Indian Council of Social Science Research has been completed.
2. C. Juyal : A report on "Survey on family planning : awareness attitudes and practices among Members of Parliament" has been completed and submitted to the Family Planning Foundation.

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3. K. Saradamoni : The report on the Project "Women and Rice Cultivation" was submitted to the Indian Council for Social-Science Research ; and was accepted by the Council's Research Committee.

TECHNICAL REPORTS

Theoretical Statistics and Mathematics

1. Barua, R. : A note on  $2ac(E_1)$ , No. 2/87, 9 pages, cyclostyled.
2. Datta, B. : Relations between Fueter structure, Yano's  $f$ -structure and foliations on smooth manifolds. No. 1/87.
3. Mishra, G. (with Douglas, R. G.) : Some calculations on Hilbert Modules, (Preprint).
4. ——— (with Sastry, N. S. N.) : Extremal problems, contractive modules, (preprint).
5. Parthasarathy, T. (with Sinha, S.) : Existence of stationary equilibrium strategies in non-zero sum discounted stochastic games with uncountable state space and state independent transitions. 11 pages, cyclostyled.
6. Ravindran, G. (with Parthasarathy, T.) : Global univalence without assuming continuous differentiability. Cyclostyled.
7. Scott, David. : On the Pompeiu problem on Lie groups.
8. Sitaram, A. (with Pricio, J. F.) : Local uncertainty inequalities for groupe-II.
9. Tripathi, T. P. (with Singh, H. P. and Upadhyay, L. N.) : Improved estimators for population mean based on double sampling. 16 pages, cyclostyled.

Applied Statistics, Surveys and Computing

1. Arnab, R. : Variance estimation in multistage sampling. No. ASC/86/17.
2. ——— : On a use of stratified sampling in optimal estimation. No. ASC/86/13.
3. Bandyopadhyay, Shibdas. : In-service statistical Training in Academic Institutions. Paper for ESCAP/SLAP Expert Group Meeting on Statistical Education and Training, 18-22 May 1986, Bangkok, reproduced as a mimeographed technical report.
4. Basu, Tapas Kumar (with Ganguly, S., Sarkar, S. K. and Banerjee, R. N.) : Effects of anti diabetic drugs SULFONYL UREA GROUP at the protein and immunoglobulin levels of maturity onset human diabetics. No. ASC/86/14.
5. ——— : Low serum cholesterol level—A health hazard in the child population of rural Ajodhya hills area.

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6. ——— (with Ganguly, S., Sarkar, S. K., Banerjee, R. N., Das, S., Jha, S. N. and Prasad, M.): A Study of ABO ASSOCIATIONS WITH NUTRITIONAL and Infective variables in a tribal population of Singhbhum District in the State of Bihar, India. No. ASC/86/16.
7. Chaudhuri, Arijit (with Adhikari Arun Kumar): On Sampling Strategies with linear randomized responses. No. ASC/87/2.
8. ——— (with Chandra, Noma): A test for Weibull populations. No. ASC/87/1.
9. Mukherjee, Bishwa Nath (with Sarkar, S. K.): A multivariate study of distributions of zooplankton in space and time in Hooghly estuary, West Bengal, India. No. ASC/86/8.
10. ——— (with Mukhopadhyay, B.): A study of digit preference and quality of age data in Turkish censuses. DRU Publication No. 85.
11. ——— (with Maiti, S. S.): Estimation and testing of Toeplitz covariance structures. No. ASC/86/9.
12. ——— (with Maiti, S. S.): Convergence of maximum likelihood solution for structural analysis and patterned covariance matrices. No. ASC/86/10.
13. Mukherjee, Biswa Nath (with Maiti, S. S.): Explicit maximum likelihood estimators for the Toeplitz correlation structures. No. ASC/86/12A.
14. ——— (with Maiti, S. S.): On some properties of positive definite Toeplitz matrix. No. ADC/86/18.
15. Mukhopadhyay, A. C. (with Bhagwandas): A Series of SGDD's processing dual property and balanced weighing matrices. No. ASC/86/11.
16. ——— (with Bagchi, S.): Optimality in the presence of two factor interactions among the nuisance factors.
17. Mukhopadhyay, Parimal: Effect of sample size on unbiased sampling strategies. No. ASC/86/15A.
18. ———: Asymptotic properties of a generalized predictor of finite population variance under probability sampling. No. ASC/86/12.
19. Pal, Manoranjan.: Indices of growth. No. ASC/86/12.
20. Sengupta, Ashis.: On admissibility of tests in multivariate analysis. No. ASC/86/20.

## Physical and Earth Sciences

### *Electronics and communication sciences*

1. Das J. (with Dutta Majumdar, D., Deb, N., Chowdhury, S., Chakraborty, K. and Sen, A. K.): On the design and development of ACDAR. No. ECSU/2/86.



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2. ——— (with Dutta Majumder, D. Dob, N., Chowdhury, S., Chakraborty, K. and Son, A. K.): Statistical studies on T.V. signal propagation in fringe region. No. ECSU/1/86.
3. Pal, S. K. (with Rosenfeld, A.): Image enhancement and thresholding by optimization of fuzzy compactness. *Tech. Report*, Univ. of Maryland, Centre for Automation Research CAR-TR-262, CS-TR-1767, DCR-86-03723.

*Geology*

1. Ghosh, G.: Tarur Nala Formation—a deformed proterozoic formation of the Godavari valley. No. P & E/Geo-01-86. Cyclostylod.

**Biological Sciences**

*Anthropometry and Human Genetics*

1. Bhattacharya, S. K. (with Gupta, R. and Piplai, C.): Intestinal parasitic infestation among the tea labourers in Duars, West Bengal: Temporal pattern. No. *Anthrop./4/87*.
2. ——— (with Piplai, C., Majumder, P. P. and Gupta, R.): A study of resting blood pressures among two migrant groups living in similar ecological conditions in Jalpaiguri district, West Bengal, India. No. *Anthrop./5/87*.
3. Gupta, R. (with Basu, A., Pawson, I. G., Bharati, P., Mukhopadhyay, B., Mukhopadhyay, S., Roy, S. K., Majumder, P. P., Bhattacharya, S. K., Bhattacharya, K. K. and Das, S. K.): Altitude and human biology: A comparative study of Himalayan, Andean and Ethiopian data. No. *Anthrop./3/87*.
4. Roy, S. K. (with Majumder, P. P.): A note on variation in work output of pluckers in tea gardens of northern West Bengal. No. *Anthrop./2/86*.

*Leaf Protein*

1. Bagchi, D. K. (with Banerjee, A.): Studies on plant growth and pod development in winged beans, *Psophocarpus tetragonolobus* (L) D.C. No. *Leaf Pro/1/87*.
2. Chanda, S. (with Chakraborti, S.): Recycling of leaf protein By-product for cultivation of yeasts. No. *Leaf Pro/3/87*.

**Social Sciences**

*Demography*

1. Ghosal, A. K. (with Sarkar, B. B.): Problems and prospects of small family in India. DRU Publication No. 86.
2. Guha Roy, S.: Population perspective of North-East India in 2000 A.D. DRU Publication No. 84.

### INDIAN STATISTICAL INSTITUTE

3. Malaker, C. R. (with Guha Roy, S.): Reconstruction of Indian life tables for 1901-81 and projections for 1981-2001. (Mimeographed)
4. Mukherjee, B. N. (with Mukhopadhyay, B. K.): A study of digit preference and quality of age data of Turkish censuses. DRU. Publication No. 85.

