



# NIAS

# NEWS

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No. 1

**T**his eighth issue of the NIAS Newsletter covers the activities of the first half of Ninety Six.

The year commenced with the 10th NIAS Course on "An Integrated Approach to Knowledge and Information" for Senior Executives from the Government, Public and Private Sectors, held between January 8 and February 3, 1996. As on earlier occasions, the course was not only well conducted but also very well received by the participants. The course was inaugurated by Prof. G. Padmanaban, Director, Indian Institute of Science and the theme of the inaugural address was "Biotechnology and Patent Issues", a very topical subject. Prof. Padmanaban highlighted various ethical issues involved in the field of biotechnology patenting. He said the time had come for India to make a realistic analysis of the patenting situation in Biotechnology. He stressed the need for us to clearly define our patenting laws by 2000 AD in order to derive the maximum advantage for our country within the GATT agreement.

The valedictory address on the last day of the course was delivered by Mr. N.N. Vohra, Former Home Secretary, Government of India. The theme of his address was "Role of the civil services in India - Problems which need to be resolved".



General S. Roy Chowdhury, PVSM, ADC, Chief of the Army Staff, immediately after delivering his talk on "Security Environment in India and the Role of the Indian Army" and Dr. Raja Ramanna.

The subjects covered in the course presented an integrated approach, in keeping with the objectives of the course as well as of the Institute. It was a wide-ranging spectrum including topics such as Chaos and Quantum Mechanics, History of Science, Origin of the Universe, Economics of Indian-Agriculture, Fifty Years after Hiroshima, Essentials of Human Genetics, Indian Philosophy, Psychology, Appreciating Theatre Arts, Recent Advances in Management of Cardio-vascular Diseases, the Constitution and the Law, Problems of Indian Women, Police and Law Enforcement and Sociology. Yet other subjects covered by way of Special Lectures were Future of Nuclear Energy, Bombay First, Religion and Politics and Criminalisation of Politics. Renowned personalities like Mr. Gerson da Cunha, Mr. Veerappa Moily, Dr. Kiran Bedi were among the list of invited speakers.

There were two important additional features in this course ! One was the three day Seminar on "Communication Revolution in India", conducted right at the beginning of the course with the participation of renowned specialists (Dr. S. Ramani, Prof. V. Rajaraman, Prof. R. Narasimhan, Dr. S.S. Kulkarni, Mr. Abnash Singh and Mr. N.K. Sinha.) The second one, which was introduced for the first time and a very successful one was project work by the participants. The projects assigned to the participants were on "The Kashmir Experience", "Collaboration between Research Organisations and Industry", "Liberalisation - Impediments, Prospects and Future Directions", "Technology - Import, Absorption and Innovation", "Administrative Reforms" and "Uniform Civil Code". The project reports are available in the Institute library.

Other activities like Associates' Programme, Faculty Lectures, Guest Lectures etc. were held according to schedule. Special mention should be made of the Evening Lecture, in the Associates' Programme, by General S. Roychowdhury, PVSM, ADC, Chief of the Army Staff on April 9, 1996 who spoke on 'Security Environment in India and the Role of Indian Army'.

Normally the NIAS Course co sponsored by the University Grants Commission and Jawaharlal Nehru Centre for Advanced Scientific Research on "An Integrated Approach to Knowledge and Information" for University and College Teachers is held in the month of July. From this year onwards, this will be held in the month of October in order to make it convenient for all. It is scheduled to be held between October 7 and November 2, 1996. The planning for conducting this course is already in progress.

### *From the Director's Desk*

The Auditorium forming part of the J.R.D. Tata Memorial Centre is nearing completion.

The multi-disciplinary aspect of the Auditorium will facilitate the organisation of not only holding lectures, seminars, workshops, group discussions etc., but also exhibitions of art, music and dance programmes and theatre productions including experimental plays, music, classical or otherwise.

The architectural and aesthetic aspects including the latest technical features such as the sound projection systems etc. have been provided, as befitting to this Centre which will be named after the late Shri J.R.D. Tata.

Women's Policy Research and Advocacy and other sociological subjects which were dear to JRD's heart would form part of the work at the Centre. This all-encompassing, yet modest-sized Auditorium at NIAS will be the pride not only of the Institute but also of the city of Bangalore which considering its cultural activities deserves such an Auditorium.

The future activities of the NIAS library will be planned based on the latest computer technology, so that the information retrieval is fast in a compact frame and at the same time there will be economy in space utilisation, reducing expenditure on buildings and structures.

## THE FACULTY

The activities of the various units of the faculty during the last six months are indicated unitwise in the succeeding paragraphs.

### UNIT: HEALTH AND HUMAN BEHAVIOUR

This unit comprises Prof. R.L. Kapur, Dr. Biswajit Sen and Ms. Susmita Subramanyam and is engaged in the following projects:-

a) CREATIVITY AMONGST INDIAN SCIENTISTS:

(Prof. R. L. Kapur and Ms. Susmita Subramanyam)

Data collection in the final phase of the study is complete and being processed. In this final phase, twenty scientists appropriately selected from the senior faculty of the Indian Institute of Science were interviewed in great detail regarding:

i) the psychological processes related to their research work; attitudes and beliefs to work environment, colleagues, peers etc.

ii) the psycho-social factors which have shaped them as individuals and scientists.

b) A PSYCHO-SOCIAL STUDY OF ALIENATION AMONGST INDIAN YOUTH:  
(Prof. R.L. Kapur and Dr. Biswajit Sen)

This DRDO project is coming to an end. By the end of June 1996 the final report will be completed.

c) PSYCHO-SOCIAL FACTORS INFLUENCING THE SEXUALITY OF URBAN INDIAN WOMEN:

This pilot project will be carried out by Dr. Biswajit Sen who has been selected as one of the eight 1996 Fellows of the MacArthur Foundation for Population Innovations, India. During 1996 and 1997 fifteen detailed case studies will be undertaken on women from different social strata with differing life histories in Calcutta.

d) The report of the three day international workshop on "Qualitative Methods in Research for Mental Health Researchers" organised during the first half of 1995 has now been completed.

e) Prof. Michel Tousignant has been a Visiting Professor to NIAS from December 1995 to June 1996. He was on sabbatical leave from the Department of Psychology of the University of Quebec in Montreal, Canada.

### Summary of activities:

i) Exploration of Indian culture especially with regard to the concept of self and the influence of religion in the formation of personality. Participation in the Tenth NIAS Course. Short journey to Dharamsala for an introduction to Buddhism.

ii) Conference on the NIAS staff scientific meeting on March 29, 1996. The title was "A psychosocial model of suicide". He addressed on the same theme to a group from the Karnataka Association of Psychologists. He gave a lecture on "Cross cultural studies of emotions" at the National Institute of Mental Health and Neuro Sciences.

iii) Completion of drafts on four articles related to the mental health of adolescent refugees and of one on family experiences of abuse in a series of 11 cases of suicide-homicide. Last stage of a book edited with I.al-Issa: "Immigration, Ethnicity, and Psychopathology" to be published by Plenum Press (New York). Translation in French and adaptation of a book chapter by Dr. Malavika Kapur on the mental health of children in the Third World.

### UNIT : PHILOSOPHY OF SCIENCE

Work is in progress in the Philosophy of Science Unit, which is constituted by Dr. Raja Ramanna, Prof. B.V. Sreekantan, Prof. R.L. Kapur, Dr. Sundar Sarukkai, Dr. M.G. Narasimhan and Dr. Sangeetha Menon.

Dr. Sundar Sarukkai's work is progressing in the areas of Philosophy of Mathematics and Epistemology.

As a part of CONSCIOUSNESS STUDIES, a lecture was given by Dr. Sangeetha Menon on 'The Concept of Consciousness in Bhagavad Gita'. She presented the methodology and the content of consciousness as discussed in the verses of Gita. CONSCIOUSNESS STUDIES will be debating upon the different approaches to consciousness and the Quantum mechanistic, Neurobiological, Psychological and Vedantic definitions of consciousness. Prof. B.V. Sreekantan has already completed a paper on the current approaches to consciousness.

Meetings were held focussing on the broader themes of 'Neurobiological approach/methodology to consciousness' and 'Experimental Approaches to Primate consciousness'. Speaking on the Neurobiological approach to consciousness Dr. M.G. Narasimhan (Visiting Associate, NIAS) outlined the structure of brain and nature of

neuronal firings. Dr. Anindya Sinha (Post-doctoral Fellow, TIFR) elaborated the experiments done for recording perceptual consciousness and social cognitivity in Primates.

CONSCIOUSNESS STUDIES will be continuing research on consciousness with an interdisciplinary approach. Dr. Sangeetha Menon will be concentrating upon the phenomenological and existential nature of consciousness in Bhagavad Gita and Vedanta in general, analysing the 'hardproblem' of subjectiveness, confronted by neurobiologists.

#### **UNIT : WOMEN'S POLICY RESEARCH AND ADVOCACY (WOPRA)**

##### **Study of the Status of Women in Karnataka:**

During this period, an exhaustive questionnaire for the collection of data was prepared, pre-tested, and refined. Due to financial and other constraints, the primary research study is being carried out in only six districts which represent the six main regions of the state, viz., Kolar in South Karnataka, Chitradurga in Central Karnataka, Kodagu in the Malnad region, Dakshina Kannada in the coastal region, Bijapur in North Karnataka, and Raichur in Hyderabad Karnatak. Approximately 200 households are being covered in each district, with one male and one female respondent being interviewed in each household. Primary data collection in collaboration with selected NGOs began in earnest in March, and thus far, data collection in nearly 600 households has been completed in the districts of Kolar, Dakshina Kannada, and Chitradurga. The following organisations are collaborating with the WOPRA Unit in carrying out the study: REACH and Gram Vikas (Kolar), GRAMA (Chitradurga), Mahila Samakhya Karnataka (Bijapur and Raichur). The data is being electronically processed by TIDE Consultants, Bangalore.

