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PROJECT REPORT SUBMITTED

Physical and Earth Sciences

Electronics and Communication Sciences

A report of the DOE funded R & D project on application of pattern recognition and image processing techniques to geological mapping and mineral detection with Prof. D. Dutta Majumder as Principal Investigator has been submitted.

This work is at the intersection of some basic sciences as Physics, Geology and of some modern technology as Remote Sensing, Image Processing, Pattern Recognition and Computer Science to achieve the object of preparing geological maps from Landsat MSS data. Aerial photography and satellite imagery have been extensively used to learn more about the condition of the earth whereas geologists and physicists are doing visual image analysis in the past. Hence image analysis and pattern recognition for constructing geological maps need a strong basis of geological knowledge, both of quantitative and qualitative. The work is of great significance from the point of Natural Resources Estimation using remote sensing techniques.

Because of the widespread interest and national importance of geological mapping, two broad themes are adopted—lithologic classification and structural analysis. In order to realize the objective of mapping, image enhancement and classification seem computer's ability to extract and process statistical information automatically. Here supervised pattern classification technique has been used since either sufficient knowledge about the prototypes or sufficient known pixels of each classes for prototype representation have created to classify 6 classes of rocks and

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also vegetation-water body-soil. Large number of indigenously developed software may be used for further advancement of related works.

This report contains 1. Sources of remote sensing data, 2. Different types of errors in MSS data and their corrections, 3. Image processing techniques for enhancing MSS imagery, 4. Image segmentation and detection of linear feature, 5. Pattern recognition techniques and preparing geological maps and 6. Conclusion.

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3. ——— (with Rudra, A., Bhattacharjee, N. and Chattopadhyay, M.) : How do the poor survive?.

Statistical Quality Control and Operation Research

1. Chakraborty, T. K. : Single sampling inspection as a goal programming problem. Tech. Report No. 4/89.
2. Dutta, T. K. (with Roy, D. K.) : Construction of Strongly balanced uniform repeated measurement design—A new approach. Tech. Report No. ASC/88/7, ISI.
3. Mohan, S. R. (with Egambaram, N.) : Some results on the linear complementary problem with an N_0 matrix. Tech. Report No. 8810, May, 1988, ISI, New Delhi.
4. Mukherjee, S. P. : Optimum investment in drilling out of turn from mining. Tech. Report No. SQC-OR 5/88, ISI.
5. Sundararaju, S. M. : Quality Restructuring in the Business Group—Watches. HMT.
6. ——— : Approach to Quality Audit in multi-plant system.

Library, Documentation and Information Sciences

1. Seetharama, S. : Call Number and its structure. To be used by Indira Gandhi National Open University, New Delhi for its course on Library and Information Science.
2. ——— : Information Infrastructure for Research and Development in WOCKHARDT : A proposal. To be used by the company.

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3. ——— : Awarpur Cement Works Information Centre : A proposal. To be used by the Company.

6. PH.D./D.SC. DEGREES

1. *Ph.D./D.Sc. Degrees Awarded*

The following is the list of Ph.D. degrees obtained by the Research Fellows, Research Associates and Projects Assistants of the Institute.

1. Malabika Nath : "Some aspects of high energy cosmic ray showers and multiparticle production phenomena", degree awarded by the University of Calcutta.
Supervisor : Professor P. Bandyopadhyay

The following is the list of Ph.D. degree obtained by the members of the staff of the Institute.

Electronics Unit

1. S. Ghosh : "Studies on Network Graphs — Their Design, Fault Tolerance, Routing and Performance Evaluation", degree awarded by the Jadavpur University.
Supervisor : Dr. B. P. Sinha.

Electronics and Communication Sciences Unit

2. C. A. Murthy : "On consistent estimation of classes R^2 in the context of cluster analysis", degree awarded by the I.S.I.
Supervisor : Professor D. Dutta Majumder

Economic Analysis Unit

3. M. H. Suryanarayana : "The Problem of Distribution in India's Development : An Empirical Analysis", degree awarded by the I.S.I.
Supervisor : Professor N. S. Iyengar.
4. Shailaja Raghuprasad : "A Quantitative Analysis of Poverty, Inequality and Consumer Behaviour : The Case of the Scheduled Castes and Tribes of Karnataka", degree awarded by the I.S.I.
Supervisor : Professor N. S. Iyengar.

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Population Studies Unit

5. Samir Guha Roy : "Estimation of Demographic Parameters for India", degree awarded by the I.S.I.
Supervisor : Professor J. Roy.

The following is the list of Ph.D. degrees obtained by the researchers not engaged in I.S.I. but worked under the guidance of members of the faculty of the Institute.

1. Asok Bandyopadhyay : "Some aspects of Gravitational Phenomena Supergravity and De Sitter Space", degree awarded by the University of Calcutta.
Supervisor : Professor P. Bandyopadhyay.
2. K. D. Debnath : "Study of some flow fields connected with flame stabilization problem", degree awarded by the University of Calcutta.
Supervisor : Professor A. Ghosh.

B. Theses Submitted for Ph.D. Degrees

The following is the list of Ph.D. theses submitted by the Research Fellows, Research Associates and Project Assistants of the Institute.

1. Asok Kumar Chakraborty : "Some aspects of the spectral characteristics of stratified turbulent flow", Jadavpur University.
Supervisor : Professor A. Ghosh.
2. Mrs. Mausumi Bose : "Applications of the Calculus for Factorial Arrangements and Allied Topics", I.S.I.
Supervisor : Dr. R. Mukherjee.
3. B. Rajeev : "Semimartingales Associated with Crossings", I.S.I.
Supervisor : Dr. B. V. Rao.
4. Amitabh Tiwari : "Curvatures of Left Invariant Metrics on Lie Groups and Parametric Homotopy Principle for a Class of Partial Differential Relations on Closed Manifolds", I.S.I.
Supervisor : Dr. A. Mukherjee.
5. Tapas Kr. Samanta : "Some Contributions to the Asymptotic Theory of Estimation in Non-regular Case", I.S.I.
Supervisor : Mr. K. K. Roy.

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6. A. K. Saha : "Mathematical Models of Biological Morphogenesis and Pattern Formation", Jadavpur University.
Supervisor : Dr. P. K. Tapaswi.
7. Subrata K. Roy : "Health status and Labour productivity" University of Calcutta.
Supervisor : Professor A. Basu.

The following is the list of Ph.D. theses submitted by the members of the staff of the Institute.

1. P. Dasgupta : "Growth at adolescence : A study of the Bengali boys", University of Calcutta.
Supervisor : Professor K. C. Malhotra.

The following is the list of Ph.D. theses submitted by the researchers not engaged in ISI but worked under the guidance of the faculty of the Institute.

1. Ms. Chumki Mahinder : "A comparative Ethno-Biological Study of (Anthropological Survey of India) some communities of Different origin inhabiting Similar ecosystems."
Supervisor : Professor A. Basu.

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

7. TWENTY-THIRD CONVOCATION

The Indian Statistical Institute held its Twenty-third Convocation for awarding the Ph.D., M.Tech., M.Stat., B.Stat. (Hons.) degrees, Post-graduate diplomas in Applied Statistics and Diploma in Statistics on 24 January 1989. Shri Subimal Dutt, President of the Institute presided over the Convocation function. Shri P. N. Haksar, Chairman of the Council of the Institute welcomed the guests. Professor Obaid Siddiqi, F.R.S., Tata Institute of Fundamental Research, Bombay delivered the Convocation Address entitled "Genes and Brain Circuits". Professor J. Roy on behalf of the Director of the Institute Professor J. K. Ghosh, presented the annual review of research, teaching and training.

The number of candidates awarded degrees and diplomas is given below :

Degrees/Diplomas	Number of candidates
Doctor of Philosophy (Ph.D.)	7
Master of Technology in Computer Science (M.Tech.)	15
Master of Statistics (M.Stat.)	42
Bachelor of Statistics (Honours) B.Stat.(Hons.)	16
Postgraduate Diplomas in Applied Statistics :	
(i) Statistical Quality Control and Operations Research, Calcutta	5
(ii) Statistical Quality Control and Operations Research, Bombay	2
(iii) Statistical Quality Control and Operations Research, Madras	2
Diploma in Operation and Programming of Automatic Data Processing Equipment	12
Associateship in Documentation and Information Science, Bangalore	8
Professional Examinations in Statistics :	
(i) Junior Diploma in Statistics	2
Total :	111

8. VISITING SCIENTISTS

A number of distinguished scientists from abroad and India participated in the research, training and other scientific activities to the Institute during the year. Some of them came to the Institute on invitation and spent fairly long period at the Institute to assist in the regular research and teaching programme while others came for short periods and gave lectures and seminars. Most of them were available for consultations by the faculty members of the Institute.

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1. Dr. S. Thangavelu, Tata Institute of Fundamental Research Centre, Bombay (4.4.88-19.4.88). Lecture : "Littlewood-Paley theory."
2. Professor G. Burger, GSF Institute for Strahlenschutz, West Germany (24.4.88-29.4.88). Lectures : (1) "A New discipline to quantitative pathology," and (ii) "Statistical approaches to cytological specimens." Delivered a series of talks on "Histometry : A new discipline of quantitative pathology" and also "Statistical approaches to classify cytological specimens."
3. Dr. M. G. Nadkarni, University of Bombay, India (27.4.88-26.5.88). Lecture : "Ergodic theory".
4. Professor Balwant Singh, Tata Institute of Fundamental Research, India (4.5.88). Lecture : "Resolution of singularities of an algebraic variety".
5. Ms. Sambari Madhavan, University of Texas at Dalas, USA (20.5.88). Lecture : "Integer programming".
6. Dr. M. Krishna, Matscience, Madras, India (9.5.88-4.6.88). Lecture : "Random Schrodinger operators".
7. Dr. Alladi Subramanian, Indian Institute of Technology, Bombay, India (20.6.88-22.9.88). Lecture : "On asymptotic aspects of sequential estimation".
8. Professor A. S. Gupta, Indian Institute of Technology, Kharagpur, India (28.6.88-1.7.88). Lectures : (i) "Laminar and turbulent plums", (ii) "Group theory methods", (iii) "Thermal convection and chaos I and II", (iv) "On different topics in Fluid Mechanics".
9. Dr. Quentin Burrell, University of Manchester, U.K. (26.6.88-13.7.88). Lecture : "Bibliometrics".
10. Dr. M. Nerurkar, Ohio State University, USA (16.6.88-6.7.88). Lectures : "Ergodic theory and topological dynamics".
11. Professor K. B. Athreya, Iowa State University, USA (18.7.88). Lecture : "Polya urn schemes, Ferguson processes and a central limit theorem".
12. Professor M. S. Raghunathan, Tata Institute of Fundamental Research, India (12.7.88). Lecture : "Values of quadratic forms at Lattice Points".
13. Dr. S. Swaminathan, Dalhousie University, Canada (17.7.88-27.7.88). Lecture : "Geometry of Banach spaces".
14. Professor A. P. Srivastava, Librarian, Delhi University (4.8.88). Lecture : "Knowledge organisation and dissemination-scholar and librarian interaction".
15. Professor Bhaskar Ghosh, Leigh University, USA (8.8.88). Lecture : "An improvement of the Edgeworth Expansion of first and second order".
16. Professor D. C. Rao, Washington University, School of Medicine, St. Louis, USA (12.8.88). Lecture : "Genetics of Plasma Lipids".
17. Professor J. K. Lindsay, Kings College, U.K. (19.8.88). Lecture : "Quantum chaos" ?
18. Professor Bryan E. Cain, Iowa State University, USA (26.8.88). Lecture : "Conjugate cones and semi-definite operators".