#### *Economic Research*

1. Chakravarty, Satya, R.: Maximization of social welfare and its income distribution implication. *Tech. Rep. No. ERU/3/86.*
2. Chakrabarty, Snigdha.: A scheme for the defining of agriculture regions in West Bengal—An exercise in the application of cluster analysis. *Tech. Rep. No. ERU/9/86.*
3. Chattopadhyay, Nachiketa.: On market structure and durability of durable goods. *Tech. Rep. No. ERU/1/87.*
4. Coondoo, Dipankar.: Multiple Representative consumers. *Tech. Rep. No. ERU/5/86.*
5. Coondoo, Dipankar.: Cereal Price and distributional inequalities—The case of rural India. *Tech. Rep. No. ERU/6/86.*
6. Coondoo, Dipankar.: A class of value share functions. *Tech. Rep. No. ERU/7/86.*
7. Coondoo, Dipankar.: Trigonometric Engel curve forms. *Tech. Rep. No. ERU/8/86.*
8. Dasgupta, Dipankar.: Reflection on administered prices. *Tech. Rep. No. ERU/4/86.*
9. Dutta, Bhaakar.: Covering sets and a new condorcet choice correspondence. *Tech. Rep. No. ERU/2/86.*
10. Maiti, Pradip.: On a neoclassical model of a dual economy with price and income elastic demand for food. *Tech. Rep. No. ERU/2/87.*
11. Majumder, Amita.: Use of pooled data—An empirical note on demand analysis. *Tech. Rep. No. ERU/10/86.*
12. Sarkar, Nityananda.: Risk matrix comparison between the ordinary least squares estimator and the mixed regression estimator in misspecified linear models. *Tech. Rep. No. ERU/3/87.*

#### *Planning (Delhi)*

1. Das, Pinaki (with Gangopadhyay, S.): Competition among traders with different characteristics. *Tech. Rep. No. 8703.*
2. Dutta, Bhaakar.: Equity in converse games. *Tech. Rep. No. 8617.*
3. Dutta, Bhaakar (with Ray, Debraj): Egalitarianism under incentive Constraints. *Tech. Rep. No. 8703.*

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4. Mihhas, B. S. : Estimating food crop acreages and yields, Indian experience and its relevance in Africa. Tech. Rep. No. 8606.
5. ——— (with Jain, L. R., Kansal, S. M. and Saluja, M. R.) : On the choice of appropriate consumer price indices and data sets for estimating the incidence of poverty in India. Tech. Rep. No. 8615.
6. ——— (with Kansal, S. M., Kumar, Jagdish and Joshi, P. D.) : On the reliability of the available estimates of private consumption expenditure in India. Tech. Rep. No. 8704.
7. Ray, Debraj. : The maintenance of community irrigation networks : some preliminary notes. Tech. Rep. No. 8701.

*National Income*

1. Roy, Bina. : Growth of national income and capital formation in India : 1850-51 to 1900-01. Tech. Rep. No. NIRU/1/87.

*Psychometry*

1. Chatterji, S. (with Mukherjee, Manjula) : Effect of Perceived Body Image, self esteem, expected performance, self assessment and anxiety on performance in group discussion in a real selection situation.

**Statistical Quality Control and Operations Research**

1. Chakraborty, T. K. : Goal Programming approach for designing single sampling attribute plans when sample size is fixed.
2. Chowdhuri, S. K. (with Sengupta, S.) : Bibliography on Quality control charts.
3. Ghosh, D. T. : The continuous Sampling Plan that minimises the amount of inspection.
4. Iyer, V. Narayana. : Cyclostyled lecture note in connection with the two-day quality circle Programme conducted at M/s. Indian Aluminium Company, Always (17 pages).
5. Mukherjee, S. P. : Optimum allocation of boreholes in geographical prospecting.
6. Mukherjee, S. P. : Exponentially decaying inventory in case of stochastic demand.
7. Pandey, R. J. : Promotional article "On a new approach to quality management".
8. Sengupta, S. (with Chowdhuri, S. K. and Majumdar, A.) : Booklet on Quality Controller Roop-Rokha in Bengali for use as teaching manual to the operators of Hindustan Cables Ltd.
9. Vankatapaiah, J. : Determination of Optimum Process conditions for Jelly filling of cables (Cyclostyled).

#### INDIAN STATISTICAL INSTITUTE

10. SQC Unit, Bombay : Course manual on SQC.
11. ——— : Course manual on Industrial Experimentation.
12. SQC Unit, Baroda : Course manual on Seven Tools of QC conducted at Hindustan Brown Boveri Ltd.
13. ——— : Course Notes for one-day Appreciation Programme on Quality Management conducted at Gujarat Narmoda Valley Fertilizers Co. Ltd.
14. SQC Unit, Delhi : Course manual for the Supervisory Programme at HMT Ltd., Pinjore.
15. ——— : Lecture notes for the Summer Institute on Reliability organised at New Delhi during June-July 1988.
16. SQC T & P Unit, Calcutta : Manual (in Bengali) for the course conducted at Hindustan Cables Ltd.
17. ——— : Course Note entitled Quality Circle—Principles and Methods for the appreciation programme conducted at MECON (I) Ltd.
18. SQC Unit, Pune : Course manual on SQC for the in-Plant training Programme for the Shop floor level Personnel of M/s. Bajaj Auto Ltd. (produced in 12 volumes).
19. ——— : Course manual on Industrial Experimentation and concurrent design for in-Plant Programme conducted for the Engineers of Bajaj Auto Ltd.
20. ——— : Course manual on SQC for the in-plant Programme conducted for the personnel of the middle management level of Ammunition actory, Khadki
21. ——— : Course manual on SQC for the in-plant Programme conducted for the Shop floor level personnel of Hindustan Cocoa Products Ltd. (Produced in 4 Volumes).
22. ——— : Course manual on SQC for the in-Plant Programme conducted for the Plant Operators of Sudarshan Chemical Industries Ltd.

#### Library, Documentation and Information Sciences

1. Devadason, F. J. : Computerized deep structure indexing system. FID/CR Report No. 21. INDEKS VERLAG. West Germany.
2. Gopinath, M. A. : Design of information retrieval systems : Knowledge representation aspects. (Report presented to the Council for International Exchange of Scholars. (Washington) and United States Educational Foundation in India, New Delhi).
3. Ravichandra Rao, I. K. : Information Retrieval. Course material for the second short term course on library automation. Library automation. course material for the first short term course on library automation.

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6. Ph.D./D.Sc. Degrees

A. Ph.D./D.Sc. Degrees Awarded

The following is the list of Ph.D./D.Sc. degrees obtained by the Research Fellows and Research Associates of the Institute.

Teaching and Training

1. Rana Barua : "Studies in set-theoretic hierarchies : from Borel sets to  $R$ -sets", degree awarded by the I.S.I.  
*Supervisor* : Professor A. Maitra.
2. Sumanta Guha : "Extensions of Gromov Theory", degree awarded by the I.S.I.  
*Supervisor* : Dr. Amiya Mukherjee.
3. B. Gupta : "On the design of easily testable logic circuits for detection of stuck-at and bridging faults", degree awarded by Calcutta University.  
*Supervisor* : Professor A. K. Chaudhuri
4. Swapan Kumar Parui : "Some studies in analysis and recognition of 2-dimensional shapes", degree awarded by the I.S.I.  
*Supervisor* : Professor D. Dutta Majumdar.
5. Amita Majumdar : "Statistical models for consumer behaviour in India", degree awarded by the I.S.I.  
*Supervisor* : Dr. Dipankar Coondoo.

Statistical Quality Control and Operations Research

The following is the list of Ph.D./D.Sc. degrees obtained by the members of staff of the Institute.

6. Ram Jit Pandey : "Certain generalisations of acceptance sampling plans by attributes", degree awarded by the I.S.I.  
*Supervisor* : Professor B. P. Adhikari.

B. Theses submitted for Ph.D./D.Sc. Degrees

The following is the list of Ph.D./D.Sc. theses submitted by the Research Fellows and Research Associates of the Institute.

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### Teaching and Training

1. Rite Saha-Ray : "Studies on optimality of some classes of designs", I.S.I.  
*Supervisor* : Professor Bikas Kumar Sinha.
2. G. Ravindran : "Global univalence and completely mixed games", I.S.I.  
*Supervisor* : Dr. T. Parthasarathy.
3. Sm. Sikha Bhattacharyya : "Some applications of perturbation technique in plasma physics", University of Calcutta  
*Supervisor* : Dr. R. K. Roychoudhury.
4. V. Narasimhan : "An essay on the formation and dynamics of the marketed Surplus and price of food-grains", I.S.I.  
*Supervisor* : Dr. Sanjit Bose.
5. Jagabandhu Saha : "A contribution to inventory theory", I.S.I.  
*Supervisor* : Dr. Sanjit Bose.
6. Mrs. Shailaja Raghuprasad : "A quantitative analysis of poverty, inequality and consumer behaviour : The case of scheduled castes and Tribes of Karnataka", I.S.I.  
*Supervisor* : Professor N. S. Iyengar.
7. Vijay H. Nayak : "Analysis of household expenditure : Treatment of zero observations in the estimation of price responses", I.S.I.  
*Supervisor* : Professor N. S. Iyengar.