##### **Advocacy:**

The final report of the Chief Minister's Expert Committee for revising the Karnataka Panchayati Raj Act, 1993, of which Ms. Srilatha Batliwala was a member, was submitted to the Government of Karnataka in March, 1996. Ms. Batliwala was also selected to be the new South Asia Regional Coordinator of DAWN, an international women's network.

The WOPRA team has also provided training and other support inputs to a wide range of international, national and other bodies during this period, including government initiatives, women's

organisations and NGOs, e.g.: the MacArthur Foundation, the District Primary Education Project, programs organised by the Indian Institute of Management (Bangalore), National Law School of India (University), Indo-Dutch Project Management Society, SPARC-SSP, OUTREACH, PRIA, Interventions, ICRISAT, etc.

#### **UNIT : ENVIRONMENT**

The Department of Atomic Energy has sanctioned a Research Project to NIAS to work on "Bioremediation of Pesticide Contaminated Soils and Effluents". Dr. P.K. Shetty is the Principal Investigator of this project, who is collaborating with Prof. K.M. Madhyastha, Organic Chemistry, IISc, Bangalore and Dr. K. Raghu, Head, Nuclear Agricultural Division, BARC, Mumbai. The experimental work is organised in the Department of Organic Chemistry, IISc, Bangalore.

The primary objective of this project is to isolate an efficient atrazine and endosulfan degrading micro-organism for bioremediation studies. For this purpose, eighteen bacterial strains and thirty six fungal strains were isolated by the soil and liquid enrichment techniques. These microbial strains were subjected to degradation studies by providing atrazine or endosulfan as sole source of carbon or nitrogen. Along with this, experiments were also carried out with different concentrations of atrazine or endosulfan in the presence of other carbon or nitrogen sources.

During this period, a few analytical techniques were standardised. Keeping in view of various methods available in literature, different solvent systems and spray reagents were developed for TLC. Among the solvent systems, benzene and ethanol in the ratio of 9:1 (v/v) was found to be optimum for atrazine. In case of endosulfan, hexane: chloroform: acetone in the ratio of 9:3:1 (v/v/v) gave better results. Similarly, it was found that detection of atrazine and its metabolites were more effective when TLC plates were subjected to fluorescence quenching at 254 nm wave length on silicagel G impregnated with fluorescent indicator. For detection of endosulfan and its metabolites ortho-tolidine was found to be the sensitive spray reagent. The GC conditions for detection of atrazine and endosulfan were also standardised using shimadzu - 14 A Gas chromatograph fitted with flame ionization detector and HR-1 column. Under optimised operational conditions atrazine had retention time of 3 min and endosulfan showed 10.2 min for alpha and 14.2 min for beta.

Ms. K.R. Vidya and Mr. N. Ramesh are assisting Dr. Shetty in this programme. Ms. Jayashree Sitarama, has completed her M.Phil Programme under the guidance of Dr. Shetty. She worked on "Isolation and screening of soil microorganisms for pesticide degradation studies". The thesis has been submitted to the Department of Environment Sciences, Bangalore University.

#### **UNIT : EPIGRAPHY CENTRE**

Dr. H.K. Anasuya Devi is continuing her research in Computer Based Epigraphy.

The aspects being stressed in the study are:-

To begin with the scope of the project may be restricted to deal with only Tamil Brahmi (TB) epigraphy texts. The expectation is that TB characters would be simpler to handle in the computer for their structural simplicity.

Create a library of epigraphic image sources as a computerised image library. The library could be progressively enlarged to, say, 100 images.

Indexing and compression techniques can be investigated for creating archival databases.

Try character-matching techniques to identify the occurrence of specific characters in the noise-cleaned text. One could try to extend these to identify the occurrence of short character strings.

From the above technique, it might give us some clues about the kinds of domain knowledge needed for intelligently coming to grips with the character recognition problem in general. The knowledge aspects and the implementation of computer-assisted text-reading techniques are being systematically investigated.

Attempts are made to improve the source materials for use by the epigraphists. Collaboration with ASI, Mysore has been initiated and with their ready assistance some additional photographs of source materials have been obtained. NIAS is trying to develop adequate hardware and software platform for this purpose in a systematic fashion.

Some of the results obtained from the exploratory work carried out on the image data during the past six months are as follows:-

The source materials obtained in the analog form have been digitised and stored in floppies, which is readily available to the epigraphists in computer readable format.

Proficiency in noise cleaning has been achieved to some using software packages, MATLAB and KHOROS, both foreground and background noise available on digitised data have been removed to some extent.

#### **UNIT: INTERNATIONAL AND STRATEGIC STUDIES (ISS)**

This Unit is a new programme and is comprised of Dr. Raja Ramanna, Dr. Deepa Ollapally, Mr. S. Rajagopal, Mr. Arvind Kumar and Ms. Sushma Shetty. This Unit began functioning actively with the arrival of Dr. Deepa Ollapally in February 1996.

The International and Strategic Studies Unit's main objective is to provide critical analysis of global issues affecting India's foreign and security policy, with a view towards promoting greater international cooperation. To this end, the ISS Unit will examine contemporary topics vital to Indian interests and produce a series of reports and other publications aimed at influencing Indian policymaking including non-proliferation efforts after the cold war and Indo-U.S. strategic relations.

#### **Nuclear Non-proliferation**

The most important non-proliferation issue facing India is the ongoing debate in Geneva on the Comprehensive Test Ban Treaty (CTBT), which is expected to be completed by September 1996. On March 28, 1996, NIAS held a Workshop on India's CTBT Options attended by some of India's most prominent experts in the field, representing a spectrum of viewpoints. The Workshop considered a number of options for India ranging from signing the Treaty to rejecting it outright and looked in details at the possible consequences. Dr. Ramanna chaired the meeting and Dr. Ollapally and Mr. Rajagopal were among the panelists presenting material. A report based on the Workshop is being completed by the ISS Unit and will be published shortly.

#### **India's Strategic Relations**

An International Seminar on India's strategic relations is planned for November 1996 with participants to attend from the U.S. as well as key countries in Asia. A major area of investigation will be the challenges and prospects for strategic cooperation in the new post cold war era. Eminent scholars and policymakers will be invited to facilitate a dialogue between different states and those versed in theory versus practice. An edited book manuscript is expected to emerge from this Seminar.

## VISITING CHAIRS

### HOMI BHABHA CHAIR PROF. C.V. SUNDARAM

The Homi Bhabha Chair continues to be devoted to studies relating to Energy, Materials and Environment.

The fifth National Symposium on Environment, organized by the Department of Atomic Energy in Calcutta during February 28 to March 1, 1996, had for its focal theme environmental issues related to mining, milling and metallurgy. In the context of participating in this symposium, a survey was made on environmental impact and aspects relating to waste generation and by-product utilisation in the Indian mining and metallurgical industries. In the large scale mining of iron ore and low grade ores of uranium and gold, strategies are now available for minimizing the damage to the environment and even restoration of vegetation. Large volumes of slag are the by-product in the production of iron and steel, and large volumes of wet red mud sludge are generated in the extraction of Aluminium from Bauxite. While some measure of success has been achieved in the utilisation of the slags from the iron and steel industry, (in road making, and in the making of concrete and cement) no solution is yet in sight on the effective utilisation of red mud.

Time was devoted for the compilation of the Report for the DST Project on "Formulation of Criteria for Effective R&D Funding in India". A reference to this report appears elsewhere in the Newsletter.

A chapter on History of Indian Metallurgy was finalised in collaboration with Dr. Baldev Raj and C. Rajagopalan of IGCAR, Kalpakkam - for the project on the History of Indian Science, Philosophy and Culture.

### J.R.D. TATA CHAIR PROF. M.N. SRINIVAS

Work on the autobiography - "Looking at Society and its Changes through the life of an individual" - continues. A chapter of it entitled, "Professor G.S. Ghurye and I, a Troubled Relationship" has been published in The Legacy of Ghurye, Edited by Prof. A.R. Momin, Popular Prakasam, Bombay, 1996.

A book entitled "Indian Society Through Personal Writings" has been published by Oxford University Press, Delhi, 1996.

### DR. S. RADHAKRISHNAN CHAIR

This Visiting Chair has recently been vacated by Prof. B.V. Sreekantan on his taking over as Senior Homi Bhabha Fellow.

### SIR ASHUTOSH MUKHERJEE CHAIR

As reported earlier, this Visiting Chair has been endowed by M/s. Peerless General Finance and Investment Company.

### SENIOR HOMI BHABHA FELLOW PROF. B.V. SREEKANTAN

Prof. B.V. Sreekantan is currently engaged in writing a comprehensive book on "Cosmic Rays". He continues to be associated with the programme on "A Scientific Study on Human Consciousness."

## ASSOCIATES' PROGRAMME

As of today, we have four hundred Senior Associates on our roll, out of which one hundred and fifty are from Bangalore. The Associates' Programmes during the first half of 1996 represents a good mix of subjects as varied and interesting as "Criminalisation of Politics", "Antartica", "Internal Security", "Security Environment in India" etc. Not only the programmes were held as per schedule but in some months there has been more than one programme.

The topics of the Associates' Programmes during the period were:-

1. January 24, 1996 - A lecture on "**BOMBAY FIRST**" by Mr. Gerson da Cunha. Mr. da Cunha's interests encompass the media, civil aviation and tourism, health and family planning, information and broadcasting, advertising to social service etc. He is currently the Chief Executive of Bombay First and in this capacity he has already made a dent in the development and maintenance of civic facilities in Bombay, an uphill task.