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19. Professor S. Huda, King Said University, Saudi Arabia (16.8.88). Lecture : "A-optimal fourth-order rotatable designs : An application of partially balanced association algebras".
20. Professor R. V. Ramamoorthi, Michigan State University, USA (1.9.88). Lecture : "Equivalence of behavioral and randomized equivariant roles".
21. Dr. Pradip Kumar Bose, Centre for Studies in Social Sciences, Calcutta (15.9.88). Lecture : "Transformation on rural class structure in contemporary India".
22. Professor Miroslav Fiedler, Czechoslovak Academy of Sciences, Czechoslovakia (7.10.88-10.11.88). Lectures : (i) "Matrices and Euclidean geometry". (ii) "Algebraic connectivity of graphs and its modifications". (iii) "Matrices and Euclidean geometry" and (iv) "Hankel, Bemout and Lorewner matrices : A survey".
23. Professor Moni Nag, the Population Council, USA (13.10.88). Lecture : "Explaining high contraceptive prevalence in Matlab, Bangladesh : A focus group methodology".
24. Professor D. J. Finney, FRS, University of Edinburgh, U.K. (16.10.88). Lectures : (i) "A few memories of P.C.M.". (ii) "Some thoughts on data and the statistician".
25. Dr. N. Nikolaj Ushakov, USSR Academy of Sciences (4.11.88). Lecture : "Non-parametric, estimation and image processing".
26. Professor Adam Idzik, Institute of Computer Science, Polish Academy of Sciences, Warsaw (21.11.88-25.11.88). Lectures : (i) "Theorems on selectors in topological spaces, (ii) "Almost fixedpoint theorems".
27. Professor P. J. Cameron, Queens Mary College, London, U.K. (19.12.88). Lecture : "Sum-free sets".
28. Professor Glen Meeden, Iowa State University, USA (13.12.88-14.12.88). Lectures : (i) "A normal like approximation for asymmetric density functions" and (ii) "Using the Polya posterior in point and set estimation problems in finite population sampling".
29. Professor R. R. Bahadur, University of Chicago, USA, delivered lectures on "Advance inference of M. Stat, students specialising in MSP during the first semester 1988-89".
30. Dr. M. Lindsay, King's College, London and Dr. J. Price, University of New South Wales, Australia (during May June 1988) and participated in the summer school on probability and Analysis held at Bangalore by the Stat-Math Division.
31. Dr. P. Jeganathan, University of Michigan, USA (June-August 1988).
32. Dr. S. Swaminathan, Dalhousie University, Canada (17.7.88-27.7.88). Lecture : "Geometry of Banach Spaces".
33. Professor M. Nori, T. I. F. R. (8.9.88). Lecture : "Linear groups over finite fields".
34. Professor K. Petersen, University of North Carolina (January 1989). Seminar "Ergodic theorems, harmonic analysis and spectral theory".

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35. Dr. D. N. Verma, T. I. F. R. (3.1.89). Seminar : "Symmetric functions and Schur-Weyl theory".
36. Dr. S. Kotani, University of Tokyo, Japan (March 1989). Lecture : "Random Schrödinger Operators".
37. Dr. V. Pati and Dr. S. Ramaswamy are Visiting Scientists at the Bangalore Centre from August 1988 and April 1988 respectively. They are taking part in the regular research and teaching activities of this centre.
38. Professor J. Horowitz, Department of Mathematics, University of Massachusetts, Amherst, USA continued his work with Dr. R. L. Karandikar and left on July 6, 1988. He again visited ISI Delhi Centre during December 1988 to attend the R. C. Bose Symposium on Probability, Statistics and Design of Experiments.
39. Dr. J. M. Lindsay, King's College, London continued his collaboration with Professor K. R. Parthasarathy and left on 9th September 1988.
40. Professor P. S. Puri, Department of Statistics, Purdue University, Indiana, USA who was visiting ISI Delhi Centre left on 2nd August 1988.
41. Dr. Bang Hyo Suk and Dr. Pak Su Hyob, Institute of Mathematics of Academy of Sciences of DRPR Korea visited ISI under the auspices of the Third World Academy of Sciences (a joint programme with INSA) from 27th March 1988. Dr. Bang Hyo Suk, during his stay at Delhi Centre attended a course on Quantum Probability by Dr. K. R. Parthasarathy. Dr. Pak Su Hyob worked with Professor S. K. Mitra and wrote a paper entitled "On Gyration of Rectangular Matrices". Both of them attended the Summer School in Analysis and Probability held at Bangalore and also visited ISI Calcutta for a couple of weeks.
42. Professor Tadeusz Radzik, Institute of Mathematics, Technical University, Wrocław, Poland (March 26 to April 26, 1988). He collaborated with Dr. Ravindran on problems relating to the existence of Nash equilibrium points.
43. Professor Chandler Davis, University of Toronto (2.5.99-1.6.88). He continued his collaboration with Dr. Rajendra Bhatia.
44. Professor Robert Carroll, Department of Mathematics, University of Illinois at Urbana, Champaign, USA (19 July 1988).
45. Professor Czesław Olech, Institute of Mathematics, Polish Academy of Sciences, Poland (8.11.88-December 1988).
46. Professor Robert A. Gustafson, Department of Mathematics, Texas A and M University, USA (7.11.88-11.11.88).
47. Professor J. J. Seidel, Technical University Eindhoven, Netherlands (18.12.88-23.12.88).
48. Professor Abram Kagan, University of Maryland, USA (9.12.88-31.12.88). Participated in the R. C. Bose Symposium.
49. Professor P. K. Pathak, Department of Mathematics and Statistics, University of New Mexico, (13.12.88-12.1.89). Participated in the R. C. Bose Symposium.

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50. Dr. Leonas Jano Saulis, Institute of Mathematics and Cybernetics, USSR, Academy of Sciences, Moscow (10.12.88-30.12.88).
51. Dr. Kasing Lau, Department of Statistics, University of Pittsburgh, USA visited ISI under the Indo-US Fellowship Program during December 1988 to February 1989. He participated in the R. C. Bose Symposium and delivered the lecture : "On a convolution equation and characterization of probability distributions".
52. Professor Jerzy K. Baksalary, Academy of Agriculture in Poznan, Poland (20.12.88-3.1.89). Participated in the R. C. Bose Symposium.
53. Professor Ludwing Elmer, University of Bielefeld, West Germany (1.3.89-4.4.89). He collaborated with R. Bhatia on problems of linear algebra and numerical analysis.
54. Professor Wilhelm Von Waldenfelds, Institute fur Angewandte Mathematik der Universitat, Heidelberg, FRG (1.3.89-30.3.89).
55. Professor G. A. Margulis, IPPI, Moscow (30.3.89-5.4.89).
56. Professor G. S. Asanov, Department of Theoretical Physics, Moscow State University, U.S.S.R. (19.1.89-20.3.89). He visited ISI under Indo-Soviet Cultural Exchange Programme, to collaborate with Sri Sisir Roy of Electronics Unit. He gave a few seminars on Differential Geometry, Finslerian Gauge Fields and Yang-Mills Field.
57. Dr. N. Nikolaj Ushkov, Professor, USSR Academy of Sciences (4.11.88). Seminar : "Nonparametric estimation and image processing".
58. Dr. Keshavan, Northrop Inc, USA (November 1988). Lecture : "Model based vision".
59. Dr. A. Togashi, University of Tokyo, Japan (9.12.88). Lecture : "AMLOG : A logic programming language".
60. Professor D. O. M. Fay, Professor, Queen's University of Belfast, UK Govt. British Council Library (14.12.88). Lecture : "Transputer and its applications".
61. Dr. Dakul Banerjee, Rockwell International, USA (28.12.88). Lecture : "Building standard programs using IEEE Software Engineering Standards".
62. Professor N. Pavesic, Yugoslavia (8.2.89). Lecture : "Optimal encoding of statistically independent features in pattern recognition".
63. Professor Anil K. Jain, Professor, Department of Computer Science, Michigan State University, East Lansing, UNDP, USA (6.3.89-14.3.89).
64. Professor Ramesh C. Jain, Professor, Department of Electrical and Computer, Engineering, University of Michigan, Ann Arbor, UNDP, USA (6.3.89-14.3.89). Purpose of both of the visiting scientists (Prof. A. K. Jain and R. C. Jain) are (i) To make some recommendations for specific research problems, (ii) To evaluate the progress made by the centre in the areas of pattern recognition, image processing, computer vision and artificial intelligence, (iii) To assist research groups engaged in the fields of computer vision, image processing studies and establishment of related laboratories, (iv) To deliver a series of talks on Object

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- recognition, Range image, Dynamic vision, Markov random fields and also participated in the group discussions for future research plan of the centre. They also joined in a technical meet on 13 March 1989 to foster fruitful collaboration among the different Indian institutes, organisations engaged in FGCS programme.
65. Professor Sankar Chatterjee, Texas Tech. University, USA, (7.12.88-17.1.89). He visited the Institute as a guest scientist. During his visit, Professor Chatterjee participated in a short field work which resulted in the discovery of the tyrannosaur and collection of some interesting geological data from the late Cretaceous Lameta rocks at Jabalpur.
 66. Professor T. A. Davis, Director, J.B.S. Haldane Research Centre, Nagercoil (3.11.88). Lecture : 'On utilization of palms'. He also visited the Agricultural Science Unit again on 7.2.89 and had group discussion with the Scientists of the Unit regarding a Research Project on Introduction and improvement of Oil palm (*Elaeis guineensis*) and coconut (*Cocos nucifera*) in the Sundarbans region.
 67. Dr. Dennis V. Johnson, Associate Editor, 'Principes', the Journal of International Palm Society, USA (5.5.88). He participated in a group discussion with the members of the Agricultural Science Unit regarding the use of tropical Asian Palms and their conservation.
 68. Professor S. Nakamwea, Eminent Seed Scientist from Tokyo University of Agriculture, Japan (17.12.88). He visited the Agricultural Science Unit and gave a seminar talk.
 69. Ms. Tamsin M. K. Jewell, Research Assistant, Department of Biological Anthropology, Oxford University, U. K. (20.10.88-20.12.88). Prepared a collaborative project proposal which is presently awaiting clearance from the Government of India.
 70. Professor H. Walter, Professor and Head, Department of Human Biology, Anthropology, Bremen University, Bremen, W. Germany (27.1.89).
 71. Ms. Maria Tegeler, Bremen University, W. Germany (6.1.89-7.4.89). Participated in the population variation programme : "Genetic study of 16 tribal groups of central India" as a part of Indo-German collaborative project.
 72. Ms. Dorte Eberhardt, Bremen University, W. Germany (6.1.89-7.4.89). Participated in the population variation programme : "Genetic study of 16 tribal groups of Central India" as a part of Indo-German collaborative project.
 73. Professor Donald von Eschen, Department of Sociology, McGill University, Montreal, Canada (30.4.89-30.5.88). Professor Von Eschen had a long discussion with the faculty members of the Economic Research Unit regarding his research work and some other collaborative research work.
 74. Dr. Bidvut Chakraborty, State University of Iowa, USA (22.3.89). Lecture : "National democratic ideology and the 1923 Jamshedpur Strike".
 75. Dr. Pradip Kr. Bose, Centre for Studies in Social Sciences, Calcutta (15.9.88). Lecture : "Transformation on rural class structure in contemporary India".
 76. Dr. Dilip Kr. Bhattacharyya, University of Leicester, U.K. (12.4.88). Seminar : "Estimation of Hidden Money with reference to the UK and USA".