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

#### 7. TWENTYFIRST CONVOCATION

The Twenty first Convocation of the Indian Statistical Institute, held on 5 March 1987, was presided over by Shri Subimal Dutt, President of the Institute. Shri P. N. Haksar, Chairman of the Council of the Institute, welcomed the guests. Professor C. R. Rao, National Professor, delivered the Convocation Address, which was entitled "Uncertainty, Randomness and Creativity". Professor J. K. Ghosh, Director of the Institute, presented the annual review of research, teaching and training.

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The number of candidates awarded Ph.D., M.Tech., M.Stat., B.Stat. (Hons.) Degrees, Post-Graduate Diplomas in Applied Statistics, Associateship in Documentation and Information Science and Diploma in Professional Examinations in Statistics is given below :

Number of Candidates Awarded degrees and diplomas

| Degrees/Diplomas  | Number of candidates |
|---|----------------------|
| Doctor of Philosophy (Ph.D.)                                      | 7                    |
| Master of Technology in Computer Science (M.Tech)                 | 14                   |
| Master of Statistics (M. Stat.)                                   | 19                   |
| Bachelor of Statistics (Honours) (B. Stat. (Hons.))               | 12                   |
| Post-graduate Diplomas in Applied Statistics :                    |                      |
| (i) Statistical Quality Control and Operations Research, Calcutta | 13                   |
| (ii) Statistical Quality Control and Operations Research, Bombay  | 1                    |
| (iii) Statistical Quality Control and Operations Research, Madras | 12                   |
| Associateship in Documentation and Information Science, Bangalore | 8                    |
| Professional Examination in Statistics :                          |                      |
| (i) Junior Diploma in Statistics                                  | 4                    |
| Total :   | 90                   |

8. VISITING SCIENTISTS

A number of distinguished scientists from abroad participated in the research, training and other scientific activities of the Institute during the year. Some of them came to the Institute on invitation and spent fairly long periods at the Institute to assist in the regular research and teaching programme and some came for short periods in different assignments for giving lectures and participated in conference and seminars.

1. Mr. J. Fujii, Osaka University, Japan (8.5.86-24.4.87).
2. Professor C. G. Khatri, University of Ahmedabad, Ahmedabad (22.7.86-26.7.86).
3. Professor M. G. Nadkarni, University of Bombay, Bombay (23.7.86-27.7.86).
4. Dr. S. Huda, King Saud University, Saudi Arabia (7.8.86-20.8.86). Lecture : "Optimal design for the estimation of variance components".
5. Professor V. Patak, Institute of Mathematics, Academy of Sciences, Czechoslovakia (19.11.86-25.11.86). Lectures : (i) "Non discrete induction and Newton method" and (ii) "Combinatorial methods in analysis".

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6. Professor H. Helson, University of California, USA (20.12.86-26.12.86).  
Lectures : (i) "Additive cocycles" and (ii) "Multiplicative cocycle".
7. Dr. S. Sutrardhar, Memorial University of Newfoundland, Canada (6.1.87).
8. Dr. V. M. Metrosov, Director of the Erkuak Computer Centre and Corresponding member of the USSR Academy of Sciences (28.12.86-5.1.87). Lectures : (i) "The technology of dynamical system modelling and optimization based on complex of programme packages"; (ii) "Analysis of dynamical properties of non-linear system" and (iii) "Dynamical modelling of industry of the administrative region".
9. Professor Frank Harary, University of Michigan, USA (12.5.86-15.5.86).  
Lecture : "On mathematical games for learning and research".
10. Dr. Y. A. Yashkin, Institute of Oriental Studies, USSR (24.12.86). Lecture : "Global Economic Problems".
11. Professor H. Morimoto, Osaka City University, Japan (13.12.86-10.1.87).  
Lecture : "Some problems concerning the existence of smallest field with certain separation properties".
12. Prof. Barry Wellman, Toronto University, Canada (10.8.86-11.8.86). Lecture : "Recent major developments in social network analysis".
13. Prof. N. K. Nijhawani, Director, Indian Council of Social Science Research, New Delhi (24.10.86). Lecture : "Organising social science data archive for eastern India".
14. Dr. Dennis Lewis, Association of Information Management, London (20.11.86-21.11.86). Lecture : "New trends in information management".
15. Prof. V. Nagi Reddy, Indian Institute of Management, Calcutta (24.86).  
Lecture : "Estimation of percentiles of finite population".
16. Prof. V. P. Chaubey, Concordia University, Montreal, Canada (30.4.86).  
Lecture : "Properties of product estimator".
17. Prof. R. Bharadwaj, Bombay School of Economics, Bombay (7.11.86). Lecture : "A structuralist approach to economic analysis".
18. Prof. P. S. R. S. Rao, University of Rochester, USA (10.7.86). Lecture : "Variance components".
19. Dr. Siddhartha Sahe, Princeton University, USA (22.7.86). Lecture : "The endogenous emergence of markets under strategic behaviour".
20. Dr. K. C. Das, Jadavpur University, Calcutta (22.7.86). Lecture : "Antieigenvalues and antieigenvectors of matrices".



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21. Prof. J. A. R. Halbrook, University of Guelph, Canada (30.10.86-25.11.86). Lectures : (i) "Quaternionic fractals", (ii) "Unitary invariance and spectral variation", and (iii) "Unitary invariance and spectral variation II".
22. Prof. Ashoke Kotwal, University of British Columbia, USA (25.11.86). Lecture : "Credit and insurance".
23. Prof. P. K. Miller, University of Paris, France (12.5.86). Lecture : "Non linear stochastic differential equations and quantum and quantum field theory".
24. Dr. R. Chandrasekaran, University of Texas, USA (25.8.86). Lecture : "Pseudo matoids".
25. Dr. K. G. Murthy, University of Michigan, USA (26.8.86). Lectures : (i) "Gravitational methods for linear programming"; (ii) "How difficult is it to compute a local minimum in simple nonconvex program ?—Realistic goals for algorithm".
26. Dr. Nguyen Van Thu, Institute of Mathematics, Vietnam (19.1.86-1.5.86). Lecture : "Prediction problems for strictly stationary processes in LP spaces".
27. Sri Indranil Sen Gupta, Department of Computer Science, Calcutta University, Calcutta (13.1.87). Lecture : "Vector testing of combinational circuits"
28. Prof. M. J. Moraveeki, University of Orgeon, U.S.A. (1st week of April 1988) and delivered a lecture.
29. Prof. A. S. Gupta, I. I. T. Kharagpur (16.6.86-20.6.86). Lecture : "Hydrodynamic Stability".
30. Dr. Subrata Das, IBM Thomas J. Watson Research Centre, Yorktown Heights, New York, U.S.A. (21-7.86-22.7.86). Lectures : (i) "Automatic speech recognition and acoustic processing". (ii) "Development of the first real-time large vocabulary speech recognizer".
31. Dr. Pradip Bose, IBM Thomas J. Watson Research Centre, Yorktown Heights, New York, U.S.A. Lecture : "Expert system for computer engineering problem".
32. Dr. Gillian, M. King, St. Hilda's College, The University Museum, Oxford (14.12.86-31.1.87). She visited the Institute under the INSA-Royal Society, London, exchange of scientists programme. During her visit, besides giving several lectures and seminars, Dr. King had extensive discussions with Institute scientists on problems of mutual interest in Palaeontology.
33. Dr. J. M. Dickins, Chairman, Subcommittee on Gondwana Stratigraphy, International Union of Geological Sciences (30.3.87). He had discussions with the members of the Geological Studies Unit regarding the forthcoming International Gondwana Symposium to be held in Brazil in 1988.