He shared with the audience some of the principles of urban planning and tried to show how one particular city has responded to those principles through 'Bombay First' which is a private business initiative - an initiative of the Bombay Chamber of Commerce and Industry. It aims its efforts to make Bombay a better place to live in, work in and invest in. The success story of 'Bombay First' is well known. After the lecture, the audience were unanimous in their view that other cities including Bangalore could follow the model of 'Bombay First', though modified to suit their specific requirements.

2. January 31, 1996 - A lecture on **"CRIMINALISATION OF POLITICS"** by Dr. Kiran Bedi, Additional Commissioner of Police, New Delhi. This lecture attracted a large audience. Dr. Bedi who was in her time element, was forthright in presenting the scenario on 'Criminalisation of Politics' as one major single factor contributing to the corruption of public life in our country today.

3. February 23, 1996 - A lecture on **"ANTARTICA AND RECENT SOLID EARTH GEOPHYSICS DEVELOPMENT"** by Dr. Harsh K. Gupta, Director, National Geophysical Research Institute, Hyderabad.

4. March 29, 1996 - A lecture on **"INTERNAL SECURITY AND PUBLIC ORDER: PERSPECTIVE FOR THE FUTURE"** by Shri A.S. Malurkar. Shri Malurkar, the Director General of Police, Government of Karnataka delivered a very forceful lecture on the subject together with his suggestions for certain improvements in the police department which falls within his jurisdiction.

5. April 9, 1996 - A lecture on **"SECURITY ENVIRONMENT IN INDIA & THE ROLE OF INDIAN ARMY"** by General S Roychowdhury, PVSM, ADC, Chief of the Army Staff. He delivered a very lucid talk on 'Security Environment in India and the Role of Indian Army' as perceived today. He was quite candid about the recent problem of input in the officer cadre vis-a-vis career opportunities outside the defence services.

6. May 31, 1996 - A lecture on **"INTERFACE OF FOOD SCIENCE WITH FOOD TECHNOLOGY - A PARADIGM SHIFT TOWARDS A SAFE FOOD"** by Dr. V. Prakash. In his presentation, Dr. Prakash stated that the trends have shown over the years that in the area of Food Science and Food Technology, the need for updating the technology is always driven by certain basic considerations to increase the shelf life of food, underpinning both nutrition and economic benefits. The application of many unit operations and basic biology and biotechnology today has resulted in a very commendable progress in this area. There is a case for deploying lot more resources for augmenting this sector to higher planes.

7. June 28, 1996 - A lecture on **"LEARNING FROM BEIJING - PERCEPTIONS OF WOMEN WORLDWIDE"** by Dr. (Mrs.) Sakuntala Narasimhan, Journalist.

## **OTHER SEMINARS / WORKSHOPS HELD AT NIAS**

**JANUARY 1, 1996 TO 30 JUNE, 1996**

1. January 3, 1996 - National Assessment and Accreditation Council, Bangalore, an Autonomous Institution of the University Grants Commission conducted One day Seminar to discuss the **"ESTABLISHMENT OF INTERNAL QUALITY ASSURANCE CELLS (IQAC)"** in Universities.

Sixteen Vice Chancellors participated in the Seminar and the discussions were chaired by Prof. A. Gnanam, Chairperson, NAAC. Prof. Armaity S. Desai, Chairperson, University Grants Commission also participated in the deliberations and appreciated the response of the universities for establishment of these cells. She emphasised the importance of feedback and the need to have "consumer orientation" in Indian Higher Education. All the Vice Chancellors while mentioning the ground realities prevalent in the universities also gave valuable suggestions for the effective functioning of IQACs.

2. February 11-14, 1996 — Revitalisation of Local Health Traditions (FRLHT) conducted second CAMP Workshop on **"CONSERVATION ASSESSMENT AND MANAGEMENT PLAN FOR SELECTED SPECIES OF MEDICINAL PLANTS"**.

This second CAMP Workshop, this time was conducted under the guidance of Dr. Michael Maunder, Chief (Conservation Unit), Royal Botanic Garden, Kew. During this CAMP Workshop 40 selected species of South Indian medicinal plants were considered for threat category assignment following the latest International Union for Conservation of Nature and Natural Resources (IUCN) guidelines. Participants to the workshop included eminent botanists, representatives of research institutions, Forest Departments, Botanical Survey of India and others engaged actively in conservation of medicinal plants.

The current work of assigning internationally recognised threat status to medicinal plants in the wild has several important and far reaching implications. It helps focus public attention on the fact that plants are also threatened and they need to be conserved and protected in the wild along with animals as part of the natural eco systems. To the policy makers and natural resource managers the threat assessment of medicinal plants is a valuable tool in prioritising conservation action.

3. March 13-14, 1996 - PHISPC and NIAS conducted Seminar on **TRADITION, SCIENCE AND SCIENTIFIC TRADITION**. This seminar was funded by PHISPC and held under the joint auspices of PHISPC and NIAS.

This seminar was held under the co-ordination of Prof. P.K. Mukhopadhyay, Department of Philosophy, Jadavpur University. Dr. Sundar Sarukkai of NIAS was the Co-convenor of this Seminar. Many illustrious speakers participated. There was a joint inauguration of this seminar along with another PHISPC seminar on "Indian Chemical Practices". Prof. D.P. Chattopadhyay delivered the inaugural address on March 11, 1996. He also addressed this seminar as the first speaker on March 13, 1996.

The topics covered ranged from fundamental questions on the meaning of tradition, the nature of scientific knowledge in traditional Indian thought, the role of tradition in science, the meaning of tradition as it arises in literature and the tradition of natural history in India. There was also a special evening seminar by Prof. M.N. Srinivas on March 13, 1996.

Apart from these speakers, there were a few invited participants. The total number of participants and speakers were over thirty-five in all the sessions. All the talks stimulated vibrant discussion.

It was widely accepted that the seminar was a good success. Many of the participants felt that a follow-up seminar with more focussed topics on the same theme must be held.

4. May 7, 1996 - National Law School of India University conducted One day Symposium on **"CAPACITY BUILDING ON ENVIRONMENTAL LAW"**.

5. May 11-12, 1996 - Academy of Sanskrit Research, Melkote and NIAS conducted Two day seminar on **"SIKSA SASTRA AND EXPERIMENTAL PHONETICS"**.

This was the fourth in the series of seminars organised by the Academy of Sanskrit Research, Melkote, as a part of the project sponsored by the Department of Electronics, Government of India. This seminar was co-organised by NIAS.

The originality and accuracy of the production of speech sounds, their duration, intonation etc. described in Siksa Sastra have been widely acclaimed. Knowledge in Siksa exists in the form of dogmatic facts. Those facts have to be properly

understood in quantifiable terms and on an experimental basis. The seminar brought to the notice of Sanskritists the modern experimental methods and tools for studying speech sounds by way of practical demonstration using computers and theoretical presentations. Such tools can be utilised either in teaching Sanskrit in keeping with modern times or to conduct research into the open problems in Siksa Sastra. At the same time, the seminar brought to the notice of today's scientists and engineers the depth and breadth of the knowledge contained in the ancient lore.

Prof. M.A. Lakshmithathachar, Director, Academy of Sanskrit Research welcomed the gathering. Sri. M.A.S. Rajan, President of the Academy, gave an interesting and comprehensive account of the activities of the Academy.

Dr. Raja Ramanna in his inaugural address emphasized the need for inter-disciplinary seminars and felt that it is highly relevant to go deep into the ancient sastras.

Dr. T.V. Anantha Padmanabha in his key note address, spoke about the relevance of Siksa Sastra in modern times and elaborated on the scope of the subject. He also gave demonstration of several interesting experiments in Sanskrit phonetics using software and hardware developed by him. The demonstrations covered internal effort on pronunciation, bahya prayatna, matra kala measurements, swara measurements etc.

The participants in the seminar comprised eminent sanskrit scholars, scientists and engineers including Vidvan Sri. N. Ranganatha Sharma, Vidvan Sri. N.T. Srinivasa Iyengar, Dr. Thomas Chako, Sri. B.S. Ramakrishna, Prof. V.D. Hegde, Vidvan So. Narasimha, Vedavaridhi P. Ramanujam, Vidvan M.A. Alwar, Dr. Annapurna, Vidvan Sri. K.S. Varadacharya, and Dr. S.R. Savithri. Dr. H.K. Anasuya Devi from NIAS coordinated the Seminar.

6. June 1, 1996 - Department of Science & Technology conducted One day discussion meeting on **"AN APPROACH TO DEVELOP NATIONAL INFORMATION INFRA-STRUCTURE (NII) PROFILE IN INDIA"**.

While examining some issues related to R&D management by the scientific departments of the Government of India, Dr. Raja Ramanna made a recommendation underlining the express need of data bases and project information for effective management of our R&D investments. It was felt that this recommendation holds good with respect

to all management problems including financial, trade and market information. All these issues need to be looked into holistically and comprehensively. Therefore, the above meeting to discuss the nuances of a National Information Infrastructure was held at NIAS. Sixteen specialists from government, private sector and academia representing different components of NII participated in the meeting. A brief inaugural was held in the morning chaired by Prof. C.V. Sundaram and Dr. Raja Ramanna delivered the inaugural address. It was agreed after a brain storming session, that a vision of NII has to be built based on specifically identified inputs from the participants. It was also agreed to convene the next meeting in August, 1996 preferably in an industry environment.