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77. Dr. P. A. V. B. Swamy, US Federal Reserve Board, Washington (22.6.88). Seminar : "Foundation of Bayesian Analysis in Statistics and Econometrics".
78. Dr. Ranganath Bharadwaj, Department of Economics, University of Bombay, Bombay (15.07.88). Lecture : "Pedagogics of Economics in India".
79. Dr. Somdeb Lahiri, Indian Institute of Management, Ahmedabad (14.9.88). Lecture : "A General Saddlepoint Property for Two-Person Variable Threat Games".
80. Professor Mukul Majumdar, Cornell University (December 1988-January 1989).
81. Professor Peter Funk, University of Bonn (All through 1988-89).
82. Professor Martin Osborne, McMaster University (January 1989-April 1989).
83. Professor A. Sattar, Rajshahi University, Bangladesh (6.5.88-23.2.89 and 20.3.89).
84. Dr. R. K. Som, Special Technical Adviser in Population, United Nations (July, 1988).
85. Dr. R. Tiwari, Reader, Jammu University, Jammu, (14.2.89-25.2.89). For consultation regarding the analysis of data of the UGC sponsored survey entitled "Utilization of the MCH case and FP services in rural areas of Jammu".
86. Professor C. M. Suchindran, Professor, Department of Demography, Trivandrum, (29.12.88).
87. Dr. D. S. Dwivedi, Professor of Medicine, Kasturba Medical College, Karnataka (20.1.89).
88. Dr. Quentin Burrell, Statistical Laboratory, Department of Mathematics, University of Manchester, UK.. (30.6.88-31.7.88). He visited ISI Bangalore Centre as a Visiting Professor to DRTC. Dr. Burrell's visit to India was sponsored by the British Council, London. He was in DRTC for a month. He delivered regular lectures on "Bibliometrics" to DRTC Faculty and students of ADIS course during the period of his stay in DRTC. In addition, he offered a series of seminars which were attended by scientists from other institutions. Besides, he acted as an adviser to research on "Bibliometrics" being carried out in DRTC.

9. HONOURS, AWARDS AND SPECIAL ASSIGNMENTS

Professor J. K. Ghosh has been elected a Member of the International Statistical Institute. Professor Ghosh was : (1) a member of the National Committee on Mathematics Education and Research, Ministry of Technology, Government of India, (2) an Expert Member on the sub-committee on Mathematics set up by UGC in 1989, (3) Chairman of the quinquennial Review Team (QRT) of Indian Agricultural Statistics Research Institute (IASRI), New Delhi, (4) Member of the National Advisory Board on Statistics (ABS) of Department of Statistics, Government of India, and (5) Member of the State Council of Science and Technology, Government of West Bengal.

Dr. S. Nag (Stat-Math) was a member of Institute Hautes Etudes Scientifique, Paris, France.

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Dr. S. B. Rao (Stat-Math.) was a member of the UGC Panel of Mathematics, New Delhi.

Dr. R. Bhatia (Stat-Math) appointed to the Editorial Boards of two leading international journals : *Linear Algebra and its Applications* published by Elsevier, New York and *Linear and Multilinear Algebra* published by Gordon and Breach, London. Dr. Bhatia also appointed Member of the International Board of the International Linear Algebra Society incorporated in the USA.

Dr. B. L. S. Prakasa Rao (Stat-Math) was a Member, Editorial Board of *Statistics and Probability Letters* and of *Stochastic Hydrology and Hydraulics*.

Dr. B. Ramachandran (Stat-Math) elected as Fellow of the Indian National Science Academy—Effective 1.1.1989.

Dr. A. C. Mukhopadhyay (Applied Statistics, Surveys and Computing) (i) Member, Steering Committee, Pavement Performance Study, Central Road Research Institute, Ministry of Transport, Government of India. (ii) Member, Committee of Direction for Central Staff Training and Research Institute, Ministry of Labour, Government of India.

Dr. Parimal Mukhopadhyay (Applied Statistics, Surveys and Computing) acted as a member of the committee set up by the Government of India on framing a sampling procedure for Annual Survey of Industries.

Dr. B. N. Mukherjee (Applied Statistics, Surveys and Computing) continued to serve as a member of (a) the Scientific Advisory Committee of the Institute for Research in Medical Statistics of both (i) New Delhi and (ii) Madras Chapters, (b) the Project Screening Committee of ERIC, National Council of Educational Research and Training, New Delhi and (c) the Advisory Committee of the Centre for Applied Statistics of the North-Eastern Hill University, Shillong. From January 1988, he has also been nominated as a member of the Educational Research Innovation Committee of the NCERT, New Delhi.

Dr. J. Dattagupta (Electronics) acted as a member of the Programme Committee for the International Test Conference '89, Washington, D.C., U.S.A.

Dr. B. B. Bhattacharya (Electronics) served as a Committee Member of the International Conference on Parallel Processing and Applications organized by the Institution of Engineers, Calcutta in December, 1988.

Professor D. Dutta Majumder (Electronics and Communication Sciences) has the following special assignments (a) Member, Board of Directors—VIII Int. Congress of World Organisation of Systems and Cybernetics, Hunter College City University of New York, USA, 11-14 June 1990. (b) Member of Governing Board of IAPR and also member of Technical Committee on 'Statistical Pattern Recognition' of IAPR

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(Continuation). (c) Member, Sectional Committee of INSA, New Delhi. (d) Member, Apex Committee of KBCS Programme of Electronics Commission, New Delhi (Continuation). (e) Member, Technical Advisory Board of CSIR, New Delhi. (f) Member, Research Committee of JNU, New Delhi. (g) Member, Research Council of CFRI, Dhanbad. (h) Member, Research Council of Centre for Mathematical Modelling (under CSI) NAL, Bangalore. (i) Member, Scientific Advisory Committee of BIM, Calcutta.

Professor S. K. Pal (Electronics and Communication Sciences) has the following special assignments (a) Offered Senior Research Award to work for a year as a Guest Investigator at the Johnson Space Centre, Houston, USA on 'Management of Uncertainty in Expert System'. (b) Offered in August 1989 to chair a session on Pattern Recognition and to deliver an invited talk. (c) Offered to act as a Member, National Committee IV Int. Conf. on CAD, CAM, Robotics and Factories of the Future, IIT, Delhi 19-22 December 1989. (d) Inclusion of biographical note in Reference Asia, Asia's Who's Who of Men and Women of Achievements Vol. IV, 1989.

Dr. B. Chanda (Electronics and Communication Sciences) has been awarded Young Scientist of the year 1989.

Dr. D. Saha (Geology) continued to work as an Assistant Editor of the Indian Journal of Geology, Calcutta, published by the Geological, Mining and Metallurgical Society of India.

Dr. A. B. Gupta (Physics) acted as a member nominated by the Director, Central Leather Research Institute, Madras of the Assessment Committee for Scientists 'B'. Dr. Gupta has been appointed member, Board of Examiners (Ph.D.), University of Madras.

Professor K. C. Malhotra (Anthropometry and Human Genetics) served as Chairman, National Expert committee on Drinking water and Health, constituted by Department of Science and Technology; served as a member of 3 committees of Planning Commission; served as a member of Expert Committee on Application of Science and Technology for the development of Weaker section of the society of DST; appointed Chairman, National Steering Committee, International Conference on progress and trends in Dermatoglyphics; member National Scientific Advisory Committee, International Symposium on Genetics, Health and Diverse; appointed Hon. Research Director, Indian Anthropological Society; was elected vice-president Indian Anthropological Society; appointed a member of expert committee of Manav Sangrahalaya Samiti, Government of India; appointed expert monitoring committees of DST to evaluate DST sponsored projects in Bihar, MP and Andhra Pradesh; Editor, Bulletin of International Dermatoglyphic Association; member editorial boards of Human Biology (USA) and HOMO (West Germany); was invited as a visiting scientist for 2 weeks at Indian Institute of science, Bangalore in September 1988; his book (edited) on Statistical Methods in Human Population Genetics was released at a function at Ranchi on 24 February, 1989.

Professor Amitabha Basu (Anthropometry and Human Genetics) was invited to participate in the evolution of the 7th Plan project progress and 8th Plan projects proposals of the Anthropological Survey of India.

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Dr. Ranjan Gupta (Anthropometry and Human Genetics) has been teaching since 1987 at the Vidyasagar University on invitation.

Shri B. Mukhopadhyay (Anthropometry and Human Genetics) has been invited to teach at the Vidyasagar University.

Dr. Chandralekha Duttgupta (Biochemistry) continued as (i) Visiting Assistant Professor, Einstein College of Medicine, Bronx, N.Y., U.S.A. and (ii) Professor (Honorary), Guha Institute of Biochemistry, Calcutta.

Professor R. Mukherjee (Economic Research) has been renominated to the Governing Council of the National Sample Survey organisation (NSSO) for the next term (1988-1990).

Dr. L. S. Bhat (Planning) (i) Member of the Steering Committee on National Resource Data Management System (NRDMS) for District Planning constituted by the Department of Science and Technology, New Delhi. (ii) Member of the Indian Association of Social Science Institutions, Delhi.

Dr. Atis Kr. Dasgupta (Sociology) has been functioning as the member of the following committees : (i) the Advisory Committee for the State Archives of Government of West Bengal ; (ii) the Advisory Committee for the State Archaeology of Government of West Bengal ; (iii) the Governing Body of Netaji Institute for Asian Studies ; (iv) Dr. Dasgupta has also accepted the responsibility of one of the General Secretaries of Lokavidya Kendra set up to publish Encyclopaedia in Bengali and (v) Dr. Atis K. Dasgupta accepted the additional assignment of "Visiting Professor" at the Department of Sociology, Kalyani University, for the year 1988-89.

Shri S. K. Biswas (Sociology) assigned as : (i) Member, Post-Graduate Board of Studies in Sociology, Calcutta University ; (ii) Member, Post-Graduate Board of Examiners, in Sociology, Calcutta University and (iii) Member, Post-Graduate Board of Examiners and Moderators in Anthropology Department, Calcutta University.

Shri V. Narayana (SQC and OR) was invited to act as a judge in the A.P. State Regional Convention on Quality Circles organised by A.P. Chapter of QCFI in August 1988. He also functioned as a judge on invitation from Cement Corporation of India in their second convention of Quality Circles in January 1989.

Shri Narayana also presided over the inaugural session of Quality Week at HCL, Hyderabad in September 1988.

Shri Y. U. Rau (SQC and OR) was invited by BHPL to act as a judge in the Case Study Presentation Contest by Quality Circles of BHEL, Hyderabad in September 1988.

Shri J. Venkatappaiah (SQC and OR) abstracted 18 articles for 'Applied Statistics and Quality Control Abstract' Journal of the Executive Sciences Institute, USA.

Shri Venkatappaiah jointly with Shri K. K. Gupta, General Manager, Hindusthan Cables Ltd., Hyderabad, won the third prize in the National Case Study Contest

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organised by IAQR, Pune, for their case study on "Experimentation for process Engineering of Jelly filling of Telecommunication Cables".

Shri N. T. V. Ranga Rao (SQC and OR) abstracted 25 articles for 'Applied Statistics and Quality Control Abstract' Journal of the Executive Sciences Institute, USA.

Shri C. R. Prasad (SQC and OR) took charge as the Hony. Editor of the 'Quality and Reliability Journal' of the National Institute for Quality and Reliability from March 1989.