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34. Dr. Jorg Schbeider, Freiburg Mining Academy, DDR (5.9.86). Lecture : "Overlook of Geology of Upper Carboniferous—Lower Permian in Mid-Europe".
35. Dr P. K. Sirkar, Hony. Director of South Bihar Tribal Family Welfare and Development Project, Gomti, Bihar (19.2.87). Seminar given : "Small group of primitive tribes in Bihar and strategy of their action studies".
36. Dr. A. R. Banerjee, University Professor in Anthropology, Calcutta (4.4.86). Seminar given : "Blood group Incompatibility and Selection in Man".
37. Dr. Subrata Chakraborty, Department of Pre-History, Viswa Bharati, Santiniketan (15.1.87). Lecture : "Stone Age Pre-History of the kopai valley, Birbhum, West Bengal".
38. Dr. L. S. Sidhu, Professor and Head, Department of Human Biology, Punjabi University, Patiala, Expert in Physiological Anthropology and Sports Medicine (24.1.87-27.1.87). Held discussion about writing of a volume on human biology of Indian populations on invitation from the Oxford University Press, Oxford, on a collaborative basis. Also held discussion on undertaking collaborative field studies.
39. Dr. Radheshyam Bairagi, John Hopkins University, U.S.A. (since October 1986). Working on "nutrition and mortality".
40. Dr. Kailash Chandra Sharma, International Crops Research Institute for the Semi-Arid Tropics, Patancheru, Andhra Pradesh (10.7.86). Held discussions with Professor Iyengar and Dr. NSS Narayana.
41. Professor S. K. Ekambaram, Professor of Statistics (Retired), Madras (13.3.86). Seminar given : "Computer and Statistics".
42. Professor Kenneth J. Arrow, Stanford University, California, USA (Nobel Laureate in Economics) (21.11.80). Held discussions with the Faculty of the Economic Analysis Unit, Stat-Math Unit and other Units of the Indian Statistical Institute, Bangalore.
43. Dr. Subramanian Swamy, Harvard University, USA. Held discussions with Faculty of the Bangalore Centre.
44. Dr. P. A. V. B. Swamy, Federal Reserve Board, Washington, USA (27.1.87). Seminar given : "Measurement of Multicollinearity Effect" and held discussions with Faculty of the Economic Analysis Unit.
45. Professor Kirit Parikh, Indira Gandhi Institute of Development Research, Bombay. Held discussions with Faculty members of the Economic Analysis Unit and students of Bangalore Centre.

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46. Dr. K. Nagamma Roddy, Osmania University (30.3.87). While in Calcutta she had discussions with Professor-in-Charge, Social Sciences Division. She worked with the Scientific and Technical staff of the Linguistic Research Unit in the area of Acoustic Phonetics and, together with Dr. (Mrs) Alokamanda Mitter, she conducted a Two-Day Seminar on "Fundamentals to Articulatory and Acoustic Phonetics and their relevance to Speech Pathology".
47. Professor S. R. S. Varadhan, Courant Institute of Mathematical Sciences, New York, U.S.A. (4.8.86 to 8.8.86). Lectures : (i) "Large Deviations and hydrodynamic scaling limits" and also held informal discussions on diffusion processes.
48. Dr. David Scott, Department of Mathematics, University of Puget Sound, Tacoma, Washington, U.S.A. (9.8.86-21.4.87). He was an Honorary Visiting Fellow in the ISI Bangalore Centre. He gave a series of lectures on "Representations of  $SL(2, C)$ ".
49. Professor G. Marmo, University of Naples, Italy (4.8.86) visited the ISI Bangalore Centre and gave a lecture on "Tangent bundle geometry and Lagrangian mechanics".
50. Professor K. B. Athreya, Iowa State University, U.S. (15.9.86-24.12.86) visited the ISI Bangalore Centre. He gave lectures on "Harris Recurrent Markov Chains".
51. Professor J. de Sam Lazaro, University of Rouen, France (30.10.86) visited ISI Bangalore Centre and gave a lecture entitled "Some remarks on Gaussian processes with simple spectrum".
52. Professor V. Patak, Czechoslovak Academy of Sciences (29.11.86-4.12.86) visited the ISI Bangalore Centre and gave a lecture on "Combinatorial Methods in Analysis".
53. Dr. Mahesh Nerurkar, Department of Mathematics, Ohio State University, U.S.A. (22.12.86) visited the ISI Bangalore Centre and gave two lectures on "Ergodic Theory and Combinatorial Number Theory".
54. Professor Henry Helson, Department of Mathematics, University of California, Berkeley, U.S.A. (2.1.87-12.1.87) visited the ISI Bangalore Centre and gave lectures on "Additive Cocycles" and "Multiplicative Cocycles".
55. Professor J. V. Deahapande, Department of Statistics, University of Poona, Pune (6.1.87) visited the ISI Bangalore Centre and gave a lecture on "Aspects of positive ageing".
56. Professor G. Folland, Department of Mathematics, University of Washington, Seattle, USA (6.1.87-8.3.87) visited the ISI Bangalore Centre and gave a series of lectures on "Harmonic Analysis and Pseudo-Differential Operators".
57. Professor Chandler Davis, a well known mathematician from the University of Toronto (8.3.86-8.5.86). He gave two lectures at the Institute and two at the Department of Mathematics, University of Delhi. He held several discus-

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- sions with Dr. R. Bhatia and Dr. K. K. Mukherjee. He and Dr. Bhatia continued their collaborative work begun in 1980. During this period a joint paper "An extremal problem in Fourier Analysis with applications to operator theory" was written by R. Bhatia, C. Davis and P. Kocis.
58. Dr. Nguyen Van Thieu, Institute of Mathematics, Hanoi (4.4.86-12.4.86). He gave one seminar.
  59. Dr. James B. Robertson, Department of Mathematics, University of California, Santa Barbara (15.9.86-6.2.87). He worked on Finitary processes.
  60. Professor John Holbrook, University of Guelph, Canada, a well known mathematician working in functional analysis and operator theory (13.10.86-13.12.86). Continued his collaborative work with Dr. Bhatia. Gave four lectures at ISI Delhi Centre.
  61. Dr. (Mrs) A. R. Meenakshi, Annamalai University (1.8.86-29.8.86). She worked with Professor Mitra in the area of generalized inverse of matrices.
  62. Professor K. Varadarajan, Department of Mathematics, and Statistics, University of Calgary (24.11.86-30.11.86). He gave three lectures on Pseudo-mitotic groups.
  63. Professor Jean Marc Deshouillers, Mathematiques et Informatique, France (11.1.87-13.1.87). He gave a seminar.
  64. Professor T. E. S. Raghavan, University of Illinois, Chicago (15.12.86-2.1.87). He visited to work with Prof. T. Parthasarathy.
  65. Professor Stef Tjjs, Mathematisch Institute, Netherlands (15.12.86-1.1.87). He visited to work with Prof. T. Parthasarathy.
  66. Professor R. L. Hudson, Department of Mathematics, The University of Nottingham, Nottingham (3.2.87-30.4.87). He visited to work with Prof. K. R. Parthasarathy in the field of quantum stochastic processes.
  67. Dr. S. Pattnayak, Department of Mathematics, Sambalpur University (11.2.87-29.3.87). He visited to work with Prof. K. B. Sinha.
  68. Professor V. Plak, Czechoslovak Academy of Sciences, visited Delhi Centre for two weeks in December. He gave two talks in the Matrix operator Seminar. His visit was under the Cultural Exchange Programme between India and Czechoslovakia.
  69. Professor P. S. Puri, Purdue University, Indiana, USA is visiting the Institute since July 1986. He has been working on 'Statistical Inference in Reliability Theory', 'a matrix convergence theorem and applications in Probability', 'Queueing Theory', 'Stochastic modelling'. He has been collaborating with Dr. K. B. Sinha, Dr. James Robertson (who visited ISI) and Dr. Harshinder Singh of Punjab University.
  70. Dr. Sangit Chatterjee, Northeastern University, Boston (20.3.87). Lecture: "Computer Intensive Methods in Statistics".