## **REPORT ON DST PROJECT - "FORMULATION OF CRITERIA FOR EFFECTIVE R&D FUNDING"**

**Suchitra Mouly, C.V. Sundaram and  
Raja Ramanna**

A meeting was convened at NIAS on January 6, 1996 to discuss aspects relating to the promoting of scientific research in University Science departments and Colleges. The participation included invitees from the colleges in Bangalore, the disciplines represented being Chemistry, Physics, Biology and Mechanical Engineering. Many of the college teachers referred to the excessive teaching load for teachers in undergraduate colleges, and with this continuous pressure a research pursuit becomes a luxury. The view was expressed that even for the motivated, apart from the availability of time, the poor infrastructure and the general environment are not so conducive for doing research. Some of the participants felt that the existing situation cannot be substantially changed unless proper incentives are provided both for the faculty and the students who show inclination towards research.

Based on the information collected during field visits to various institutions, analysis of the responses to the Questionnaire and the discussions at the Seminars and Meetings convened at NIAS during the past two years a comprehensive report is under preparation for submission to the DST. The report will be made up of two volumes. Volume I will include chapters on Promoting S&T Research and Development in India, the scope of the present project, the field work, Seminars and Meetings, a National Strategy for Science & Technology,

Research and Industry, and an additional Chapter contributed by Prof. A.N. Mitra on Indian Scientific Community - a Cultural Crisis. Volume II will be a compilation of the reports on the various Seminars and Meetings, typical reports on the field visits and responses to the questionnaire.

The quantum of funding for extramural research at Universities and Research Institutions needs to be substantially augmented. This can be achieved by pooling of the resources available particularly with the larger agencies and better coordination between them. Such a coordination will also bring a better focus to S&T funding and enable the establishment of special facilities and centres. There is an urgent need for re-activating an apex body like the National Committee on Science & Technology or the Science Advisory Council to oversee the broad policies of S&T development as a whole in the country. Every effort has to be pursued to attract research funding by the Industry and to promote close interaction between research organisations and the industry.

## **DUALITY OF MASSES AND LIFETIMES**

**Raja Ramanna**

The work on a new approach to Nuclear problems using the principle of Cardinality was continued. In a letter sent to the Modern Physics Letters 'A', Anju Sharma and myself have shown that using the formula developed in the earlier paper to be published in the Journal of Modern Physics, that the life times of fundamental particles which are isospins can be obtained directly. In particular the lifetime of the proton can be obtained, which comes out to be  $5.33 \times 10^{33}$  years.

Work is now in progress to obtain the ground state spins of  $\beta$  emitting nuclei using the above mentioned principle.

## **GUEST SPEAKERS**

1. January 3, 1996 - A lecture on "THEORY OF CONSCIOUSNESS" by Prof. Amit Goswami, Professor of Physics at the Institute of Theoretical Sciences, University of Oregon, USA.

The talk was based on his 'Theory of Consciousness' which is expanded in his book 'The Self-Aware Universe'. Prof. Goswami's theory which has overtones of the Vedanta Philosophy is a theory of monistic idealism in which consciousness not matter is the ground of all being

and is the creator of the world. He pointed out how his theory may lead to the resolution of some of the problems of quantum physics.

2. February 16, 1996 - A lecture on **"MENTAL HEALTH, RETARDATION & DESTITUTION AMONG WOMEN - CASE STUDY OF ADMISSIONS TO THE STATE HOME FOR MENTALLY RETARDED WOMEN, BANGALORE"** by Dr. Pauline McConville, Psychiatrist from Scotland who spent sometime at NIAS analysing data on admissions to the "State Home for Mentally Retarded Women". She also reviewed studies on women's mental health in Karnataka.

3. February 19, 1996 - A lecture on **"INDUSTRIALIZATION AND THE SOUTHEAST ASIAN MIRACLE: MYTH VERSUS REALITY"** by Prof. Jomo K. Sundaram, Faculty of Economics, University of Malaya, Kuala Lumpur.

It has become almost conventional wisdom that the successful expansion of the Southeast Asian economics stands as validation for the free market model. Prof. Sundaram challenged this dominant notion, especially as put forth by recent World Bank reports and argued that a form of state capitalism in which government intervention in the economy was substantial was behind the success stories. He drew on numerous examples from East and Southeast Asia to provide evidence for his methodological critique. In terms of lessons for India, Prof. Sundaram emphasized that it was a unique combinations of situational and historical factors such as good government, land reform, monetary policies and trade measures which tended to produce results rather than a generalisable blueprint per se.

4. April 3, 1996 - A lecture on **"COLLECTIVE IDENTITY AND COLLECTIVE VIOLENCE: GROUP PSYCHOLOGY IN POLITICAL BEHAVIOUR"** by Dr. Dipak K. Gupta, Professor and Co-Director, Institute for International Security and Conflict Resolution, San Diego State University.

5. April 10, 1996 - A lecture on **"RESEARCH-INDUSTRY INTERACTION: MAKING A HABIT OF CREATIVITY"** by Shri B.K. Rao, Former Secretary, Department of Mines and Metals, Government of India.

6. April 17, 1996 - A lecture on **"MERLEAU-PONTY AND CONSCIOUSNESS"**

by Prof. James Morley, St. Joseph's College, Connecticut, U.S.A.

7. June 6 and 7, 1996 - Two lectures on **"BLACK HOLES IN STRING THEORY: A POSSIBLE RESOLUTION OF THE INFORMATION PUZZLE"** and on **"QUARK CONFINEMENT AND DUAL REPRESENTATION OF PURE YANG - MILLS THEORY IN 2+1 DIMENSIONAL"** by Prof. S.R. Wadia of Theoretical Physics group of the Tata Institute of Fundamental Research, Mumbai.

He presented some of the recent works in string theory dealing with microscopic models of black holes. He also presented a derivation of the Hanking - Bekenstein entropy formula from the microscopic model.

In his second talk, he presented a self consistent solution to the quark confinement problem in 2+1 dimensional Pure Yang-Mills Theory. A dual representation in terms of disorder operators was also presented.

## FACULTY LECTURE PROGRAMME

Lectures delivered by various faculty members during the first half are as under:-

Feb 14, 1996	A lecture on <b>'The Concept of Consciousness in Bhagavad Gita'</b>	Dr. Sangeetha Menon.
March 29, 1996	A lecture on <b>'Suicide'</b>	Prof. Michel Tousignant.
June 12, & 19, 1996	Two lectures on <b>"Ordinary Integers"</b> and An <b>"Irrationality problem"</b>	Prof. K. Ramachandra.

## IMPORTANT LECTURES / ADDRESSES/PRESENTATIONS/ PUBLICATIONS ETC.

(JANUARY 1, 1996 - JUNE 30, 1996)

**DR. RAJA RAMANNA**  
DIRECTOR

### A. LECTURES/ADDRESSES/SEMINARS:

1. January 10, 1996 - Participated in the Brain-storming session relating to the academic community in our country organised by the Planning Commission, Government of India, New Delhi.

2. January 10, 1996 - After-Dinner discussions on (a) Nuclear option; (b) Different rules for different countries; (c) NPT; and (d) CTBT; at the St. Stephen's College, New Delhi.

3. January 16, 1996 - Lecture delivered on "Future of Nuclear Energy" to the participants of the 10th NIAS Course.

4. January 28, 1996 - Lecture Demonstration on "Structure of Raga Systems" at the 4th East-West Encounter organised by the Bangalore School of Music, Bangalore.

5. February 1, 1996 - Delivered the Fourth Prof. C.R. Narayana Rao Memorial Lecture on Nuclear Structure as we know it today at the Gokhale Institute of Public Affairs, Bangalore.

6. February 7, 1996 - Lecture on "Duality of Masses and Lifetimes in Quantum Systems" at the Special Theoretical Seminar organised to celebrate the Golden Jubilee of the Tata Institute of Fundamental Research, Bombay.

7. March 4, 1996 - Delivered the Valedictory Address on "Science and Buddhist Thought" at the All India Seminar on Philosophy and Traditions of Abhidharma (Fourth Monastic Dialogue) organised by the Tibet House in collaboration with Indian Council of Philosophical Research and Sakya College, Dehradun.

8. March 26, 1996 - Addressed the members of the 36th National Defence College Course at the National Defence College, New Delhi.

9. May 11, 1996 - Inaugurated the Seminar on Siksa Sastra and Experimental Phonetics organised jointly by the Academy of Sanskrit Research, Melkote and NIAS.

10. May 14, 1996 - Delivered a talk "On Some Common Features in the Decay of Quantum Systems" at the two-day seminar in honour of Professor Pratul Bandyopadhyay on his 60th Birthday organised by the Indian Statistical Institute, Calcutta.

11. June 1, 1996 - Inaugurated the one-day discussion on "An Approach to develop National Information Infrastructure (NII); Profile of India" organised by the Department of Science and Technology at NIAS.

#### **B. PUBLICATIONS:**

##### **Accepted for publication:**

1. Paper on "Duality of Masses and Lifetimes in Quantum Systems" in the International Journal of Modern Physics 'A', Singapore.

2. Paper on "Particle Symmetries in Gamma/M Ratios and the lifetime of Proton" has

been submitted to the Modern Physics Letters "A" co-authored by Ms. Anju Sharma.

#### **PROF. R.L. KAPUR**

##### **A. LECTURES:**

1. February 18 - March 8, 1996 - A lecture on "Changing Psychology of Young People" given to IAS officers during a three-week inservice training programme on "Management and Policy Challenges in the Current Reforms" at Indian Institute of Management, Bangalore.

2. March 7-9, 1996 - Participated in a conference entitled "Culture, Rights and the Culture of Rights" organised by the Centre for the Study of Developing Societies and acted as discussant for a paper on 'Torture' by Dr. Somasundaram of Jaffna Medical College, Sri Lanka at Delhi.