Dr. K. G. Ramamurthy (SQC and OR) is serving as Principal Secretary for the Asian Congress on Quality and Reliability to be held at Delhi during 30 October-2 November 1989.

10. SCIENTIFIC TOURS AND ASSIGNMENTS ABROAD

Dr. S. Nag (Stat-Math.) visited (i) Cornell University, USA during the period August 1987 to June 1988 as a Visiting Faculty; (ii) International Centre for Theoretical Physics, Italy during the period July 1988 to April 1989 as a Visiting Mathematician. During the period April 1988 to March 1989 he delivered about 15 lectures (invited) at the (i) Princeton University, USA; (ii) Pennsylvania State University, USA; (iii) City University of New York, Lipman Bers' Seminar; (iv) International Center for Theoretical Physics, High Energy Physics Seminar; (v) New York Dynamical Systems Seminar as "Einstein Visitor to New York"; (vi) CERN, Geneva; (vii) IHES, Paris; (viii) Imperial College of London, U.K.; (ix) King's College of London, U.K.; (x) University of Southampton, U.K.; (xi) University of Bielefeld, West Germany; (xii) University of Munster, West Germany and (xiii) University of Hagon, West Germany.

Dr. R. B. Bapat (Stat-Math.) attended the Mathematical Sciences Lecture Series on Matrix Spectral Inequalities, Johns Hopkins University, Baltimore, Maryland, during June 22-24, 1988; Sponsored by Department of Mathematical Sciences, Johns Hopkins University and presented a paper entitled "Majorization and Singular Values II". He also gave seminars at University of Maryland, Baltimore County; University of Lexington; Kentucky and Northern Illinois University, Dekalb. He left India on 19 June 1988 and returned on 11 July 1988.

Dr. R. Bhatia (Stat-Math.) attended the Conference on Matrix Spectral Inequalities, Johns Hopkins University, Baltimore, USA, June 1988. He gave an invited talk and participated in discussions.

Dr. Kalyan Mukherjee (Stat-Math.) visited College on Global Analysis at ICTP, Trieste, Italy during 19 November-15 December 1988. He delivered a lecture based on "Coincidence Point Theorems for Manifolds with Boundary in Topology".

Dr. K. R. Parthasarathy (Stat-Math.) visited France under the exchange programme between the National Board for Higher Mathematics and C.N.R.S. (France) during 13 May 1988-14 June 1988. He delivered lectures on (i) Operator representation

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of Azema martingales, University of Paris—31.5.88; (ii) Introduction to quantum probability, University of Strasbourg—0.6.88; (iii) Cohomology of finite power sets and construction of quantum fields, CNRS Centre for Theoretical Physics, St. Luminy, Marseilles—13.6.88. Dr. Parthasarathy visited University of Rome II and participated in the Bernoulli Conference on Stochastic Processes and their applications. He delivered invited address entitled "Cohomology of finite power sets, Wiener-Clifford algebras and Boson Fermion Bridges"—30.6.88.

He reminisced on Academician A. N. Kolmogorov, Academia Nazionale dei Lincei, Rome—2.7.88.

Dr. T. Parthasarathy (Stat-Math.) attended the Game Theory Workshop, Ohio State University, Columbus, Ohio, USA during July 4-29, 1988. He visited Cornell University during July 29—August 12, 1988 and participated in discussions with Professors Mukul Majumdar and R. Sundaram regarding problems relating to stochastic game theory. Gave two seminar talks one at Columbus and another at Cornell.

Dr. K. B. Sinha (Stat-Math.) was an invited visitor to Universities of Geneva, Switzerland, Nottingham at U.K. and Heidelberg at F.R.G. during August—October 1988.

Dr. K. P. S. B. Rao (Stat-Math.) visited the University of Brunei from 17.1.88 to 30.6.88.

Dr. K. Rama Murthy (Stat-Math.) has been a visiting faculty member at the University of Tennessee, Knoxville, U.S.A., since August 1988.

Dr. S. Ramasubramanian (Stat-Math.) has been a visiting faculty member at Indiana University, Bloomington U.S.A., since August 1988.

Dr. V. S. Sunder (Stat-Math.) was a Visiting Fellow at the University of New South Wales, Australia during October-November 1988. He gave lectures at the University of New South Wales and Macquarie University, Sydney.

Dr. Arijit Chaudhuri (Applied Statistics, Surveys and Computing) visited (1) The University of Havana, Havana (Cuba) under an educational and cultural exchange programme during 6.6.88-22.6.88 to give 5 seminar talks on survey sampling, and (2) Carleton University, Ottawa (Canada) during 23.10.88-5.1.89 to do research jointly with Prof. J. N. K. Rao in the area of foundational aspects of sample surveys and small area estimation—gave an invited talk on Randomized Response Surveys of Statistics, Canada (Ottawa).

Dr. Parimal Mukhopadhyay (Applied Statistics, Surveys and Computing) undertook a scientific tour to Australia during 16th May—19th June 1988. Dr. Mukhopadhyay presented a paper "On estimating the variance of a finite population under a superpopulation model" (written jointly with S. Bhattacharyya) to the National Mathematical Science Congress, Australian National University in May 1988. Also visited the Department of Mathematics, University of Western Australia, Nedlands,

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from 20th May to 18th June and gave seminar, "On the robustness of some BLU-predictors under a class of alternative multiple regression models".

Professor P. Bandyopadhyay (Electronics) visited Australia in August, 1988 and gave a talk entitled "Quantum gravity, supergravity and torsion" in the Fifth Marcel Grossmann meeting held in Perth.

Shri S. Roy (Electronics) visited Department of Theoretical Physics, Moscow State University, U.S.S.R., for six weeks (November-December, 1988) to collaborate with Professor G. S. Asanov under Indo-Soviet Cultural Exchange Programme.

Shri Roy visited Joint Institute for Nuclear Research, Dubna, U.S.S.R., on invitation of the Director of the Institute for two weeks in December, 1988. He gave lectures at JINR on 'Cosmological Constant'.

Professor D. Dutta Majumder (Electronics and Communication Sciences) attended and delivered an invited talk in International Conference on Pattern Recognition, Rome—Italy, 14-17 November, 1988. He chaired a technical session on Filtering estimation in ICPR, Rome, Italy, November, 1988.

Professor D. Dutta Majumder visited International Association for Pattern Recognition (IAPR), Italy during 19-21 November 1988 and participated in Governing Board Meetings of IAPR and also its sectional committee meeting for representing India.

Professor Dutta Majumder also visited the Institute of Cybernetics, University of Palermo, Italy during November and delivered an invited lecture.

Professor S. K. Pal (Electronics and Communication Sciences) visited the Department of Management Engineering, Osaka Electrocommunication University, Japan on 18 August 1988 and delivered an invited talk on 'Image Processing and analysis : conventional approach' at Osaka.

Professor Pal Chaired session on 'Pattern Recognition' and gave an invited talk on 'Relevance of fuzzy mathematics in machine vision' in Int. Workshop on Fuzzy system and applications, Lizuka, Fukunoka—Japan, 21-24 August, 1988.

Professor Pal also delivered at a special seminar held at Fukunoka on 26 August, 1988, a series of talks on 'Fuzzy set theoretic pattern recognition', for application oriented Industrialists and Engineers.

Shri M. K. Kundu (Electronics and Communication Sciences) visited under UNDP fellowship programme attached to M.I.T., Cambridge USA, during September 1988-February, 1989 when he did several courses in computer vision/machine vision offered by Artificial Intelligence Laboratory and Computer Science Department.

Shri Kundu also visited at AT & T Bell Lab., Allen Town—P.A., USA on 27 December 1988 for a technical discussion with the working scientists regarding the fabrication of digital signal processors.

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Shri S. N. Biswas (Electronics and Communication Sciences) visited under UNDP fellowship programme attached to MIT, Cambridge, USA during September 1988—February 1989, where he did several course work on computer and machine visions offered by Artificial Intelligence Laboratory and Computer Science Department. Also he, for a brief period of 2 months, worked at Computer Vision Laboratory, Amherst University, USA.

Miss Soma Mukherjee (Physica) attended the 8th International Symposium on Bioengineering and the Skin at Milwaukee, Wisconsin, USA during June 16-18, 1988 and presented a paper entitled 'pH-mapping of prepubertal skin of Indian Subjects'. She also attended a pre-symposium Workshop on 'Bioengineering' there. She also participated in an 'Observation and Training Programme' at National Hansen Disease Centre at Carville, Louisiana, USA during June 20-26, 1988.

Dr. B. Karmakar (Anthropometric and Human Genetics) participated in the 12th International Congress of Anthropological and Ethnological Sciences, Zagreb, Yugoslavia, 24-31 July 1988, organised by the Croatian Anthropological Society, Institute for Medical Research and Occupational Health, University of Zagreb, Yugoslavia and presented a paper.

Dr. Karmakar attended the 5th Annual Anthropology and Health courses : Biocultural antecedents to Alcoholism, Dubrovnik, Yugoslavia, 14-20 August 1988. He also visited the Inter University Centre of Post Graduate Studies and took part in Teaching.

Dr. Karmakar also visited two University (a) Torino and Florence, Department of Anthropology, Italy, during 1-20 August, 1988 and at Torino and Florence University had discussion with Prof. M. Masali and Prof. A. D. Chiarelli, and (b) gave seminars at the department of Anthropology.

Professor K. C. Malhotra (Anthropometry and Human Genetics) attended the 12th International Congress of Anthropological and Ethnological Sciences at Zagreb, from 24-31 July 1988. He presented 3 papers, and chaired 3 sessions. He also visited universities of Bremen and Hamburg where he gave seminar talks.

Professor Malhotra visited several universities in USA, during 10th January 1988 to 14th February 1989. University of Utah, Salt Lake City; Meharry Medical College, Nashville; Center for Demography and Population Genetics, University of Texas, Houston; Medical School, Washington University, St. Louis; University of Arizona at Tucson, and Department of Anthropology of Pittsburg and delivered many talks and held discussions and conducting joint research work.

Shri P. Dasgupta (Anthropometry and Human Genetics) visited (a) Free University of Brussels, Laboratory of Anthropogenetics, Belgium, under the framework of advanced research and training in Human Growth and Development, from 9th September to 10th October 1988. (b) Institute of Child Health, University of London, from 10th to 20th October 1988 for a collaborative work with Prof. J. M. Tanner, Emeritus Professor of Child Health and Growth, University of London.

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Professor R. L. Brahmachary (Embryology) visited Africa on the invitation of George Adamson (of 'Born Free' fame) and conducted some ecological studies on lions and *Acacia* thorns at the Kora National Reserve, Kenya, during November 30—January 28, 1989.

Dr. N. Bhattacharya (Economic Research) served as Statistician/Lecturer in Statistical Methods and Sampling at the Statistical Institute for Asia and the Pacific (SIAP), Tokyo under UN ESCAP, from 12 September 1987 to 31 March 1989.

Dr. Robin Mukherjee (Economic Research) visited the Brown University, USA in May 1988 on invitation and gave Seminars at Brown and at the State University of New York at Albany, New York. He was also invited to teach and participate as a consultant in an SIAP/UNDP/ESCAP sponsored course held in Vientiane at Lao PDR in March 1989.

Dr. Debraj Ray (Planning) visited (i) Universidad Autonoma de Barcelona, Barcelona, Spain, during May—June 1988, (ii) Institute de Matematica Pura e Aplicada, Rio de Janeiro, Brasil, during June—July 1988. He attended workshops on : (i) Mathematical Economics, Luminy, France, June 1988—contributed a paper ; (ii) Economic Theory Conference, Barcelona, Spain, June 1988—contributed two papers.