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71. Professor S. M. Pollock, University of Michigan (June-July 1986) visited the SQC Unit at ISI Delhi Centre.
72. Professor K. G. Murty, University of Michigan, U.S.A. (June-July 1986) visited the SQC Unit at ISI Delhi Centre.
73. Shri R. Chandrashekar, University of Texas at Dallas, U.S.A. (June-July 1986) visited SQC Unit at ISI Delhi Centre.
74. Professor Walter Masang, President International Federation of Quality Control (29.10.86) visited the SQC T & P at Calcutta and delivered a lecture on "Quality Control in Federal Republic of West Germany". He has also delivered a lecture entitled "Quality Assurance and Improvement—today and to-morrow" at a seminar organised by the Max Mueller Bhavan in collaboration with the Indian Statistical Institute on 28 October 1986.

9. HONOURS, AWARDS AND SPECIAL ASSIGNMENTS

Professor J. K. Ghosh became a member of the National Board for Higher Mathematics for a second term of three years. He also served on various committees of the CSIR, UGC and the INSA.

Professor Somesh Das Gupta (Stat-Math) attended the meeting of the UGC Committee for Syllabus in Statistics, held at University of Gujarat, Ahmedabad during 27.3.87 to 29.3.87. He also attended the meeting of the Advisory Committee for planning and development of scientists and engineers, held at New Delhi under the auspices of the Department of Science and Technology, Government of India, New Delhi during the period 2.3.87 to 4.3.87.

Dr. K. R. Parthasarathy (Stat-Math) Member, U.G.C. Review Committee for North Eastern Hill University.

Dr. T. Parthasarathy (Stat-Math) received the Shanti Swarup Bhatnagar Prize for the year 1986 for Mathematical Sciences from the Council of Scientific and Industrial Research. This award is made for the work done in the theory of stochastic games.

Dr. B. N. Mukherjee (Applied Statistics, Surveys and Computing) continued to serve as a (a) member of the Scientific Advisory Committee of the Institute for Research in Medical Statistics, ICMR, New Delhi, (b) member of the Task Force, ICMR, (c) member of Project Screening Committee ERIC, NCERT and (d) member of the Advisory Committee of the Centre for Applied Statistics of the North Eastern Hill University, Shillong.

Dr. A. C. Mukhopadhyay (Applied Statistics, Surveys and Computing) continued as a member of the Steering Committee for Pavement Performance Study, CRRI.

Prof. P. Bandyopadhyay (Electronics) has been appointed a member of Committee for the Theoretical Physics Seminar Circuit sponsored by the Department of Science and Technology, Government of India.

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Shri Sisair Roy (Electronics) has been appointed as a reviewer for a project on 'Nelson's Stochastic Mechanics and Zero-point field in Stochastic Electrodynamics' by the National Science Foundations, Washington, D.C., U.S.A.

Prof. D. Dutta Majumder (Electronics and Communication Sciences) was awarded Fellowship of the Computer Society of India in CSI National Convention in January 1987 at Bombay. He was elected member of INSA Sectional Committee for three years.

Professor Dutta Majumder has been appointed Chairman of a Committee on 'Application of AI Techniques in Power Systems', by the Government of India, Department of Electronics. He continued to serve as member of the Governing Board of International Association of Pattern Recognition.

Dr. Sankar K. Pal (Electronics and Communication Sciences) was awarded Fulbright Post-doctoral Visiting Award to work at the University of California, Berkeley and the University of Maryland, College Park, USA. He was selected to act as a reviewer for the Indian Journal of Management and Systems in the field of Fuzzy Sets and System.

Dr. Pal was selected as a member of the board of Examiners in Horticulture, Calcutta University. He is also continued to serve as a member of the board of examiners in Computer Science, Calcutta University.

Mr. K. S. Ray (Electronics, and Communication Sciences) has been appointed as a co-opted member of a committee on 'Application of AI Techniques in Power Systems', by the Department of Electronics, Government of India.

Dr. S. Roy (Electronics and Communication Sciences) was selected for Fulbright Post-Doctoral Visiting Award to work for 4 months, at the Southeastern Massachusetts University, U.S.A. during 1987-88.

Professor S. L. Jain (Geology) has been nominated as a Honorary Foreign Member of the Group Francais d'etude du Gondwana, Institute of Palaeontology, Paris. He has also been nominated as a Member of Morrison Users Directory (MUD) at Dinosaur National Monument, Utah, USA, which entitles its members use of fossil reference material from Morrison Formation in USA. He continued to serve for the tenth consecutive year as Chairman, Working Group on Vertebrate Paleontology under the International Union of Geological Sciences (IUGS), Subcommittee on Gondwana Stratigraphy.

Dr. Dilip Saha (Geology) has been awarded H. C. Das Gupta Memorial Medal (1988) by the Geological, Mining and Metallurgical Society of India. Dr. Saha continued as Assistant Editor of the Quarterly Journal of the Geological, Mining and Metallurgical Society of India.

Professor K. C. Malhotra (Anthropometry and Human Genetics) (i) Elected President of the Indian Society of Human Genetics, (1987-88); (ii) Appointed Chairman, National Advisory Board, 'Save the Western Ghats—March'; (iii) Appointed

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Expert Committee Member on (i) Promotion and Development of Science and Technology for weaker Sections and (ii) Science and Technology Application for Rural Development, Department of Science and Technology ; (iv) Elected member organizing Committee, National Seminar on Mother-child Health Status and XII Annual Conference of Indian Society of Human Genetics, Calcutta, February—March 1987 ; (v) Appointed Editor, Modular Series in Human Genetics, Indian Society of Human Genetics ; (vi) Appointed a member of the editorial board of the Journal Gene Geography, Italy. Attended as a member of the Advisory board meeting of Development Alternatives held at Delhi on 6-7 March 1987 and (vii) Appointed a member of the UGC Committee on curriculum Development in Anthropology and attended meetings held at Ranchi in April and December 1986.

Professor S. K. Roy (Botany) served as (i) Member, Scientific Panel on Agricultural Economics, Statistics and Marketing of the Indian Council of Agricultural Research (ICAR), New Delhi ; (ii) Member, Adaptive Research Council in Agriculture, Government of West Bengal, Calcutta ; (iii) Member, Under-Graduate Board of Studies in Botany, University of Calcutta and (iv) Member of the Board of Advisers, Society for Research on Haematology and Blood Transfusion, Calcutta.

Dr. D. K. Bagchi (Leaf Protein) served as Secretary of the Indian Chapter of Society for Green Vegetation Research (SGVR) organised National Symposium on 'Green Vegetation Research' in collaboration with the Centre of Advanced Study in Botany at B.H.U., Varanasi from 27 to 29 November 1986.

Dr. C. R. Malaker (Demography) was nominated as a member of the advisory committee of the Centre for Applied Statistics, North East Hill University, Shillong.

Shri S. Guha Roy (Demography) was nominated as a convener, Eastern Chapter of the IASP.

Dr. N. Bhattacharya (Economic Research) continued to serve in the following capacities : (i) ISI's nominee on the Standing Committee of Central and State Statistician's Conference ; (ii) ISI's nominee on the Governing Council of NSS Organisation, Government of India. He also served as a member/chairman of several working groups set up by the Governing Council of the NSSO. He also served as Member of the Steering Committee of a study project entitled 'Highway Design Study—Part B, Pavement Performance Study', undertaken by the Central Road Research Institute, New Delhi.

Dr. R. Mukherjee (Economic Research) has been nominated to serve as the Institute's representative on the following two committees, viz., (i) the 'Technical Group' for recommending methodology for the estimation of income at district and rural/urban levels, set up by the Department of Statistics, Ministry of Planning, Government of India, and (ii) the 'Technical Committee' on Research and Surveys on Employment and Unemployment at the State Level, set up by the Development and Planning Department, Government of West Bengal.

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Dr. K. C. Majumdar (Economic Research) served as a member of the National Board on Higher Mathematics, set up by the Department of Atomic Energy, Government of India.

Professor B. S. Minhas (Planning, Delhi) has been reappointed for a second five year term, 1988-1990, as Chairman, Governing Council of the National Sample Survey Organisation, Government of India. He has also been elected for the third time to the Council of the Econometric Society.