##### **B. PUBLICATION:**

1. "Exploring the Personal Dimensions of a Therapist", Training Oneself as a Therapist, NIMHANS Journal, Chapter VII, Pages 135-143, (1996)

##### **C. UNDER-PUBLICATION:**

1. "Mental Health Care in India and the Global Context - An Examination of Historical Developments and Suggestions for Future Policies" Rajiv Gandhi Foundation Publications.

2. "Qualitative Methods in Research for Mental Health Researchers: A report of the three day workshop of the same name.

#### **PROF. C.V. SUNDARAM HOMI BHABHA VISITING PROFESSOR**

##### **A. LECTURES:**

1. January 11, 1996 - Lecture on 'Fifty years after Hiroshima', at the 10th NIAS Course.

2. February 7 & 8, 1996 - Participation in the National Committee Meeting on 'Marine Resources - Minerals and Energy', at IIT, New Delhi, in connection with the formulation of the Ninth Plan for the Department of Ocean Development.

3. February 28 & 29, 1996 - Inaugural Address at the Fifth National DAE Symposium on Environment, VEC, Calcutta and Invited Talk on 'Environmental Impact in the Indian Metallurgical and Mineral Industries - Aspects relating to Waste Generation and By-product Utilisation'.

4. March 3, 1996 - Lecture on 'Energy, Materials and the Environment' in the Symposium on 'Technologies for the Next Millenium', Golden Jubilee Inauguration, Department of Metallurgy, IISc., Bangalore.

5. March 28 & 29, 1996 - Participation in the National Committee Meeting on 'Marine Resources - Minerals and Energy' - National Institute of Ocean Technology, I.I.T., Madras.

6. April 26, 1996 - Inaugural Address on 'Growth of Powder Metallurgy Programmes in India', Annual Meeting of the Powder Metallurgy Association of India, Bangalore.

7. May 18, 1996 - A presentation on 'Science and Technology Funding in India', for the Materials and Processes Panel, Silver Jubilee Celebration of the Aeronautical Research & Development Board, NAL, Bangalore.

#### **B. PUBLICATION:**

1. Chapter on 'History of Metallurgy in India', (with Dr. Baldev Raj and C. Rajagopalan), for the project on History of Indian Science, Philosophy and Culture.

#### **PROF. M.N. SRINIVAS**

#### **J.R.D. TATA VISITING PROFESSOR**

#### **A. LECTURES/ADDRESSES/SEMINARS:**

1. March 13, 1996 - Special Lecture on "Artisans, Some Reflections on Indian Cultural Tradition" at the Seminar on "Tradition Science and Scientific Tradition", jointly organized by NIAS and the Project on "The History of Indian Science, Philosophy and Culture".

2. March 25, 1996 - Special Lecture on "The Roots of Indian Pluralism", Bangalore Social Science Forum.

3. March 27, 1996 - Valedictory Address to the U.G.C. - sponsored Refresher Course in Sociology, organised by the Bangalore University, for College Teachers in Sociology.

#### **B. PUBLICATIONS:**

1. Collection of papers entitled "Village, Caste, Gender and Method", Oxford University Press, Delhi, 1996.

2. Article : "Indian Anthropologists and the Study of Indian Society", Economic and Political Weekly, Bombay, Vol. XXXI, No. 11, March 16, 1996.

#### **DR. BISWAJIT SEN FELLOW**

#### **A. LECTURES:**

1. January, 1996 - Two lectures on "Youth Psychology" given to engineering college teachers under their programme IMPACT at the CEDT, Indian Institute of Science.

2. May, 1996 - A lecture on "Youth Psychology" given to engineering college teachers under their programme IMPACT at the NTTF, Centre for Electronics, Bangalore.

3. June, 1996 - Two lectures on "Youth Psychology" given to engineering college teachers under their programme IMPACT at IIT Bombay.

#### **B. PRESENTATION:**

Electronic Media and Violence in the Indian Society : A presentation made during a seminar on **Impact of the Electronic Media on Indian Society** during 10th NIAS course for Senior Executives.

#### **C. BOOK REVIEW:**

"Insight into riots" : Published by the Deccan Herald on Sudhir Kakar's book "The Colours of Violence."

#### **MS. SRILATHA BATLIWALA FELLOW**

#### **A. LECTURES/WORKSHOPS/MEETINGS/ TRAINING PROGRAMMES:**

1. January 13, 1996 - Gender Sensitization Training, Indo-Dutch Project Management Society (IDPMS).

2. February 13, 1996 - "Government-NGO Partnerships - Potential and Possibilities", Indian Institute of Management, Bangalore.

3. February 24, 1996 - "Gender and the Concept of Equality", Human Rights Advocates Refresher Course, NLSIU, Bangalore.

4. March 1, 1996 - "Saving our Cities - Case Study of an NGO Initiative", Indian Institute of Management, Bangalore.

5. March 4-5, 1996 - Gender Sensitization Training, OUTREACH, Bangalore.

6. April 22-23, 1996 - National Workshop on Role of Gender Coordinators, District Primary Education Project, Whitefield.

7. May 28-29, 1996 - "The Gender Impact of Technology Adoption", ICRISAT Workshop on Welfare Impact of Technology, Hyderabad.

## B. PUBLICATION:

1. Srilatha Batliwala and Gayatri V, Reservation vs. Exclusion: Women in Karnataka's State Politics", Deccan Herald, Sunday, April 7, 1996.

## DR. DEEPA M. OLLAPALLY FELLOW

### A. UNDER PUBLICATION:

1. "Identity Politics and the International System", forthcoming in Nationalism and Ethnic Politics.

2. Review of Steven Hook, National Interest and Foreign Aid (Rienner, 1995) and David Arase, Buying Power: The Political Economy of Japan's Aid (Rienner, 1995) forthcoming in Journal of Politics.

## B. PUBLICATION:

1. Review of Arturo Escobar, Encountering Development: The Making and Unmaking of the Third World (Princeton University Press, 1995) in The International History Review (Winter, 1996).

## DR. P.K. SHETTY RESEARCH FELLOW

### A. LECTURES:

1. April 12, 1996 - Lecture on "Pesticide Pollution: An Overview" at the Department of Environment Sciences, Bangalore University.

2. April 19, 1996 - Lecture on "Biodegradation of Atrazine and Endosulfan in Soil" at Nuclear Agriculture Division, Bhabha Atomic Research Centre, Mumbai.

## B. PUBLICATIONS:

1. Variation among cowpea cultivars for nitrogen fixation by *Rhizobium* strain BS-7 under black soil conditions. **Soil organisms and Sustainability**. Proc. IV Nat. Symp. Soil Biol. Ecol. (Eds) D. Rajagopal et.al, published by Indian Society for Soil Biology and Ecology, UAS, Bangalore.

2. Isolation and screening of cowpea *Rhizobium* from medium black soils of semi arid regions of Karnataka. **Soil organisms and Sustainability**. Proc. IV Nat. Symp. Soil Biol. Ecol. (Eds) D. Rajagopal et. al, published by Indian Society for Soil Biology and Ecology, UAS, Bangalore.

## DR. SUNDAR SARUKKAI RESEARCH FELLOW

### A. LECTURES:

1. January 15 — 16, 1996 - Two lectures on 'Sociology of Science' for the 10th NIAS Course participants.

2. February 24, 1996 - 'Abstract Objects and Virtualism' - Invited paper at the National Seminar on 'Reality in Physics and Philosophy', S.N. Bose Institute, Calcutta.

3. February, 1996 - Taught a Module on philosophy of science to Doctoral students at Indian Institute of Management, Bangalore.

4. March 14, 1996 - 'Tradition, Knowledge and Validation', paper presented at the National Seminar on 'Science, Tradition and Scientific Tradition', NIAS.

5. April 9, 1996 - 'Construction of Knowledge', NIMHANS, Bangalore.

### B. ACTIVITIES:

1. Course Co-ordinator with Prof. R.L. Kapur, 10th NIAS Course, January 1996.

2. Visiting Faculty, Indian Institute of Management, Bangalore, February, 1996.

3. Co-Convenor with Prof. P.K. Mukhopadhyay, National Seminar on 'Science, Tradition and Scientific Tradition' at NIAS, March 13-14, 1996.

## DR. H.K. ANASUYA DEVI RESEARCH FELLOW

### A. LECTURE:

1. January 9-11, 1996 - Demonstrations sessions organised at STP, INFOSYS, NCSI and SERC to the participants of 10th NIAS Course on "Communication Revolution in India".

### B. INVITED SEMINAR:

1. January 17, 1996 - One day conference on "Pre-Conference Tutorial on Internet" organised by SIS Bangalore Chapter at SERC, IISc., Bangalore.

2. January 18-20, 1996 - A three day conference on 15th Annual SIS Convention and Conference on Digital Libraries" organised by SIS Bangalore Chapter at CSIC, IISc., Bangalore.

3. May 11-12, 1996 - A two day seminar on "Siksha Sastra and Experimental Phonetics" organised by Academy of Sanskrit Research, Melkote and NIAS.

4. May 25-27, 1996 - A three day conference on "XXII Annual Congress of the Epigraphical Society of India and XVI Annual Conference of the Place Names of India organised by Archaeological Survey of India, Mysore at Karnataka Institute for Agricultural Marketing, Mysore and presented a paper on "Computer Aids to Epigraphy".

5. June 10, 1996 - One day seminar on "WEBFORCE Systems from Silicon Graphics for Interactive Content Creation and Fast Serving" organised by Silicon Graphics at Taj Residency, Bangalore.

**DR. S.A. SANGEETHA MENON**  
**RESEARCH FELLOW**

**A. LECTURES/SEMINARS:**

1. January 5, 1996 - Lecture on 'Intentionality and Integrality in Bhagavad Gita', at the 7th International Vedanta Conference held in Madras University, organised by Radhakrishnan Institute for Advanced Studies in Philosophy and Miami University.