Dr. Atul Sarma (Planning) on invitation (i) visited the FAO of the UN, Rome to prepare two papers—"Net Transfer of Resources from Agriculture : Concept and Methodology" and "Agricultural Taxation in Developing Countries"—for initiating country studies during October-December 1988 (ii) participated IDPAD, Netherlands in the IDPAD project on Projects for Trade in Manufactures among Developing Countries during March 19-26, 1989.

Dr. P. Chander (Planning) visited (i) California Institute of Technology, June 8, 1988 (ii) State University of New Jersey, Rutgers, June 20, 1988 (iii) Tilburge University, November 16, 1988 (iv) C. O. R. E. University Catholique de Louvain, November 21, 1988 (v) C. E. M. E. Universite Libre de Bruxelles, November 22, 1988 (vi) Chaired a session and presented a paper at the Far Eastern Meeting of the Econometric Society held in Kyoto, Japan June 10-11 1988, (vii) University of Kagawa, Japan, June 12, 1988 (viii) University of Okayama, Japan, June 13, 1988, (ix) University of Armidale, Japan, June 16, 1988.

Dr. Alokanda Mitter (Linguistic) visited Belgrade, Yugoslavia at the invitation of the Institute of Experimental phonetics and Speech Pathology, Belgrade, Yugoslavia, from 5 September 1988 to 28 October 1988. During her stay she participated in the Belgrade Institute's project on "Speech Habilitation of the pre-school age hearing impaired child with Kostic' methodology and instrumentation". She also worked with Professor Kostic on the Unit Plan Projects and discussed expansion of activities with him.

Dr. C. R. Malakar (Population Studies) at the invitation, visited the School of Oriental and African Studies (SOAS), University of London during 25 August—21 September 1988 and undertook collaborative research on the project entitled "The

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Impact of Environment and Economic Class on Health in Urban India". Two reports were prepared at the SOAS.

Dr. T. S. Arthanari (SQC and OR) visited New Shattal, Switzerland to present a paper on 'Parametric Design and Global Optimization' at the first International Conference on Optimal Design during July 1988. He also visited University of New Shattal during 29 July-12 August 1988.

Shri P. Lakshmanan (SQC and OR) in the capacity of Hony. Director of Gemini Colour Lab. was sponsored by the company to participate in Photokina at Koln and study the methodology of Quality and Productivity in West Germany, U.K. France, Italy and Switzerland during 7-18 October 1988.

Shri P. K. Basu (SQC and OR) participated in the 3 weeks training programme on Production Quality Management conducted by Asian Productivity Organisation, Tokyo, during February-March 1989.

Shri T. K. Chakraborty (SQC and OR) attended First International Conference of the Association of Asian Pacific Operations Research Societies within IFORS held in Seoul Korea, during 24-26 August 1988. He presented a paper 'Fuzzy Goal Programming Approach to Single Sampling Inspection' and acted as a chairperson in the session 'Quality Control'.

Dr. S. K. Majumder delivered a series of invited lectures on Process Capability and Design of Experiments organised by IIM, Calcutta at Kathmandu, Nepal during 6-11 June 1988.

Shri S. S. Handa (SQC and OR) presented a paper on "Quality Improvement of Hollow guide blades" in the Second Asia Pacific Conference at Seoul, South Korea during 28-29 November 1988

Shri A. K. Chowdhury (SQC and OR) continues in his assignment at Al-Fateh University, Tripoli.

Shri A. N. Nankana (SQC and OR) served as a member in the Committees on standards on 'Quality Control and industrial statistics' at Bureau of Indian Standards. He is working as Convener, Finance Committee for the Asian Congress on Quality and Reliability to be held at Delhi during 30 October-2 November 1989. He, also acted as a member of Advisory Board of Maintenance Journal of National Productivity Council.

Shri S. C. Chakraborty (SQC and OR) reviewed a book "Sample Survey designs" by Daraga Singh and F. S. Chaudhury for OPSEARCH. He is also working as Executive Secretary for the Asian Congress on Quality and Reliability to be held at Delhi during 30 October-2 November 1989.

Shri Rajiv Goel (SQC and OR) reviewed a book "Business Statistics" by C. V. Shenby and others for OPSEARCH. He also reviewed two papers on sampling plans for OPSEARCH.

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Dr. R. J. Pandey (SQC and OR) is serving as Joint Secretary, Programme and Publication Committee of Asian Congress on Quality and Reliability to be held at Delhi during 30 October—2 November 1989. He served as a member of SMD4 Committee of Bureau of 'Indian Standards'. He has also prepared 4 technical abstracts for 'Applied Statistics and Quality Control Abstract' Journal of the Executive Sciences Institute, USA.

Dr. S. K. Majumder (SQC and OR) has been elected as an Executive Member of the Committee of "Metallurgy and Material Sciences", Institute of Engineers (India), West Bengal State during 1989-91.

Shri D. T. Ghosh (SQC and OR) on being requested by the Bureau of Indian Standards, prepared a draft : Indian Standards on Statistical Interpretation of data—Determination of Statistical Tolerance Interval.

Shri B. K. Pal (SQC and OR) was elected as the Honorary Secretary of the National Institute of Quality and Reliability, National Body. He was invited to act as a judge for QC Presentation Contest at HAL in September 1988, and at Indian Telephone Industries in December 1988.

Shri C. A. Setty (SQC and OR) was elected Hony. Treasurer of NIOR, Bangalore Branch (1989).

Shri R. Anantha Rao (SQC and OR) was elected Hony. Secretary of NIOR, Bangalore Branch (1989). He also functioned as a judge on invitation from Confederation of Engineering Industries at Bangalore, Karnataka Region, at the Quality Circle Contest in November 1988 and later for Southern Regional Competition in QC Circles (Finals) on 28 January 1988.

Shri V. Narayana Iyer continued as a Director of M/s. Karur Mills Ltd., Karur. He continues to serve as a member of Expert Advisory Committee of ETDC, Trivandrum Centre, a DOF Unit. He was also selected as a member of the Organising Committee for conducting the Annual Conference of ORSI at Trivandrum during May 1988.

Shri V. Gopalan (SQC and OR) Chaired the first Technical Session on "Application of Statistical Techniques in Textile Industry" at P. S. G. College of Arts and Sciences on 30 March 1989.

11. SCIENTIFIC ASSIGNMENTS IN INDIA

Dr. Somesh Bagchi (Stat-Math.) attended the 'Instructional Conference in Ergodic Theory' held at TIFR, Bombay under the auspices of the National Board of Higher Mathematics during the period May 31, 1988 to June 21, 1988 as an Instructor. Besides participating in discussions and tutorials, he gave about 10 lectures in the area of 'Smooth Dynamical Systems and Hamiltonian Mechanics' and 'Homeomorphisms of the Circle : Ergodic Classification'.

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Dr. J. Mathew (Stat-Math.) gave lectures in the Instructional Conference in Ergodic Theory held during the period 30 May to 18 June 1988 organised by the University of Bombay and TIFR., Bombay.

Dr. Rahul Mukherjee (Stat-Math.) participated at the R. C. Bose Symposium, organized jointly by the Indian Statistical Institute, Delhi University and the Indian Agricultural Statistics Research Institute at New Delhi during 26 to 30 December 1988 and read a paper.

Dr. Amiya Mukherjee (Stat-Math.) delivered an invited lecture at the 'Professor F. W. Levi Conference' on March 30, 1989 which was held under the auspices of the Calcutta University at the Department of Pure Mathematics.

Dr. T. J. Rao (Stat-Math.) participated at the : (i) R. C. Bose Memorial Conference held on New Delhi, December 1988 and presented a paper, (ii) Indian Science Congress held at Madurai in January 1989 and presented a paper. He was also been invited by the : (i) University of Rajasthan as a Visiting UGC Professor 14 November to 30 November 1988, (ii) Reserve Bank of India, Bombay to give a series of lectures on Sampling Techniques during March 6-12, 1989.

Professor A. K. Roy (Stat-Math.) delivered an invited lecture at the 'Professor F. W. Levi Conference' on March 30, 1989 which was held under the auspices of the Calcutta University at the Department of Pure Mathematics. He also attended the Mathematics Advisory Committee meeting of the BRNS as a member in late February 1989.

Dr. K. Sikdar (Stat-Math.) lectured at a six weeks summer training course in Theoretical Computer Science organised during May-June, 1988, for the Prefinal B.Tech. students of Computer Science and Engineering, Jadavpur University.

Dr. T. P. Tripathi (Stat-Math.) participated in the 42nd Annual Conference of Indian Society of Agricultural Statistics held at Assam Agricultural University, Jorhat during 19-21 January 1989 and presented a paper.

Dr. R. Bhatia (Stat-Math.) delivered lectures on : (a) "The Clarkson-McCarthy Inequalities", TIFR, Bombay, July 1988 (b) "Perturbation of Eigenvalues", IIT, Bombay, July 1988 (c) "An interpolation problem for matrices", Bombay University, July 1988 (d) "Roots of polynomials"—Invited talk at the Annual Conference of the Indian Mathematical Society, University of Poona, December 1988 (e) "A History of Fourier Series", UGC sponsored Seminar at Lady Shri Ram College, Delhi, 10th February 1989 (f) "Perturbation of Eigenvalues", Punjab University, Chandigarh, February 1989 (g) "Uniform convexity of norm ideals", Punjab University, Chandigarh, February 1989.

Dr. K. R. Parthasarathy (Stat-Math.) delivered lectures on : (a) "Principle of least squares"—to students who won prizes in Mathematical Olympiad, 21.12.88 (b) "From random walks to diffusions in quantum probability"—Indian Science Congress, Madurai, 9.1.89 (c) "Chaos of Markov chains"—Seminar at ISI Delhi Centre, 28.2.89 (d) "A historical survey of Brownian motion"—Lecture at B.I.T.S.,

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Pilani, 2.3.89 (e) "Comments on the journal: Sankhya" at the 'Brain storming session on Indian S & T periodicals', IIT, Madras, 18.3.89.

Dr. Kalyan Mukherjee (Stat-Math.) attended the Indo-French Colloquium on Geometry in T.I.F.R., Bombay, February 1989.

Dr. V. S. Sunder (Stat-Math.) helped to organise the UGC-Instructional Conference on C*-Algebras held at the University of Hyderabad during 5.12.88 to 26.12.88 and gave several lectures. Dr. Sunder visited Calicut University from 12.3.89 to 25.3.89 and gave a series of lectures on von-Neumann algebras.

Dr. G. Misra (Stat-Math.) attended the UGC-Instructional Conference on C*-Algebras held at the University of Hyderabad during 5.12.88 to 26.12.88 and gave several lectures.

Dr. A. Sitaram (Stat-Math.) attended the UGC-Instructional Conference on C*-Algebras held at the University of Hyderabad during 5.12.88 to 26.12.88 and gave a few lectures. Dr. Sitaram visited the University of Hyderabad during August-October 1988 and gave a series of lectures on 'Linear Lie groups and representation theory'.

Dr. V. Pati (Stat-Math.) attended the Indo-French Conference on Geometry held at TIFR during February 1989.

Dr. S. N. Joshi (Stat-Math.) attended the Indo-US Workshop on Bayesian Analysis in Statistics and Econometrics held at Bangalore during December 1988. Dr. Joshi was also a member of the hospitality committee.