Dr. Partha N. Mukherji (Planning, Delhi) served (i) Treasurer, Indian National Organising Committee of the XI World Congress of Sociology held in August 1988 and (ii) Secretary, Indian Sociological Society, 1987-89.

Dr. Atul Sarma (Planning, Delhi) served as (i) Member, Standing Advisory Committee on Petroleum & Natural Gas constituted by the Assam Government; (ii) Member, Indian National Committee of World Energy Conference, Calcutta; (iii) Member, Committee for Formulation of Employment Policy of Assam constituted by the Assam Government and (iv) Member, Task Force for preparation of a Plan for economic development of Assam.

Professor N. S. Iyengar (Economic Analysis, Bangalore) (i) has been nominated by the Indian Statistical Institute as its nominee on the "Academic Committee" of the National Institute of Rural Development, Hyderabad, for a period of three years from February 1987; (ii) has been invited to become a member of the Board of Research Faculty of the Institute for Social and Economic Change, Bangalore, for a period of three years.

Mr. Durga Prasad Bhattacharya (Pre-Census Population Studies) continued to serve as (i) Member, Indian Historical Records Commission, (ii) Honorary Director of the Research Project : Sociological writings in Bengali, 1818-1947, sponsored by the Indian Council of Social Science Research, (iii) Honorary Director of the Research Project : Bengali writings of Science and Technology, 1800-1950, sponsored by the Indian National Science Academy, and (iv) Secretary, Socio-Economic Research Institute, Calcutta.

Smt. Rama Deb Roy (Pre-Census Population Studies) continued to serve as (i) the Joint Secretary, Socio-Economic Research Institute, Calcutta; (ii) Honorary Co-Director of the Research Project : Bengali writings of Science and Technology, sponsored by the Indian National Science Academy. She also served as an Honorary faculty member in the Training seminar on quantitative techniques in History, sponsored by the UNESCO at New Delhi, 28th January to 7th February 1987.

Shri S. K. Biswas (Sociological Research) served as (i) Member, Boards of Under and Post Graduate Studies in Anthropology, Calcutta University; (ii) Member, Boards of Examiners, Post Graduate Studies in Sociology, Calcutta University; (iii) Member, Boards of Examiners of Under and Post Graduate Studies in Anthropology, Calcutta University; and (iv) continued as the Focal Person (India) in the CICRED, Paris (Committee for International Cooperation in National Research in



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Demography), "Population Ageing" Project: Demographic and Socio-Economic Aspects of Population Ageing.

Dr. S. Bandyopadhyay (Sociological Research) served as (i) Member, Post-Graduate Board of Studies in Sociology, Department of Kalyani University; and (ii) Invited to be a Research Associate of an all-India project on "Cooperatives and Rural Development in India", undertaken by the Department of Sociology, University of Delhi and Department of Anthropology, McGill University, sponsored by the International Development Research Centre, Ottawa, Canada.

Shri K. Chattopadhyay (Sociological Research) served as Member, Board of Directors, Seva-Bharati, Kaggari, Midnapore.

Dr. M. A. Gopinath (DRTC) served as (i) Member of the Advisory Committee of the ENVIS Centre at the Indian Institute of Science, Bangalore, and (ii) was awarded the Fulbright Fellowship to visit USA by the Council for International Exchange of Scholar, Washington for the period 1 September to 31 December 1986.

Professor G. Bhattacharyya (DRTC) rendered advisory service relating to the development of an Environmental Information System (ENVIS) during 2-3 October 1986. His advice was primarily relating to indexing of Micro documents and manpower for the ENVIS.

Dr. S. Sotharama (DRTC) was invited by the Institute of Public Enterprises, Hyderabad for advisory service in regard to the development of a Public Enterprise Documentation Centre. During the period March 2-6, 1987, Dr. Sotharama was in the Institute to help them to prepare an integrated plan for the Centre.

#### 10. SCIENTIFIC TOURS AND ASSIGNMENTS ABROAD

Professor J. K. Ghosh delivered invited lectures at the International Conference on Statistical Decision Theory held at Purdue University and the International Conference on Reliability and Statistical Quality Control held at University of Missouri. He also visited the Department of Mathematics, Indiana University.

Dr. R. B. Bapat (Stat-Math) attended the conferences on (i) Second Utah State Matrix Theory Conference, Logan, Utah, USA, January 29, 30, 31, 1987. Sponsored by the Department of Mathematics, Utah State University, presented a one hour talk; (ii) University of Illinois at Chicago, April 11, 1980. Seminar given: "The Hadamard Inequality and certain generalizations"; (iii) Northern Illinois University DeKalb, April 15, 1986. Seminar given: "Brouwer's fixed point theorem: Combinatorial aspects and constructive proofs".

Dr. R. B. Bapat also visited (i) Northern Illinois University, DeKalb, Illinois, USA April 1, 1986—May 15, 1980. Visiting appointment (held since August 15, 1985); (ii) University of Pittsburgh, Pittsburgh, February 2-6, 1987, presented two seminars; (iii) The Catholic University, Nijmegen, Netherlands, February 23-26, 1987, presented one seminar.

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Dr. R. Bhatia (Stat-Math) attended the conferences on (i) Canadian Operator Theory Conference at Victoria, 28 July to 1 August 1986. Presented a half hour talk; (ii) International Congress of mathematicians, Berkeley, California, 2—11 August 1986; (iii) Vrije University, Amsterdam 28 August 1986. Seminar given: "Operator Equations in Perturbation Theory"; (iv) Philips Laboratory, Brussels, 29 August 1986. Seminar given: "Perturbation of Eigenvalues".

Dr. R. Bhatia was Visiting Professor at the Department of Mathematics and Statistics, University of Guelph, Canada, 1 June—15 August 1986. During this period he continued his earlier collaboration with Professor John Holbrook on the problem of spectral variation. Between 16—23 August 1986 he visited the University of Toronto on the invitation of Professor Peter Rosenthal. Between 25—31 August 1986 he also visited Vrije University, Amsterdam and Phillips Laboratory, Brussels to deliver some lectures on Perturbation Theory.

Dr. Rana Barua (Stat-Math) attended the summer school in Nice, France conducted by the International Centre for Pure and Applied Mathematics on 'Fundamentals of Computer Science' during the period June 16 to July 12, 1986.

Professor Someah Das Gupta (Stat-Math) visited the University of Maryland, Catonsville, Madison; and University of Illinois, Chicago during the period February to March 1987 and delivered seminar talks. He also visited the University of Wisconsin, Madison for scientific discussion.

Dr. B. S. Mazumder (Stat-Math) attended the Congress on Fluid Mechanics held in Tokyo, Japan on September 1—5, 1986 and presented a paper.

Dr. G. Misra (Stat-Math) attended the Post-doctoral Association Conference at SUNY, Stony Brook, during the period June to August 1986. He also visited the University of Victoria, Canada and did some joint research work there.

Dr. K. R. Parthasarathy (Stat-Math) attended the conferences on (i) First World Congress on Probability Theory of the Bernoulli Society, Tashkent, September 8-13, 1986. Organised a session on Probability Theory and Mathematical Physics and presented a paper entitled "Stop times in Fock space stochastic calculus"; (ii) Conference on Quantum Stochastic Processes, Oberwolfach, January 26-30, 1987. Delivered an instructional lecture entitled "Local times in quantum stochastic calculus".

Dr. K. R. Parthasarathy also visited Steklov Institute of Mathematics, Moscow and Romanovsky Institute of Mathematics, Tashkent, U.S.S.R. under Indo-U.S.S.R. Cultural Exchange Programmes for two weeks and delivered three instructional lectures on recent developments in quantum stochastic calculus.

Dr. R. L. Karandikar (Stat-Math) visited Centre for Stochastic Processes, University of North Carolina at Chapel Hill, USA 15.8.86 to 16.10.86.

Dr. K. Rama Murthy (Stat-Math) visited the Department of Mathematics, University of Tennessee, Knoxville, U.S.A. as Assistant Professor during the period 1 April to 30 June 1986.