2. March 13, 1996 - Seminar on 'Tradition, Science and Scientific Tradition' at NIAS organised by NIAS and PHISPC.

**B. PUBLICATION:**

1. 'Intentionality and Integrality in Bhagavad Gita' - A phenomenologico - existential study', 7th International Vedanta Conference Abstract of Papers, p-47.

**C. UNDER-PUBLICATION:**

1. Paper titled 'The Ontological Pragmaticity of Karma in Bhagavad Gita' submitted for publication in the Conference Catalogue of Xth World Sanskrit Conference in Bangalore to be held from 3 to 9 January, 1997.

**MS. SUSMITA SUBRAMANYAM**  
**RESEARCH ASSOCIATE**

**A. LECTURES:**

1. March — May, 1996 - A three month seminar course for fifth year students at the National Law School of India on 'Law' & Psychology', has been successfully organised and completed.

**B. PUBLICATION:**

A report in three sections has been compiled of the work completed on the creativity project, so far. A paper is to be submitted from this for publication.

**MS. ANITA GURUMURTHY AND**  
**ANITHA B.K.**

**RESEARCH ASSOCIATES:**

**A. LECTURES/WORKSHOPS/MEETINGS/  
TRAINING PROGRAMMES:**

1. March 6-8, 1996 - Training of Investigators of NGO REACH, for status of Women in Karnataka (SWK) Study, Kolar District (with assistance of Ms. Chandana Wali)

2. March 18, 1996 - Talk on "Indicators for Understanding the Status of Women", by Ms. Anita Gurusurthy, at Workshop on Engendering Development, SPARC, Bombay.

3. March 29-31, 1996 - Training and Investigators for NGO Gram Vikas, for SWK Study, Kolar District.

4. April 29-May 1, 1996 - Training of Investigators from Dakshina Kannada, for SWK Study, NIAS (with assistance of Ms. Chandana Wali)

5. May 14-15, 1996 - Training of Investigators of NGO GRAMA, for SWK Study, Chitradurga District.

6. June 3, 1996 - "Unpacking the Notion of Status", paper presented by Ms. Anita Gurusurthy at UN HABITAT II Conference, Istanbul, Turkey.

**MR. ARVIND KUMAR**  
**RESEARCH ASSOCIATE**

**A. PUBLICATION:**

1. "The Hank Brown Amendment and its implications", Strategic Analysis (January, 1996).

**VISITS ABROAD**

1. April 5 - 8, 1996 : Ms. Srilatha Batliwala attended the Steering Committee Meeting of DAWN, in Suva, FIJI.

2. May 29 - June 15, 1996 : Ms. Anita Gurusurthy attended the UN HABITAT II Conference in Istanbul, Turkey.

## COUNCIL OF MANAGEMENT AND ANNUAL GENERAL MEETINGS

The fifteenth meeting of the Council of Management and the sixth Annual General meeting of the Society of NIAS were held on March 15, 1996.

These were attended by Mr. J.J. Bhabha (Chairman), Dr. Raja Ramanna, Mr. R.M. Lala, Prof. G. Padmanaban, Prof. R.L. Kapur, Prof. C.N.R. Rao, Prof. M.N. Srinivas and Maj Gen M.K. Paul (Retd) (Secretary). Prof. C.V. Sundaram also attended the meetings by invitation.

### NIAS LIBRARY

NIAS library has added more than 100 books in the last six months. The highly recommended reference source entitled Encyclopedia of Religion and Ethics was purchased this year. The library has also increased the number of journals. The new subscriptions include the Bulletin of the Atomic Scientists, Arms Control Today, International Studies, South Asian Survey, Philosophy Today, Philosophy of Science and Gender and Development.

One of the main tasks this year has been to automate library operations. NIAS library is in the process of creating its home page which will include items like new additions of books, weekly list of journals, complete journals holdings list, list of reference books, information services, library statistics, email addresses of other libraries in India, Indian information on CD-ROM, information about access to home pages of Indian Academic Institutes. This home page will become a public space on the INTERNET once the Institute has a full fledged connection to INTERNET.

NIAS library is now a member of LIS-FORUM which is an electronic mail discussion forum for library and information services.

### THOSE WHO JOINED US

The following joined NIAS during this half of the year:-

1. January 8, 1996 - Dr. S.A. Sangeetha Menon, as a Research Fellow in the Unit of "Philosophy of Science". Her doctorate is in "The Concept of Consciousness in Bhagavad Gita". She is the recipient of the National Junior and Senior Research Fellowship from the University Grants Commission.

2. February 1, 1996 - Dr. Deepa M Ollapally, as a Fellow in the Unit of "International and Strategic Studies". She holds a Ph.D in Political Science from Columbia University, New York. Her areas of expertise are international strategic studies, especially American security policy towards developing countries; nuclear non-proliferation; and the comparative politics of South Asia. She is the author of the book "Confronting Conflict: Domestic Factors and U.S. Foreign Policy in the Third World" published in 1993. She has also published numerous articles and reviews including "U.S.-India Tensions: Misperceptions on Nuclear Proliferation", co-authored with Dr. Raja Ramanna in "Foreign Affairs" (January/February 1995); and "Third World Nationalism and the United States After the Cold War", in "Political Science Quarterly" (Autumn 1995). Dr. Ollapally held a Senior Research Fellowship from the American Institute of Indian Studies during 1992-'93 and was a Presidential Fellow to the prestigious Salzburg Seminar in 1995.

3. February 15, 1996 - Mr. S. Rajagopal (Director, Quality Assurance, Nuclear Power Corporation, Mumbai), as a Visiting Fellow in the Unit of "International and Strategic Studies". He is a graduate in Electrical Engineering from the College of Engineering, Guindy, Madras. He was an International Atomic Energy Agency (IAEA) Fellow at the South West Research Institute, San Antonio, Texas. Mr. Rajagopal was also the Head of the Technical Liaison Mission of the Department of Atomic Energy in Paris, followed by the position of Secretary to the Atomic Energy Commission. He has published a number of papers relating to nuclear technology.

4. March 13, 1996 - Mr. N.R. Prashanth, as a Computer Consultant.

5. March 15, 1996 - Ms. Sushma Shetty, as a Research Assistant in the Unit of "International and Strategic Studies". She is a graduate from the University of New England, Australia where she majored in Economics, History and Politics. She also has a Graduate Diploma in Applied Finance and Investment from the Securities Institute of Australia and was appointed a Member in Young Achievement in Australia. She worked briefly as an Analyst with American Express International in Sydney, Australia before joining NIAS.

6. March 15, 1996 - Mr. Arvind Kumar, as a Research Associate in the Unit of "International and Strategic Studies". He is completing his

doctorate on American nuclear strategy and is based at Jawaharlal Nehru University in New Delhi. His dissertation is "Reagan's Military strategy and Force Structure, 1981-'85". Mr. Kumar worked as a Researcher at the Institute for Defence Studies from 1994 to January 1996. His publications include "SriLankan Ethnic Crisis and Chandrika's Peace Initiatives", "Strategic Analysis" (December 1995).

The following joined NIAS as "Honorary Visiting Professors":-

1. Dr. R. Narasimhan, National Fellow, CMC, Bangalore.

2. Prof. K. Ramachandra, Senior Professor, Tata Institute of Fundamental Research, Mumbai.

### THOSE WHO LEFT US

On completion of his assignment as Research Assistant, Mr. H. Karan Kumar left NIAS on February 29, 1996.

### HONOURS AND AWARDS

**Prof. M.N. Srinivas:**

1. Honorary Membership of the Mythic Society, Bangalore;

2. Festschrift for M.N. Srinivas, Vol-I: "Social Structure and Change"; and

3. Festschrift Volume II "Social Structure and Change: Women in Indian Society", 1996, edited by Professors A.M. Shah, B.S. Baviskar and E.A. Ramaswamy, 1996 published by Sage Publications India Pvt Ltd., Delhi 1996.

**Dr. Biswajit Sen:**

1. The first recipient of BALINT AWARD instituted by the Indian Association of Social Psychiatry on behalf of the Foundation of Psychomatic and Social Medicine, Ascona, Switzerland for the paper **In Search of Meaningful Existence** in 1995 (to be formally awarded in 1996).

### THOUGHTS ON HUMANISM AND THE GANDHIAN APPROACH

**C.V. SUNDARAM**

While Man represents a considerably evolved and mature species - with superior mental faculties compared to other forms of life on earth -

the world as such is a large population of men, women, and children, with a gradation in age at any point in time, with wide variations in individual capacities and inclinations and in collective cultures. We can distinguish between great individuals with unusual endowments in intellect and spirit - who have been path-breakers for human progress through successive periods of human history, and the large spread of common folk who have sustained every day activities in agriculture, construction, industry and the services, and also the significant number of physically and mentally handicapped people who require societal understanding and support. We know how accidents of birth and circumstance place severe handicaps in the course of individual lives and even large communities. We are also aware of the historical forces that have determined the growth and the outlook of the different nations of the world as we see them today.

In such an obviously disparate world, what are the philosophic principles that we can extract - from the experiences of the past and an analysis of the present - to generate a vision for the growth of mankind in the future?

The French Revolution had proclaimed the principles of Liberty, Equality and Fraternity as guiding principles for evolving a civilised society. By and large, those principles are still valid to provide the blueprint for our future. The creative urge in Man - for artistic expression, scientific discovery and innovation, and philosophic enquiry - requires an atmosphere of Freedom to flourish. Properly enunciated and effectively implemented principles of fair play and justice are necessary for common men and women to attain to their full potential and be effective partners in the vast human enterprise. And sensitive fellow-feeling has to be inculcated - through a liberal system of education and exchange - for men to have regard and affection for all fellow-men, for them to be alive to the vast variety of problems that burden humanity all over the world, and even more to ensure that no outrages on human dignity are perpetrated under any circumstance.