Dr. V. R. Padmawar (Stat-Math.) attended the Indo-US Workshop on Bayesian Analysis in Statistics and Econometrics held at Bangalore during December 1988.

Dr. S. Ramaswamy (Stat-Math.) attended the Raj Chandra Bose Symposium on Probability, Statistics and Design of Experiments held at Delhi during December 27-30, 1988.

Dr. Shiladas Bandyopadhyay (Applied Statistics, Surveys and Computing) attended the Sample Survey Methods for Disability Detection. Invited talk delivered in the Seminar on Lower Extremity Orthotics, 27-28 September 1988, organised by the National Institute for the Orthopaedically Handicapped, Calcutta.

Dr. Arun Adhikary (Applied Statistics, Surveys and Computing) (i) Attended the 76th session of the Indian Science Congress held at Madurai during 7 to 12 January, 1989. (ii) Went to Puri and Bhubaneswar during 12 to 18 September 1988 in connection with the field work of the Project 'A Survey of Tourists in Orissa, 1988-89'. (iii) Went to Delhi during 18 to 20 May, 1988 to attend a meeting held at CSO, Sardar Patel Bhawan regarding JCCS Training Programme Evaluation. (iv) Went to Delhi on 18 August, 1988 to attend the meeting of the Selection Committee held at CSO, R. K. Puram with Mr. Suiderrajan and Mr. H. K. Chawla. (v) Went to Puri during 2 to 6 December 1988 in connection with the educational excursion of the JCCS Trainees, 1988-89.

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Shri Nikhil Ranjan Pal (Applied Statistics, Surveys and Computing) delivered a lecture on "Data based management" for a two day course on "Application of computer in quality control" organised by the SQC OR Unit of the Institute.

Dr. Aditya Bagchi (Applied Statistics, Surveys and Computing) attended "Parallel Processing Systems and their Applications"—4th National Convention of Computer Engineers, Institute of Engineers, Calcutta, 1988.

Shri Sukumar Ganguly (Applied Statistics, Surveys and Computing) attended a Workshop at Delhi during the period 19 September to 7 October 1988.

Dr. B. N. Mukherjee (Applied Statistics, Surveys and Computing) on receiving special invitation, participated in the National Workshop in Educational Research Methodology held in Karaikudi, Tamil Nadu from December 8 to December 11, 1988 and delivered a special lecture on 'Some recent advances in the analysis of qualitative data'.

Dr. B. P. Sinha (Electronics) served as a reviewer of papers submitted for the (a) International Conference on Parallel Processing and Application, Calcutta, December 1988 and (b) R. C. Bose Memorial Conference on Combinatorial Mathematics and Application, Calcutta, December 1988.

Dr. Sinha was invited as an Expert for Panel Discussion in a Workshop of Local Area Network held in Department of Applied Physics, University of Calcutta in 1988.

Shri B. B. Bhattacharya (Electronics) acted as reviewer of papers submitted for the (a) International Conference on Parallel Processing and Applications, Calcutta, December 1988 and (b) International Conference on Foundation of Software Technology and Theoretical Computer Science, Pune, December, 1988.

Shri Bhattacharya delivered an invited talk on 'VLSI Design Methods' at a seminar on 'Recent Advances in Computers' organised by the Computer Society of India, Calcutta in March 1989.

Ms. S. Sur Kolay (Electronics) acted as a reviewer of papers submitted for the International Conference on Foundation of Software Technology and Theoretical Computer Science, Pune, December 1988.

Professor D. Dutta Majumder (Electronics and Communication Sciences) has performed the following: (a) Invited talk in National Conference on 'Super Computer and Application', organised by C. DACT, Pune 25-26 April 1988. (b) Invited talk in 1st National Conference on KBCS, NAL—Bangalore 10-11 June, 1988. (c) Invited talk in Symposium on 'Electronics for Rural Development IETE—Calcutta, 27-28 August, 1988. (d) 1st Death Anniversary lecture of Prof. A. K. Chowdhury, IRPE, Calcutta University, Calcutta 6 September, 1988. (e) Invited talk in SEARCC 88 Conference New Delhi, 28 November—2 December, 1988. (f) Special talk in National Seminar on 'Nation Building, Development Process and Communication' New Delhi, 3-7 December 1988. (g) Invited talk in National Seminar on 'Parallel Processing Systems and their Application', Institute of Engineers, Calcutta,

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9-11 December, 1988. (h) Invited talk in CSI seminar, Calcutta 16 December 1988. (i) Keynote Address in 2nd All India Inter-Engineering College Academic meet 1989, B.E. College, Howrah, 6-8 December 1988. (j) Invited talk in National Council of Science Museums BITM, Calcutta 26 January 1989. (k) Session—Chairman of 'Models in Medicine' on Workshop on Mathematical Models in Biology and Medicine, ICB—Jadavpur 22-23 February 1989.

Professor A. K. Datta (Electronics and Communication Sciences) delivered an invited talk in National Conference on Speech Signal Processing, TIFR, Bombay 31 October 1988.

Professor J. Das (Electronics and Communication Sciences) has performed the following : (a) User—Researcher Interaction Seminar, DEAL—Dehradun, 14-15 April, 1988. (b) Invited talk in National Conference on Environment Degradation and Regeneration, Panjabi University—Patiala, 27-29 October 1988.

Professor S. K. Pal (Electronics and Communication Sciences) has performed the following . (a) Delivered a series of invited lectures on Pattern Recognition and Image Processing, DRDO-Ministry of Defence, New Delhi, 23-24 May 1988. (b) Delivered two invited talks at Summer School, IIT-Kharagpur, 1 July, 1988. (c) Presented a paper in Seminar on Parallel Processing Systems and their Applications, Institute of Engineers, Calcutta, 9-11 December, 1988. (d) Series of special lectures in National Seminar on Computer Hardware and Software Applications, Rourkela Engineering College, Orissa, 23-25 February 1989.

Professor B. B. Chaudhuri (Electronics and Communication Sciences) delivered an invited talk, IRPE-Calcutta University, 31 May 1988.

Shri A. K. De (Electronics and Communication Sciences) attended User-Researcher Interaction Seminar, DEAL, Dehradun, 14-15 April 1988.

Shri B. Chanda (Electronics and Communication Sciences) presented a paper in 1st National Conference on KBCS, NAL, Bangalore, 25-26 April 1988.

Dr. A. Bagchi, Mr. A. Gupta and Mr. S. R. Das (Electronics and Communication Sciences) have attended National Seminar on Parallel Processing Systems and Applications, Institute of Engineers, Calcutta 9- 11 December 1988.

Dr. D. Saha (Geology) delivered a series of lectures on Precambrian stratigraphy as a Guest Lecturer (Geology) in the Post-Graduate, Geology Department, Calcutta, University, Calcutta.

Dr. A. B. Gupta (Physics) attended the XVII National Conference of the Indian Association of Dermatologists, Venerologists and Leprologists at the Taj Hotel, Bombay during January 9-11, 1989, sponsored by IADV L., and presented two papers on investigative dermatology and also actively participated in the special seminar 'Dermatosurgery' conducted as a part of the Conference. His book on 'Dermatophysics' was released during the workshop on 'Dermatosurgery'.

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Mr. S. Adhikari (Agricultural Sciences) attended the 76th Session of the Indian Science Congress Association, held at Madurai during January 7-12, 1989 and presented a paper.

Dr. D. K. Bagchi (Agricultural Sciences) attended Annual Conference of Indian Society of Agricultural Biochemists and Society for Green Vegetation Research held in C. S. Azad University of Agriculture, Kanpur during 27-30 October, 1988 as invited speaker and delivered his lectures.

Dr. Bagchi attended the Second Annual Convention on 'Green Vegetation Research' held at Kanpur during 27-28 October 1988 and presented a paper.

Shri S. Das (Agricultural Sciences) attended the 76th Session of Indian Science Congress held at Madurai during January 7-12, 1989 and presented a paper.

Shri S Das and M. Ghose (Agricultural Sciences) attended the National Symposium on Modern Trends of Plant Taxonomy during March 27-28, 1989 at Kalyani University and presented a paper.

Professor K. C. Malhotra (Anthropometry and Human Genetics) as an expert attended (i) Workshops held at Aizwal (18-22 April 1988) and Kohima (26-28 April 1989) on Shifting Cultivation and sustainable development, sponsored by the Department of Environment, Government of India. (ii) Meeting on 'Input of Science and Technology for the development of Bastar', DST, New Delhi on 29th June 1988. (iii) Meeting on "Delivery mechanisms for transfer of technology", DST, New Delhi, 19 August, 1988. (iv) Workshop of Monitoring Group, DST, New Delhi held at Palghat on 26-27 September 1988.

Professor Malhotra also attended (i) Board of Studies of Department of Sociology, S. V. University, Tirupati in May 1988. (ii) Third International Range land congress, held at Delhi, 7-11 November, 1988, Chaired a session and presented a paper. (iii) XIV Annual Conference of Indian Society of Human Genetics and role of Human Genetics in the Health Programme of the Tribal People held at Ranchi, 24-26 February 1989, he gave a presidential address, and chaired a session and presented a paper. (iv) Seminar on Health, Culture and Environment held at Calcutta 17-19 March 1989 and presented a paper and chaired a session.

Professor Malhotra organized a Workshop sponsored by DST on Status of anthropological, demographic and health data among tribes of Bastar, at Ranchi during 22-23 February 1989.

Professor Amitabha Basu (Anthropometry and Human Genetics) attended (a) the International Seminar on Tribal Culture in a Changing World, Institute of Oriental and Orissan Studies, Cuttack, December 1988. (b) National Seminar on Integrated Tribal Development, Strategies, challenges and Prospects, Tamil University, Tanjavur. March 1989.

Dr. Premnanda Bharati (Anthropometry and Human Genetics) attended the 6th Annual Convention and National Seminar on Statistics in Medicine, Health and Nutrition, Hyderabad, October 1988.

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Mr. B. Karmakar (Anthropometry and Human Genetics) participated in seventy fifth session of the Indian Science Congress, Pune, 7-12 January 1989, Pune University and presented a paper.

Prof. B. N. Mukherjee (Anthropometry and Human Genetics) attended the 14th Annual Conference of Indian Society of Human Genetics and the National Seminar on the Role of Human Genetics in the Health Programme of the Tribal People of India, held at Ranchi, from 24-26 February, 1989, and presented a paper as well as chaired the session on Population Genetics.

Dr. P. K. Tapaswi (Embryology) delivered an invited lecture on Mathematical Modelling of Cell Differentiation and Morphogenesis at the Calcutta Mathematical Society.

Dr. D. Dasgupta (Economic Research) attended the conference on Development Economics Organised by the Delhi School of Economics, during December 1988 and presented a paper.

Dr. D. Coondoo (Economic Research) participated as a discussant in the International Conference on "Methods of planning and policy Analysis for Mixed Economics" organised by the Indira Gandhi Institute of Development Research, Bombay, during January 1989. He also participated as a discussant in the Annual Conference of the Centre for Advanced Studies in Economics, Presidency College, Calcutta, during March 1989.

Dr. S. Chakraborti (Economic Research) attended the 71st Annual Conference of the Indian Economic Association held at Jadavpur University, Calcutta, during December 29-31, 1988 and the "Workshop on Transport Planning in Eastern India Co-ordination of alternative methods" organised by Centre for Transport Studies, Jadavpur University, Calcutta during March 17-18, 1989. She also attended and presented a paper in the 26th Indian Econometric Conference, Bombay, during January 2-4, 1989.