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Professor A. K. Roy (Stat-Math) visited the University of Toledo, Toledo, U.S.A. during January 1986 to June 1986. Fulfilled teaching and research assignments, the latter culminating in a paper. Spoko in the departmental seminar and gave an invited talk, on the subject of 'Intersection properties of balls in tensor products of Banach spaces', at the Department of Mathematics, Ohio State University, Columbus, Ohio, U.S.A.

Dr. K. B. Sinha (Stat-Math) visited University of Geneva, Switzerland during June 1986 to July 1986 and gave invited lectures on quantum stochastic processes at Eco Polytechnique, Federale, Lausanne. Dr. Sinha also visited of Rome II, Italy during December 1986 to January 1987 and gave invited talk at the Oberwolfach Conference on Quantum Stochastic Processes.

Dr. J. Roy (Applied Statistics, Surveys and Computing) has joined the Division on completion of an assignment at Statistical Institute for Asia and Pacific, Tokyo, Japan.

Dr. A. C. Mukhopadhyay (Applied Statistics, Surveys and Computing) visited Czechoslovakia under Indo-Czech Cultural exchange Programme during May-June 1986 and attended DIANA II Conference held in Liblice in May 1986.

Dr. Shibdas Bandyopadhyay (Applied Statistics, Surveys and Computing) attended the Second International Conference in Teaching of Statistics during 11-15 August 1986 and the meetings of the heads of International Statistical Education Centre on 12 and 14 August 1986 at Victoria, B. C., Canada.

Dr. S. R. Chakraborty (Applied Statistics, Surveys and Computing) has returned from his assignment in Uganda and resumed his duties.

Dr. Partha Pratim Majumder (Applied Statistics, Surveys and Computing) participated in the following seminars during the period 14 September to 17 November 1986. (i) 7th International Congress of Human Genetics, Berlin, F.R.G. (22-26 September, 1986); (ii) 5th Congress of the European Anthropological Association, Lisbon, Portugal (28 September to 4 October 1986); (iii) 3rd Human Genetics Program Retreat, Pymatuning, U.S.A. (10-12 October, 1986); and (iv) 37th Annual Meeting of the American Society of Human Genetics, Philadelphia, U.S.A. (2-5 November 1986). Dr. Majumder also visited the following universities for delivering seminars, holding discussions and performing data analysis: (i) Department of Human Genetics, Medizinische Hochschule, Hannover, F.R.G.; (ii) Department of Humanbiology University of Bremen, F.R.G.; (iii) Institute for Humanbiology, University of Humburg, F.R.G.; (iv) Department of Biological Anthropology, University of Oxford, England; (v) Department of Biostatistics, University of Pittsburgh, U.S.A.; (iv) Department of Anthropology, Pennsylvania State University, U.S.A. and (vii) Division of Biostatistics, Washington University, School of Medicine, U.S.A.

Shri Sisir Roy (Electronics) went to France, under cultural exchange programme and was attached to the Laboratoire de Physique Theorique, Institute Henri Poincare, Paris from January 1986 to December 1986. He worked on 'Causal Stochastic

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Interpretation of Quantum Mechanics and Quantum Statistics' with Prof. J. P. Vigiér and his group. He has also worked with Prof. J. Fronteau on Quasi Brownian Motion at Department of Physics, University of Orleans, France.

Shri Sisir Roy visited International Centre for Theoretical Physics, Trieste, Italy on invitation from Prof. A. Salam from June 24 to June 30, 1986. He gave an invited talk at the Department of Physics, University of Orleans, France on 'Probabilistic Geometry and Foundations of Quantum Theory' on May 15, 1986. He also gave an invited talk at the University of Catollica, Boucias, Italy on 'Stochastic Geometry and Quantum Potential' on 24 June 1986.

Dr. Bhargab Bikram Bhattacharyya (Electronics) took up an assignment as a visiting Assistant Professor with the University of Nebraska, Lincoln, U.S.A., from 4 June 1985 and is still continuing in the same assignment.

Dr. Bhabani Prasad Sinha (Electronics) took up an assignment as a Visiting Associate Professor with Southern Illinois University, Carbondale, U.S.A., from May 20, 1986. He is still continuing with the assignment.

Dr. H. P. Mazumder (Electronics) took up an assignment as a Visiting Professor at the University of Trondheim, Norway from 1 October, 1986. He is still continuing with the assignment.

Dr. B. B. Chaudhuri (Electronics and Communication Sciences) has been in West Germany as a Guest Scientist firstly with the Inst. Furstrahlenschutz, GSF Munchen and then with the Inst. fur Nachrichtentechnik and Information verarbeitung, Universitat Hannover.

Professor A. K. Datta (Electronics and Communication Sciences) chaired a technical session in the 8th International Conference on Pattern Recognition held at Paris during 27-31 October 1986. He also gave an invited talk in the one-day IEEE Workshop on Expert Systems and Pattern Analysis held at Paris on 31 October 1986. He visited, on invitation, Dipartimento di Informatics, Universita Delgi Studi di Torino in Italy from 1 to 29 November in 1986. He also gave seminars in Polytechnica di Torino and Centro Studi E Laboratori Telecomunication SPA (CSELT) in Italy.

Professor D. Dutta Majumder (Electronics and Communication Sciences) visited Italy on invitation from CNR/IFCAI Italy and participated in the following two international Workshops (i) International Workshop on Data Analysis in Astronomy ERICE, Sicily 17-30 April 1986, and presented an invited paper on 'A Computer Scientist's view on Data Analysis' and (ii) NATO-Advanced Research Workshop on Image Processing Architecture from 5-10 May 1986, at Maratea near Naples, and presented an invited paper on pattern recognition, image processing, computer vision and artificial intelligence in FGCS. He also visited University of Palermo on an invitation and gave a seminar lecture on 'A New Approach to Shape Analysis' (1-4 May 1986).

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Dr. Sankar K. Pal (Electronics and Communication Sciences) worked with Prof. L. A. Zadeh, University of California, Berkeley, Computer Science Division and Prof. A. Rosenfeld, University of Maryland, College Park, Centre for Automation Research during September 1986 to January 1987. One topic of his research was Fuzzy Expert System and Vision. Besides this programme, he also visited several laboratories/institutes in his field of interest and delivered invited talks at (i) Bell Laboratory (Signal Processing), Murray Hill, N. J. on October 13, 1986; (ii) The Florida State University (Computer Science), Tallahassee, on October 17, 1986; (iii) University of California, Berkeley (Computer Science), on October 27, 1986; (iv) University of Pennsylvania, Moore School of Electrical Engineering, Philadelphia, on November 20, 1986; (v) Hewlett Packard, Palo Alto, on December 3, 1986 and (vi) Purdue University (Electrical Engineering), West Lafayette, on December 22, 1986.

Professor K. C. Malhotra (Anthropometry and Human Genetics) was invited to participate in 7th International Congress of Human Genetics, West Berlin, 22-26 September 1986. Professor Malhotra visited Department of Anthropology, University of Arizona Tucson, USA in connection with the project "Chimpanzee Dermatology" and studied finger, palm, sole and toe prints of a series of Chimpanzee. He delivered 4 invited lectures at San Juan College, Farmington and two lectures at Eureka College, Illinois. He also visited Washington Medical School at St. Louis and finalized a couple of manuscripts with Dr. D. C. Rao. He studied dermatoglyphic prints of American Blacks at Meharry Medical College, Nashville. He left India on 11 August and returned on 30 September 1986.

Professor R. L. Brahmachary (Embryology) returned in April 1986 after studying *Loligo* embryology at the Laboratoire Arago, France.

Dr. (Mrs.) Sunanda Chanda (Leaf Protein) on invitation, participated in the XIV International Congress of Microbiology held in Manchester, England during 7-13 September, 1986 and presented a paper entitled "Reduction of pollutant parameters of leaf protein by-products by microbial fermentation" she also took part in "Microbial conversions of organic wastes in relation to agriculture and food Industry" Round Table Conference sponsored by International Union of Microbiological Societies. She visited Rothamsted Experimental Station, Harpenden, Herts Commonwealth Mycological Institute, Kew Gardens; University of Manchester and Liverpool.