The twentieth century that will soon be drawing to a close can be described as a century of accelerating change. Systematic progress in science and technology which had its beginnings some three centuries back, has proceeded at a phenomenal pace in the twentieth century. It has been a vast accumulation of knowledge and experience - that however, still remains to be

widely disseminated and effectively harnessed for the good of the majority of mankind.

The twentieth century has also seen a disturbingly fast spurt in the growth of the world's population. World population that was around 1-1/2 billion at the beginning of the century will be well over 6 billion by the year 2000. This has placed tremendous pressures on the earth's natural resources and threatened the natural environment. In the heady pursuit of higher standards of living, resource consumption has become alarmingly excessive. The question that is being increasingly articulated and that has to be urgently addressed is what are the levels of consumption that can be reasonably sustained for development in the world as a whole.

The twentieth century has also witnessed two major large scale conflicts in the form of the two world wars. Though an open conflagration of the size of World War II has not happened again, the unfortunate cold war between the two major powers, the U.S.A and the USSR, was a long period of tension and unease and a thoughtless race in the build up of nuclear armaments and escalating defence expenditure, distorting national and world economies. On a comparatively smaller scale, there have been many instances of wars between nations small and big (like the Korean war, the Vietnam War, and the more recent Gulf war) and also wasteful civil strife in newly emerging nations. Continuing conflict in different parts of the world is a symptom of impatience, intolerance, and despair on the part of large sections of society.

With this backdrop of the recent past and the present what are the hopes for the future? What are the options available for the nations of the world to disentangle themselves and to chalk out new pathways for homogeneous progress? What are the ideals that individuals and societies can place before themselves to evolve to a better state of well-being?

It is in this context that the life and work of Mahatma Gandhi appear strikingly important and relevant. The year 1994- '95 was celebrated to mark the 125th anniversary of Gandhi's birth. Gandhi, who had the lofty ambition 'to wipe every tear from every eye', had in fact once expressed the wish to live for 125 years, to implement many of his forward-looking ideas towards a world which will ensure the uplift of everyone (Sarvodaya), a world of compassion and justice without any violence, where people respect the dignity of the individual, and development is pursued with due

regard to sustainability and with emphasis on simple living, creative occupation for every one and the minimum of mechanisation.

To quote Ronald Duncan, a British activist who was inspired by Gandhi's work and personality in many ways, "The essential contribution Gandhi made to 20th Century thought was his insistence on the need for a lower standard of living, in opposition to the Western notion that progress lies in an accumulation of material prosperity. He maintained that the essence of Civilisation consists not in the multiplication of wants but in their deliberate and voluntary renunciation".

Gandhi's vision of Sarvodaya proceeded from a genuine concern for every living being on earth. The concept of equality arises from the principle that all living beings are alike in their sensitivities, in that 'if you tickle them, they laugh; if you prick them, they bleed'.

A spirit of fellow feeling that encompasses the whole of humanity is enshrined in the old saying:

अयं निजः परो वेति गणना लघुचेतसाम्।  
उदारचरितानां तु वसुधैव कुटुम्बकम्॥

It is only the small minded who raise the distinction between whom they consider as their own (kith and kin) and the rest of the world. For people of noble conduct, the entire world is one single family. Gandhi expatiated on this aspect in no uncertain terms.

So far we have considered some of the aspects of Man's prudent survival on earth, and the importance of his establishing sensitive relationships with fellow-men. From the earliest times Man has not been content with merely fulfilling his basic needs of food, shelter and clothing. He has felt the urge and the need to express his spontaneous feelings and emotions in artistic form - in poetry, music, dance, painting, sculpture and architecture. The accumulation of these works of art over the ages is a rich, vital and inspiring part of our cultural inheritance. Man has also cultivated the spirit of scientific enquiry - through observation, experiment, measurement, analysis, and by developing models - to build a coherent system of knowledge that has helped him to obtain insights into the nature of physical phenomena, the structure of the physical world, and the principles underlying chemical and biological processes and transformations. (Side by side, he has been able to devise machines and

systems to gain a certain mastery over nature, to harness natural resources and improve his material well-being.) And, again from the earliest times, man has shown a strong inclination to reach out into the back of beyond, seeking to experience and know the underlying Truth in all the beauty, order and grandeur of the Universe around him, and also to look equally inward to understand the nature of his true self and being. He has felt compelled to ask questions about the purpose of his existence, the meaning of the world around him and the nature of Reality. Such an enquiry has been important for him to evolve a sense of values, of right and wrong, a code of conduct to regulate his every day life with perennial serenity and confidence. And in the process, at different times in history, Man has gravitated towards the concept of God, as the symbol and model of ultimate perfection.

We have earlier referred to Gandhi's social philosophy. That philosophy emanated from a strong religious faith nurtured from early childhood, and continuously strengthened by study, observation, experience and analysis, and above all through his own original 'Experiments with Truth', - and from a personal philosophy that placed great emphasis on self-discipline and self-purification as pre-requisites for self-realisation. As Gandhi's biographer Judith Brown has observed "Gandhi's religious vision was both God-centred and man-oriented. It stemmed from an unshakable sense of a divine power ordering, sustaining and suffusing the created order, yet it emphasised man's response to this central reality; each man and woman must recognise the divine, work hard to co-operate with it, and ruthlessly shed all encumbrances on the individual spiritual journey towards the divine which is the only true human goal." Gandhi believed in the enormous capacity of the human spirit. He believed that "all people were ultimately capable of spiritual and moral perfection, however long the process of transformation, however hard the struggle".

While Gandhi recognised the importance of religious faith in providing purpose and direction to human existence, he was equally aware of the danger of institutionalising religion in dogmatic structures. He was himself witness to some of the

worst demonstrations of hostility in the clashes between Hindus and Muslims in the name of religion. In his daily prayer meetings he constantly reminded his audience: "Each religious tradition had valid insights into the nature of truth and devotional practices which aided the vision of truth, but no one of them perceived truth in its totality. Truth like a diamond has many facets and men can only glimpse some of them. Adherents of particular religions must treat those of other traditions with tolerance and charity, recognising that they too have glimpsed something of the totality".

As we come to the conclusion of this essay, we may attempt to briefly address the question 'what does the Future hold for the individual in society and for Mankind as a whole?' With the accumulated experience and knowledge, over the ages, the Individual - amidst a variety of constraints - has still the possibility of pursuing a way of life with a sense of purpose, establishing coherence and harmony with the external world and his inner self, and finding his fulfillment. The real question is: can the billions of people around the world drawing from the same stock of growing knowledge and wisdom, develop a sense of collective responsibility and purpose, for Mankind as a whole to continuously progress to new levels of fulfillment - with fully shared emotions and values? However impractical or illusory it may appear, it is the ideal to strive for, - the same ideal that was the essential part of Gandhi's vision. The movement towards that ideal will require the realisation that the power that all knowledge brings should be evaluated with care and deployed with concern for the whole world. It will require the wisdom to discriminate smaller issues from larger issues and the voluntary sacrifice of small individual interests in the cause of larger global interests. The world has to mature into one whole Democracy, with equal regard for individual creativity and collective good.

*(This is a condensed version of the article contributed to the Indian Institute of World Culture Golden Jubilee Publication "Facets of Humanism", Edited by Prof. B.V. Subbarayappa).*

# BHAGAVAD GITA ON THE NATURE AND METHODOLOGY OF CONSCIOUSNESS

SANGEETHA MENON

The concept of consciousness is vested with diverse meanings and functions from the religious, ethical and historical perspectives apart from the philosophical, psychological and scientific standpoints. The word 'consciousness' is taken up into the technical terminology of a number of philosophical systems (eastern and western), cognitive science and AI studies. Consciousness is taken up as a mental quality / knowing function/ behaviouristic response / neurological stimuli / self-identity function, as of personal or impersonal nature, as an epistemological / ontological reality. Whichever the perspective be, today it is accepted that in no field of study consciousness can be alienated from its reference to subjective existence. Apart from having logical and epistemic priority, it has ontological priority too being an apodeictic/self-evident fact. Bhagavad Gita, which is one amongst the Prasthanatraya of classical Indian thought, presents a unique and holistic theory of consciousness which cannot be characterised solely as psychological, existential, epistemological or pragmatic.

As a brief prologue to the discussion of the concept of consciousness in Bhagavad Gita, an examination of the same as developed in Upanishads and various systems of Indian philosophy can serve as a backdrop. The most important contribution of Upanishads regarding consciousness, lies in the exposition of Mahavakyas. They give an ontologised epistemology - defining the self as of the nature of prajana. The being of prajana lies in its knowing. The knower and known coalesce in Being ...

Consciousness is an epiphenomenon due to its imperceptuality, is a quality of the self, is a non-substantial stream, according to Carvaka, Jainism and Buddhism respectively. Consciousness is an adventitious quality of the self according to Nyaya Vaisesika. Samkhya Yoga maintains Purusha as the static consciousness and Prakrti as the dynamic matter. Advaita Vedanta contends consciousness as the essential self-evident nature of self which illumines all objectivities.

The important feature of the Gita concept of consciousness is that Gita gives a polydimensional picture of consciousness. From the epistemological standpoint Gita describes consciousness as Kshetrajna - that which awares/knows Kshetra, the seen, all that which falls in the field of consciousness. From the existential standpoint Gita gives the picture of a Yogi who interacts with the world. And from the hermeneutic standpoint, we get the behavioural patterns of Sthitaprajna/one who is able to clearly distinguish between and understand Kshetra and Kshetrajna/the seen and the seer/the field and the knower of the field.