Shri B. Roy (Economic Research) participated in the 9th Annual Conference Narendrapur, during February 1989 and presented a paper. He also participated in the "National Seminar of Save and Depressed Children", Calcutta University, during December 1988 and presented a paper.

Shri K. Chattopadhyay (Economic Research) attended the Conference on Industrialization and Urban Development held at the Department of Economics, Calcutta University, during 25-26 February 1989.

Dr. L. S. Bhat (Planning) (i) participated in a Workshop on the preparation of a national source book on population and development organised by the NCERT at Bangalore during April 6-8, 1988; (ii) participated in the Data Users' Conference, organised by the Registrar-General and Census Commissioner in Delhi during April 18-20, 1988; (iii) Organised and participated in the training programme of C.S.O. (JCCS Part III trainees) on Regional Planning, during May 24, 1988; (iv) delivered special lectures on "Micro Level Planning with reference to integration of remote sensing

data with those of socio-economic data" by the National Remote Sensing Agency, Hyderabad during June 27-28, 1988; (v) delivered inaugural address to the Seminar on Indian Development experience—Regional Planning, Miranda House, New Delhi on August 25, 1988; (vi) Participated in the Workshop on Monitoring and Evaluation of Non-formal education Information System organised by the National Institute of Education and Planning Administration, New Delhi during September 5-6, 1988; (vii) participated in the Seminar on "Strategies for the VIII Five Year Plan with reference to weaker sections" organised by the Minorities Commission in Delhi on September 24, 1988; (viii) participated in the Indo-Soviet Seminar on rational utilisation of Natural Resources, organised by the J.N.U. Delhi during October 10-12, 1988; (ix) participated in the Seminar on Environment and Development of the Hilly and Tribal Areas, organised by the NEHU, Shillong during October 14-17, 1988; (z) delivered lecture on spatial dimensions in District Planning at the Haryana Institute of Public Administration, Chandigarh on November 15, 1988; (xi) participated in the 10th Indian Geography Congress of the National Association of Geographers at Mysore during December 26-28, 1988. Dr. Bhat served as Secretary-General of the Association during 1988-1989; (xii) delivered key-note address at the Seminar on Environment and Development, organised by the G. B. Pant Institute of Himalayan Studies at Almora during December 30, 1988 to January 1, 1989; (xiii) participated in the National Workshop on Metropolitan Planning Organised by the School of Planning and Architecture, New Delhi during January 2-4, 1989; (xiv) participated in the National Seminar on Changing Role of Agriculture in Regional Development, organised by the Aligarh Muslim University, Aligarh during February 21-23, 1989.

Dr. Atul Sarma (Planning) (i) Delivered two lectures on Forecasting tools at the National Institute of Rural Development, Guwahati on June 1, 1988. (ii) Delivered two lectures on Planning for Economic Development in a tribal economy to the participants in the ICSSR workshop on Research Methodology on Economic Development Tribals in Orissa, Cuttack, June 10, 1988. (iii) Delivered one lecture on Centre-State Financial Relations at the Assam Administrative College, Guwahati on June 27, 1988. (iv) Participated in the Finance Minister's Pre-budget meeting with Economists held on January 6, 1989.

Dr. Debraj Roy (Planning) participated Development Economics Conference, Delhi School of Economics, on December 1988 and contributed a paper.

Mr. P. N. Mukherji (Planning) (i) "Sociology, Development and National Integration" Key note address Inaugural Conference, All Orissa Sociological Association, Kendrapara College, during September 24, 1988. (ii) "Agrarian Movements", Lecture invited for Indira Gandhi National Open University. (iii) National Labour Institute, October 1988, Leadership Development Programme. (iv) Series of Lectures on Social Movement and social change, Lal Bahadur Shastri National Academy of Administration, Mussoorie, 3-6 May 1988. (v) "Theory in the study of Indian Society", Open Panel Discussion Lecture, XIX Indinn Sociological Conference, 3-5 March 1989, Narayana Agricultural University, Ilissar. (vi) "Gandhi and the Dalit Question", Seminar, Gandhian Institute of Studies, Varanasi, 18-19 March 1989. (vii) Invited to a meeting of the Sub-Committee of the National Integration Council, July, 8, 1988.

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Dr. M. R. Saluja (Planning) (i) First Data Users Conference 1991 census, held by the Office at the Registrar General and Census Commissioner, India, April 18-20, 1988. (ii) Workshop on "Quantification of Benefits and their Relationship with the Public Expenditure on Social Services" jointly held under the auspices of the U.P. Planning Department and the Planning Commission, during April 21, 1988.

Dr. S. M. Kansal (Planning) attended the Seminar, organised by the Indian Association for Research in National Income and Wealth (IARNIW) at Lucknow, during 16-18 November 1988 presented a paper (jointly with B. S. Mishra) on the comparisous of the NSS and CSO Estimates of Private Consumption.

Mrs. C. Juyal (Planning) (i) attended the Indian Econometric Society Meeting, January 1989. (ii) attended a National Workshop on "Situational Analysis of Children in India" during March 14-16, 1989, organised by the National Institute of Public Cooperation and Child Development, New Delhi.

Dr. N. S. Iyengar (Economic Analysis) attended and participated (i) Workshop on Food Futures and Security by 2010 AD., Central Food Technological Research Institute, Mysore on June 26, 1988. (ii) Twenty-Sixth Indian Econometric Conference, Department of Economics, University of Bombay, Indira Gandhi Institute of Development Research, Bombay, he delivered the Presidential Address. Title: "Recent Studies in Poverty in India: A Survey" on January 2-4, 1989. (iii) International Conference on Methods of Planning and Policy Analysis, Indira Gandhi Institute of Development Research, Bombay. He participated in discussions on January 4-6, 1989. (iv) Workshop-cum-Seminar on Karnataka's Future, Karnataka University, Academic Staff College, Dharwar. He gave a Course of Lectures on "Targets Forecasting" on February 13-15, 1989.

Dr. N. S. S. Narayana (Economic Analysis) participated (i) Indo-US Workshop on Bayesian Analysis in Statistics and Econometrics, Bangalore, during 19-23 December 1988. (ii) International Conference on Methods of Planning and Policy Analysis, Indira Gandhi Institute of Development Research, Bombay. He presented an invited paper entitled, "Production Decisions and Farm Supply Response to Policy Changes in Developing Countries". (iii) Seminar on "Interlinked Country Model System". Research and Information System for the Non-Aligned and other Developing Countries, New Delhi during 27 February to 1 March 1989.

Dr. K. Surekha Rao (Economic Analysis) participated in the Workshop and presented a paper jointly with (W. E. Griffiths) for the poster session, entitled: "Additive and Multiplicative Heteroscedasticity—A Bayesian Analysis with an Application to an Expenditure Model", Indo-US Workshop on Bayesian Analysis in Statistics and Econometrics, Bangalore during 19-23 December 1988.

Dr. M. R. Narayana (Economic Analysis) participated in the training and discussions in "Workshop on Optimal Control of Economics", Indira Gandhi Institute of Development Research, Bombay during 16-25 January 1989.

Smt. Mina Dau (Linguistic) was invited by the Central Institute of Indian Languages, Mysore, to attend a Workshop as the expert on Bangla for preparing and

finalizing Bangla Test materials, during 23-27 May 1988. (ii) delivered a lecture on "Phonemic and Morphemic frequencies in Bangla and its relevance in teaching the hearing impaired child", at the All India Institute of Medical Sciences, New Delhi, on 9 March 1989. (iii) attended lectures on "The Acoustic Analysis of Speech" delivered by Dr. S. S. Agrawal of CEERI Centre, New Delhi at the All India Institute of Medical Sciences, New Delhi, during 14-15 March 1989. (iv) visited Delhi to work on Hindi suprasegmentals during 6-18 March 1989. While in Delhi she also attended the workshop on "Kostic Classification and Kostic Methodology" at the All India Institute of Medical Sciences, New Delhi, during 6-18 March 1989. During her stay in Delhi she visited the CEERI Centre (Central Electronic and Engineering Research Institute) New Delhi, and the National Physics Laboratory, New Delhi.

Dr. Alokkananda Mitter (Linguistic) (i) delivered a lecture on "Some Aspects of Phonetics" at the University Women's Association, Calcutta, on 20 July 1988. (ii) conducted a Workshop on "Kostic Classification and Kostic Methodology in the Speech and Language Habilitation of Hearing Impaired children", at the Department of Otorhinolaryngology, of the All India Institute of Medical Sciences (AIIMS), New Delhi, during 6-18 March 1989. The objective of the workshop was to train students and personnel of the Otorhinolaryngology Department of AIIMS in the use of Kostic Classification and Kostic Methodology in connection with a Five year Project taken up by the Department. (iii) attended lectures on "The Acoustic Analysis of Speech" delivered by Dr. S. S. Agrawal of CEERI Centre, New Delhi, at the All India Institute of Medical Sciences, New Delhi, during 14-15 March 1989. (iv) delivered a lecture on "SAFA (Selective Auditory Filter Amplification) and its application in the treatment of children with hearing impairment", at the All India Institute of Medical Sciences, New Delhi, on 15 March 1989. During her stay in Delhi she visited the CEERI Centre (Central Electronic and Engineering Research Institute) New Delhi, and the National Physics Laboratory, New Delhi.

Shri Amitav Choudhury (Linguistic) (i) attended a three day conference on "Language Processes and Language Disorders" at Osmania University, Hyderabad, during 16-18 February 1989. (ii) delivered a lecture on "Language Interference—Socio-Cultural and Psychological Factors", at the All India Institute of Medical Sciences, New Delhi, on 13 March 1989. During his stay in Delhi he visited the CEERI Centre (Central Electronic and Engineering Research Institute), New Delhi, and the National Physics Laboratory, New Delhi. (iii) attended lectures on "The Acoustic Analysis of Speech" delivered by Dr. S. S. Agrawal of CEERI Centre, at the All India Institute of Medical Sciences, New Delhi, during 14-15 March 1989.

Smt. Madhabi Indu (Linguistic) (i) attended lectures on "The Acoustic Analysis of Speech" delivered by Dr. S. S. Agarwal of CEERI Centre, New Delhi, at the All India Institute of Medical Sciences, New Delhi, during 14-15 March 1989, (ii) visited Delhi to work on Hindi suprasegmentals, during 6-18 March 1989. While in Delhi she also attended the workshop on "Kostic Classification and Kostic Methodology" at the All India Institute of Medical Sciences, New Delhi. During her stay in Delhi she visited the CEERI Center (Central Electronic and Engineering Research Institute), New Delhi, and the National Physics Laboratory, New Delhi.

Dr. B. N. Bhattacharya (Population Studies) (i) the meeting of the Project Advisory Committee on Children's Studies on 12th July, 1988 at Bhopal Gas Disaster

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Research Centre (Indian Council of Medical Research), Bhopal. (ii) the National Seminar on "Recent Statistical Advances in Problem Oriented Research" at the Department of Statistics, Banaras Hindu University, Varanasi and contributed a paper entitled a "Probability Model for Open Birth Interval in equilibrium birth process. (iii) a meeting relating to analysis of demographic data for ICMR and UGC projects, at the Centre of Population Studies, Banaras Hindu University, Varanasi during December 12-15, 1988.

Dr. C. R. Malaker (Population Studies) participated in Data Users' Conference, 1991 Census on 20 April 1988, New Delhi and contributed a paper "Houses and Household Data in Indian Censuses (1951-81); A Review".