Dr. C. R. Mslakar (Demography) served as United Nations Consultant in the Gambia during the period 16 August to 12 December 1986.

Dr. A. K. Sengupta (Economic Research) attended and presented a paper at the 8th International Input-Output Conference, sponsored by UNIDO and held in Japan during April 28 to May 2, 1986.

Dr. Bhaskar Dutta (Planning, Delhi) attended the Conference on Distributive Justice and Economic Theory, Brussels, January 8-10, 1987 and presented a paper.

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Dr. Dutta also visited Universidad Autonoma de Barcelona in October-November 1986.

Dr. C. Juyal (Planning, Delhi) served on the organising committee and chaired 2 sessions of the International Conference of the Association for Modelling and Simulation in Enterprise held in Sorrento, Italy during September 28-30, 1986. Dr. Juyal also visited the Centro d' Elude dos Manvomens, Paris.

Professor B. S. Minhas (Planning, Delhi) attended the Conference on Statistics in support of African Food Strategies and Policies, Brussels, 13-16 May, 1986 and presented a paper. Dr. Minhas also attended conference on consultation on African Food Statistics at the Institute of Development Studies, England, 19-25 May 1986.

Dr. Debraj Ray (Planning, Delhi) attended and presented papers at the following conferences. (i) Summer workshop in Economics, Warwick University, 5-20 July 1986; and (ii) Food Strategies Research Conference, United Nations University, Finland, 21-25 July 1986. Dr. Ray visited Stanford University and Cornell University during November to December, 1986.

Dr. K. Saradamoni (Planning, Delhi) attended and presented papers at the conferences. (i) 9th European Conference on Modern South Asian Studies, Heidelberg University, 9-12 July, 1986 and (ii) India-China seminar on Planning and Socio-Economic Development, Beijing, September, 1986.

Professor N. S. Iyengar (Economic Analysis, Bangalore) participated in the 1986 Australasian Meetings of the Econometric Society, Melbourne, August 24-26, 1986 and presented the paper entitled "The Extreme Disparity Ratio and its Economic Applications : An Illustration from NSS Data".

Professor Iyengar also visited the University of Melbourne and addressed a group of applied econometricians at the University's Centre for Applied Economics. Further, on way back to India, he also paid a visit to the Department of Economics and Statistics of the National University of Singapore and gave a talk to the Faculty and students on the problem of decomposition and inequality on September 4 and 5, 1986.

Dr. (Mrs.) Alokandana Mitter (Linguistics) on invitation, attended a Workshop on "The Application of the Kestic Methodology and Instrumentation to Children with Speech Defects and Normal Hearing", organised by the Institute for Experimental Phonetics and Speech Pathology, Belgrade, Yugoslavia, during the months of June and July, 1986.

Dr. Mitter on invitation, conducted Ten-Day Seminar on "The Kestic Methodology and Instrumentation for Speech Habilitation of Hearing Impaired Children", organised by "Deaf No More, Incorporated", Albuquerque, New Mexico, USA, from 17-27 June, 1986. She left Calcutta on 27 May 1986 and returned on 1 August 1986.

Dr. F. J. Devadason (DRTC) visited Library and Regional Documentation Centre, Asian Institute of Technology, Bangkok to act as a Member of the Faculty

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for the Summer Course on Library and Information Services organised there during the period 2-22 July 1986. Dr. Dovadasan left India on 1 July 1986 and returned to Bangalore on 24 July 1986.

Dr. G. Bhattacharyya (DRTC) went to Kathmandu to act as a member of the Visiting Faculty and also act as the course coordinator for 6 weeks course on "Modern Information Handling Techniques" held during the period 10 August 1986 to 26 September 1986. Dr. Bhattacharyya left Bangalore on 8 August 1986 and he returned to Bangalore on 24 August 1986.

Dr. M. A. Gopinath (DRTC) went to USA as a Fulbright Senior Research Visiting Fellow to the School of Library and Information Science, University of Pittsburgh, Pittsburgh, USA. The United States Educational Foundation for India (USEFI, New Delhi) and the Council for International Exchange of Scholars (CIES, Washington) sponsored the visit of Dr. Gopinath. Dr. Gopinath left Bangalore on 27 August 1986 and returned to Bangalore on 3 January 1987. During his stay at USA, Dr. Gopinath visited the following institutions :

(1) School of Library and Information Science, University of Pittsburgh, Pittsburgh (31 August to 12 November 1986). Did research on the use of classificatory and facet analytic techniques in the design and development of knowledge base information systems. In particular, knowledge representation languages such as PROLOG, KL-1, and New KL-1 can be improved in their input representation for knowledge base and also provide an inner structure to the Inference Engine. The Ranganathan's model of (BS) (PMEST) provided an excellent base-structure for the knowledge representation languages. Based on these studies we can design a thesaurus which would aid effective information retrieval and has the capacity to generate adaptive information organisation (A report was submitted to CIES/USFEI on this subject).

Dr. Gopinath delivered a lecture-demonstration course on Information Processing and Organisation to the Doctoral Students of the School of Library and Information Science, University of Pittsburgh, Pittsburgh on 10 October 1986.

(2) School of Library and Information Studies, Texas Woman's University, Denton (Near Dallas) (from 12 to 19 November 1986). During this period he delivered lectures (i) Lecture on Trends on Education for Library and Information Science in India to Doctoral Students on (13 November 1986) and (ii) Comparative Indicators of Growth in Library and Information Systems in India and USA on 17 November 1986.

(3) Dallas Public Library System and the Kennedy Memorial Centre at the Dallas City on 18 November 1986.

(4) Fortworth Public Library System and the Art Museum on 19 November 1986.

(5) North Texas University Library System, Denton on 20 November 1986.

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(6) School of Library and Information Science, Atlanta University, Atlanta from 21-23 November 1986. During this period he delivered lectures on (i) "Interdisciplinary Nature of Information Science" to Master's Degree Students and (ii) "Knowledge-based Information Systems" to the Doctoral Students of School of Library Science.

(7) Experimental Project on Community of Tomorrow (KISSIMT). Observational Studies on Information Projections and Presentations from 23-30 November 1986.

(8) University Library Systems of the University of Miami, Miami, and the Florida International University, Miami,. Observational Studies from 1 to 20 December 1986.

Dr. M. A. Gopinath, as an invited international delegate, also attended the 49th Annual Conference of the American Society for Information Science, held at Chicago during 30 September to 3 October 1986.

#### 11. SCIENTIFIC ASSIGNMENTS IN INDIA

Dr. Pulakesh Maiti (Stat-Math) attended the 24th Econometric Conference held at Ahmedabad during the period 8-10 January 1987 at Sardar Patel Institute of Social Science under the auspices of the Indian Econometric Society and presented a paper. Dr. Maiti is associated with the ISI-ONGC Collaborative Research Project. In this connection he had to go to Dehra Dun, Baroda three to four times during the year 1987-88 for discussion with the ONGC officers and collection of data. The project has been sponsored by ONGC to develop a model on the evaluation of cost of discovery and cost of production. The project also aims at optimizing the resource allocation into two broad activities of ONGC namely exploration and exploitation.

Dr. B. S. Mazumder (Stat-Math) attended the "Indo-French Instructional Conference and Symposium on Differential Equations and Numerical Methods" held at TIFR, Bangalore from 6th May to 28th May 1986.

Dr. G. Misra (Stat-Math) visited the Mehta Research Institute on invitation during the period 30 November to January 4, 1987. He attended the International Conference on Invariant subspaces organised by Delhi University held from 15 December to 20 December, 1986. Later, he visited the Matasciences at Madras on invitation.

Dr. S. Nag (Stat-Math) visited the Institute of Math. Sciences, Matascience, Madras on invitation for three weeks in May-June 1986 and had joint research discussions with Professor C.S. Seshadri and also some string theories there. He also delivered an half-hour address at Indian Science Congress held at Bangalore from 3 to 7 January 1987.

Shri B. Rajeev (Stat-Math) participated in the Summer School on Analysis and Probability conducted by the Stat/Math. Division during May 26-June 21, 1986.