Dr. P. K. Majumdar (Population Studies) participated in a "National Seminar on Recent Statistical Advances in Problem Oriented Research" at the Department of Statistics, Faculty of Science, Banaras Hindu University, Varanasi during March 16-17, 1989 and presented a paper "Biological Maturity among rural females in Uttar Pradesh".

Dr. Suraj Bandyopadhyay (Sociology) visited the McGill University, Canada as a Visiting Scientist during September-December 1988, sponsored by IDRC, Canada. This is in connection with a collaborative project work with a team of researchers on "Cooperative Enterprises and Rural Development in India", sponsored by the Department of Anthropology, McGill University, Montreal, Canada. (i) attended workshop on "Rural Cooperation", organised by IDRC, Canada; McGill University, Montreal, Canada; and Department of Sociology, Delhi University, and Ministry of Rural Development, Government of India, during 22-30 April, 1988. (ii) acted as Chairperson in the Valedictory Session of the "National Seminar on Rural Development: Social issues, perspective and implications" during 16-17 February 1989 at Kalyani University.

Dr. A. Maiti (Sociology) attended Economic Conference in Vidyasagar University, Midnapore, during 8-9 April 1988 and acted as (i) Chairman in "National Seminar on Constraints, Development Processes and Communication" Manipur University, during 10-12 March, 1989. (ii) Resource Person in ICSSR Workshop on "Research Methodology on Industrial Development in Orissa" Ravenshaw College, Post Graduate Department of Economics, June 1988.

Dr. P. Chakrabarti; Dr. Atis Dasgupta; Sri T. N. Ghosh, Sri A. Chakrabarti, Sri B. N. Ghosh, Sri S. Mukherjee; Sri D. Bhattacharjee and Sri Arun Chatterjee (Sociology) attended the "National Seminar on Rural Development: Social Issues, perspectives and implications" during 16-17 February, 1989, organised by the Department of Sociology, Kalyani University, Kalyani, Nadia.

Shri V. Narayana (SQC and OR) delivered an invited lecture on 1 November 1988 at BHEL, Hyderabad on "Objectives of Quality Month" during inaugural session of Quality Month.

Shri J. Venkatappaiah (SQC and OR) attended the Joint Quality Assurance Meeting of Hindustan Cables Ltd. and DOT, Government of India at Bangalore on 3 August 1988.

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Shri P. Lakshmanan (SQC and OR) delivered lectures on (i) "Guidelines for Process Control" to the Executives of BHEL and Neyveli Lignite Corporation on 23 November 1988 at Neyveli Thermal Station (ii) "Process Control Techniques" in the Institute of Standards Engineers on 4 November 1988. (iii) "How to build Quality into the Product" at Seamless steel Tube Plant, BHEL, Trichy on 26 November 1988.

Dr. T. S. Arthanari (SQC and OR) gave a series of lectures on invitation from Anna University on "Decision Analysis" in their MBA programme during April-May 1988.

Shri C. R. Prasad (SQC and OR) gave a series of invited lectures on "Decision Theory" in the MBA programme of the Anna University during February-March 1989.

Shri K. M. Date (SQC and OR) (i) attended a seminar on "Company Wide Quality Control" by Prof. H. Takahashi of Chou University, Tokyo, conducted by AOTS Maharashtra in collaboration with AOTS, Tokyo during 21-22 October 1988. (ii) delivered a lecture on invitation from Pune Management Association on "Motivational and Attitudinal aspect of Quality" on 25 October 1988.

Shri V. Gopalan (SQC and OR) on invitation (i) from Confederation of Engineering Industry, Southern Region, Coimbatore, delivered a talk on "Use of SQC—Seven Tools" on 17 September 1988. (ii) from Tamilnadu Institute of Labour Studies, Madras, delivered a lecture on "Statistical Quality Control" on 5 October 1988.

Shri M. V. Lakshmana Samy (SQC and OR) on invitation from Export Inspection Agency, Bombay, on 27 February 1989 delivered a lecture on "SQC Techniques and Analysis of Data for Quality Improvement."

Shri A. N. Nankana (SQC and OR) delivered an invited talk on "Quality, Productivity and Cost in Cement Manufacture" in a seminar organised by IAQR and ISE, Hyderabad.

Shri P. R. Lakshmikantan (SQC and OR), as a visiting lecturer was invited to give a course on "Operations Research and Statistics" at the School of Planning and Architecture, New Delhi.

Shri Arvind Seth (SQC and OR) gave two invited lectures on "Dynamic Programming" to the IAS and IPS Officers at the Department of Personnel and Administration.

Shri B. Majumder (SQC and OR) gave invited lectures on "Tools of QC" at Delhi Productivity Council and (ii) "Basic Statistics" at IAQR, Delhi.

Shri Rajiv Goel (SQC and OR) delivered two invited talks on "Process Control Techniques" at Universal Engineering (I), Faridabad on 19 and 21 November 1988.

Shri S. C. Chakraborty (SQC and OR) gave invited talks on (i) "Quality Control" at Modi Rubber Ltd., Modipuram during 24-25 June 1988. (ii) "Design

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and Analysis of Experimental Data" to the scientists of CSIR Laboratories at Delhi on 6 September 1988. (iii) "Industrial Experimentation" at J. K. Synthetics, Kota on 4 October 1988. (iv) "Quality Management" at Universal Engineering (I), Faridabad on 19 November 1988. (v) "Simple Tools of QC" to executives from DGQA, Ministry of Defence, at Bureau of Indian Standards, New Delhi. (vi) "Tools of QC" at CEI, Delhi. (vii) "Simple and Quick Aids" on 9 July 1988, Material Management for Quality and Productivity" on 15 November 1988, and "Sampling Plans" on 16 November 1988 at IACR, Delhi.

Dr. R. J. Pandey (SQC and OR) delivered invited talks on (i) "Basic concepts of Quality Control" at Calcutta Productivity Council" on 19 May 1988. (ii) "Concept and Development of Quality Circle" at Bureau of Indian Standards, Calcutta on 3 November 1988. (iii) "Concept of Quality Circle and its implementation in India" to the Officers of DGQA at Calcutta on 5 November 1988.

Shri S. K. Chaudhuri (SQC and OR) gave invited talks on (i) "Concept of total Quality Control and its application in Jute Industry" at Export Inspection Agency, Calcutta on 29 September 1988. (ii) "Concept of Quality and Quality Control" at the East India Pharmaceutical Works, Calcutta on 13 March 1989.

Dr. S. K. Majumder (SQC and OR) delivered invited lectures "SQC in Metallurgical Industry" at Indian Institute of Metals in a workshop on Metallurgy during 17-19 January 1989.

Shri R. Anantha Rao (SQC and OR) gave invited talks on (i) "Beta Correction for process control" at Central Machine Tools Institute on 5 May 1988. (ii) "Beta adjustment technique" at aerospace and Aircraft Divisions of HAL, Bangalore on 26 June 1988. (iii) "A few of the seven simple tools of Quality Control" at Bureau of Indian Standards, Bangalore on 16 August 1988. (iv) "A new method of on line Process Control" on 25 May 1988 and "QC Tools" on 10 September 1988 at National Institute for Quality and Reliability, Bangalore, on 25 May 1988.

Shri B. K. Pal (SQC and OR) delivered invited talks on (i) "Quality Management" at Indo German Society, Bangalore on 31 July 1988. (ii) "Industrial Experimentation" at Bureau of Indian Standards, Bangalore on 19 August 1988.

Shri C. A. Setty (SQC and OR) was invited by HAL Staff College, Bangalore to deliver a talk on "Concept of Quality Aspect" on 25 October 1988.

Shri U. H. Acharya (SQC and OR) delivered a lecture on invitation from Indian Telephone Industries, Bangalore on "Quantitative Methods in Quality Circle" to the delegates of the Quality Circle Convention on 29 November 1988.

Shri J. Verghese (Central Library) delivered a number of lectures in the Workshop on Information Management held in Calcutta from 7-17 June, 1988 and also acted as the Coordinator of the Workshop. He also participated in (i) a two day Seminar on 'Management and Application of Micrographics' organised by Micrographic Congress (India) and the Department of Science and Industrial Research at Central Food Technological Research Institute, Mysore from 25 to 26 August 1988 and

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presented a paper entitled "Film Technology Inspection and Quality Control".
(iv) INSPEC (pertaining to Computer Software) one day Seminar held at the ISI Central Library, Calcutta on 6 March, 1989.

Dr. G. Bhattacharyya (DRTC) attended the Bibliographic Data Bases and Networks held in New Delhi during the period 22 to 25 February 1989.

Dr. M. A. Gopinath (DRTC) (i) attended the seminar on "Online Information Systems and CD-ROM facility at the National Aeronautical Laboratory, Bangalore during the period 15 to 16 July 1988. He presented a paper on the role of thesaurus in On-line information retrieval. He also presided over the concluding session held on 16 July 1988. (ii) delivered a keynote address on "Information Users and Search Strategies and databases for the Workshop on Information Retrieval for National Centres in NISSAT, held during 14-16 October 1988. (iii) attended the DSIR Workshop on the Analysis of Information Users Requirements in Industries held at CFTRI, Mysore during 8 to 9 February 1989. He presented a paper on "Information Sources for Industrial Development". He was also the Director of the Workshop. (iv) attended the NIC-ICMR Advisory Seminar on Biomedical Information held at the National Informatics Centre, New Delhi on 10 February 1989. He was the Chairman of the Seminar. (v) participated in the seminar on "Acquisition of Documents to Libraries: Librarian and Bookseller Interaction" held on 11 February 1989. The workshop was held at Hotel Ashraya, Bangalore. Dr. Gopinath was the Chairman of the Seminar. (vi) participated in the International Conference on "Bibliographic Data bases and Information Networks" held in New Delhi during 23-25 February 1989. (vii) participated as a Resource Person and Coordinator for the "National Workshop on Thesaurus Construction" sponsored by the IASLIC, Calcutta, in collaboration with DRTC. It was held during 14-24 March 1989. (viii) participated as a resource person and coordinator for the workshop on Indexing Methods for Bio-Medical Information Centre sponsored by the National Informatics Centres, New Delhi. It was held during 27 to 31 March 1989.

Dr. S. Seetharama (DRTC) attended the IASLIC National Seminar (13) held in Calcutta during 20 to 23 December 1988. Dr. Seetharama presented a paper entitled "Guidelines for Marketing of Information Services and Products".

Dr. I. K. Ravichandra Rao (DRTC) attended as a resource person the seminar on "CDS/ISIS" held at Manipal on 8 April 1988. (ii) offered a Seminar on "Library Automation and CDS/ISTS" at the Jayachamarajendra College of Engineering, Mysore on 9 June, 1988. (iii) offered a seminar on "Data bases: Design and Development" on 7-10-89 at National Aeronautical Laboratories, Bangalore. (iv) offered two seminars on "Bibliographics" as part of the Workshop on Bibliographics organised by INSDOC during 13-18 February 1989, in New Delhi. (v) attended the seminar on Automation of Libraries held at the National Law Centre of India University, Bangalore on 25 to 26 February 1989. Dr. Rao presented a paper entitled "Automation of Libraries". (vi) participated in the seminar on Computerized Thesaurus Construction and Indexing" held at NIC, New Delhi during 27 to 31 March 1989. Dr. Rao delivered a series of lectures on this occasion.

Ms. Aruna Arora (Delhi Centre Library) attended one month training course on "Computer Science and its applications to Library activities" organized by NISST—INSDOC.