Epistemologically consciousness is that which knows/experiences that which falls in its field. Consciousness is given an ontological status by identifying it with the knower's self. Three epithets are used as if in a hierarchy to denote the place of matter and consciousness - Kshara Purusha, Akshara Purusha and Purushottama - the macro & micro psychophysical organism, the creative power of consciousness and consciousness. This is not a hierarchical statement of the different states of consciousness. It is an attempt made to show the interrelationship and integrality of consciousness, when looked from three different perspectives. Consciousness which is the cogniser's self itself is the variegated material pattern, itself is the creative power which organises the different patterns. Consciousness is inclusive of its manifesting power, manifestation, but is still beyond and untouched by its patterns. If it is asked about the relationship between consciousness and matter, it can only be said that it is a non-causal, non-separate relationship. Causality/Relationship has meaning only with reference to a partial and separate system/a complex system. Gita rules out the separate existence of matter.

Activity/Karma is not a mere pragmatic notion but is a definite ontological concept. Work is very much related to the physical and psychical environment of the individual. The pragmatism of Gita can be defined as ontological pragmatism since it fills the lacunae between the psychology of the mind and ontology of consciousness ... Four definitions are given for 'Yoga' -- i) equanimity in terms of dualities (samatva), ii) dexterity in action (karmasu kausalam), iii) disjunction from non-happiness (dukha samyoga viyogam). An active mind is one which renounces what it has created. Non-reaction is keeping the mind in a steady but highly active state by reducing

reactions/intense likes and dislikes incurred. Renunciation is continuous creation, according to Gita, and a renouncing mind is a meditative mind. Work and meditation are complementary to each other... Freedom is the existential expression of consciousness. It is notable that Gita uses the epithet 'Sthitaprajna' to mean both 'a free person' as well as the 'quality of a free person'. Consciousness is intentional only in the cognitive process and not ontologically. Ontologically it is Integral.

As per Bhagavad Gita consciousness is not merely an epistemic phenomenon/construct but is ontologically related to the Self, Self-knowledge, World, Activity, Freedom and Happiness. Gita dissolves the bifurcation itself of consciousness and matter. It presents consciousness realistically to the Idealist and idealistically to the Realist. The Questioner / Perspective / Mental Infrastructure is given more importance than the question. According to Gita, to understand the multidimensional nature of consciousness, right perspectives are to be defined.

*(Dr. Sangeetha Menon is a Research Fellow at NIAS. This is a summary of the Faculty lecture given by her to the Faculty Members of NIAS on February 14, 1996)*

## **INTERNATIONAL ECONOMICS : THE HAWALA MARKET**

**INDIRA RAJARAMAN**

International economics is a study of those issues that arise in what are called open economies as distinct from closed economies, that is to say, economies or countries which have no relationships with other economies.

An open economy can have two types of relationships with other economies, or to use a more technical term, there can be two types of cross-border flows. There are trade flows. Imports and exports are examples of trade flows. And there are financial flows. The balance of payments statement of any country is an official record of all cross-border flows, whether trade flows or financial flows, or in other words of all transactions that an open economy has with other open economies. It goes without saying that a balance of payments statement can only record such flows as go through official channels. So obviously hawala transactions do not figure in the balance of payments statement at all.

The balance of payments is divided into a current account and a capital account. In the current account, there are further sub-divisions. There is a trade account, in which exports are entered with a positive sign and imports with a negative sign. Then there is the second component of the current account, called invisibles. Invisibles, in turn, are sub-divided into three components. One is trade in services, such as shipping, insurance and so on. The second is interest payments or receipts on debt, and the third, very importantly from the viewpoint of the Indian economy, is remittances. When an Indian worker in the Gulf sends home money, those remittances constitute the third component of invisibles in the current account.

The balance of trade, technically the 'merchandise balance of trade', is most usually negative in our country. That means that our imports exceed our exports. The balance on services is also usually negative, as is the balance on debt servicing because we are not a creditor nation. We are a debtor nation. It is only in the remittances category of invisibles that we have a substantial positive entry. Summing across trade and invisibles, there is the overall balance on current account, which in principle could be positive, but most usually, in recent years, has been negative. That is to say, remittances have not been enough to outweigh the negative balances elsewhere.

Let us move now to hawala transactions, i.e. unofficial, unrecorded cross-border flows. The hawala market cannot exist unless there is a supply of dollars and a demand for dollars. I use the word dollars here in the sense of general foreign exchange. It need not necessarily be U.S. dollars but can also be pounds sterling, or German marks.

The major source of supply of dollars to the hawala market has traditionally been diverted remittances. Why is it that an ordinary Indian worker in the Gulf goes to a hawala trader to make remittances to his family in India, rather than going through official banking channels? Quite simply, it is because of the efficiency of the hawala network. The remittance is delivered in rupees at the doorstep of the worker's family, even if they are resident in a remote village. They do not have to go to a bank; they do not have to go through all the procedural harassment which we in India are famous for. The hawala operator minimises what economists call 'transactions costs'. And that is why the hawala market has thrived as it has. That

is why it has succeeded so remarkably in diverting remittances and thereby substantially impacting upon the Indian balance of payments and giving us a negative balance on current account.

Diverted remittances are not the only source of supply of dollars to the hawala market. Export under-invoicing and import over-invoicing offer other routes by which hawala operators obtain a supply of dollars, although now that export income is not taxable, export under-invoicing is no longer a source. The exemption from taxation of export income has in fact generated a channel for money laundering through export over-invoicing. It must be remembered that whenever there is mis-invoicing in the opposite direction to that which generates a dollar supply, there is then a corresponding demand for dollars from the hawala market. Another source of supply of hawala dollars is commissions and kickbacks on defence and other imports, where the recipient of the kickback wishes to convert it into rupees rather than hold it in dollars. Since kickbacks constitute a part of the cost of the import, that is basically just another form of import over-invoicing.

The major source of demand for dollars until recently, was gold smuggling. Gold was bought with hawala dollars and smuggled into the country. Because the Indian price of gold was so much higher than the international price, the rupee proceeds were enough to compensate the supplier of dollars in rupees at a rate higher than the official exchange rate, and yield a substantial residual profit for the hawala operator. But now with the importation of gold having been substantially liberalised, this is no longer as buoyant a source of demand for hawala dollars as it once was.

There continues to be a demand for hawala dollars for the smuggling of consumer goods. One of the important benefits obtainable from relaxation of import restrictions still in force on consumer goods, is that the demand for smuggled consumer goods will go down, and thereby the demand for hawala dollars.

Then there has always been some demand for dollars from importers wishing to under-invoice and thereby reduce import tariffs payable. This is the opposite of what generates a supply of hawala dollars. Smuggling is in fact just a special case of import under-invoicing, because smuggled goods are basically zero-invoiced imports. One of the benefits of our import tariffs having come down with liberalisation is that the demand for import under-invoicing has also gone down. Thus,

corruption, smuggling, and hawala are greatly influenced by official policies.

There always has been, and continues to be, a demand for dollars for money laundering purposes. Export over-invoicing has already been mentioned as a tax-free channel for receipt of dollars, but other routes are possible, such as the setting up of non-profit organisations. Lastly, of course, there is a demand for dollars from people wishing to hold their assets outside the country in dollars, rather than within the country in rupees.

So, you have then the hawala market, with smuggling, money laundering and capital flight together generating the demand for dollars, and diverted remittances and trade mis-invoicing supplying the dollars. The hawala margin is a function of the demand for dollars at any time relative to the supply. In recent years, the hawala margin has declined relative to what it was in the heyday of gold smuggling.

Hawala is obviously a criminal operation. There is no question about it. And it has damaged the country. It is clear however that it has thrived on a policy environment conducive to its functioning, and on the strength of its own undeniable efficiency as an institution. It is clear also that it can be reduced, as it already has, or be killed completely by the right kinds of policy intervention.

*(Dr. Indira Rajaraman is the Reserve Bank Chair Professor of National Institute of Public Finance and Policy at New Delhi. She delivered a series of lectures on "International Economics" during the 10th NIAS Course for Senior Executives. This article deals with one aspect of the subject.)*

## INFORMATION TECHNOLOGY

S. RAMANI

We are passing through an information technology revolution in India. It may come as a surprise, but more than half of this revolution is already over. There will be tremendous improvements in telephone, broadcasting, television and computers. These together constitute the information technology area. This technology makes its major impact by improving the productivity of these services. It is one of the reasons why the service sector is reaching fifty percent of our GNP. It is also a reason why the cities account for a high percentage of GNP. The

day is not far off when the cities will contribute sixty percent of our GNP.

Tele-communication involves transmission and switching. Satellites, microwave and fiber optics have created a revolution in the transmission area. While a copper cable carried a single voice signal, a fiber optics cable now carries 8,000 voice signals at the same time.

The use of computer based telephone exchanges has completely modernised switching. Modern telephone exchanges are very sophisticated. They enable you to have a tele-conference with a number of people, they allow you to forward a call to another number to chase the called party. They allow your caller to "CAMP-ON" your telephone instrument, so that the moment you finish one conversation the bell will ring automatically to put you in touch with the waiting party. There are a couple of dozen important features like these which make the modern telephone exchange a part of the "Intelligent Network". All this is made possible because the logic of the telephone exchange is in software, which is a thousand times cheaper than hardware.

The telecom sector in India is worth approximately Rs.25,000 Crores. The day is not far off when we will spend more on telecom than we will spend on petroleum products. We are perhaps one third the size of British Telecom today. Within five to ten years, Indian Telecom would have overtaken British Telecom in size.

The current challenge in India is to create a regulatory system which will be effective, fast and transparent. It should separate regulatory power from commercial service activity. The shop-keeper cannot be the judge, particularly when the plaintiff is the consumer! Some of the highest telephone tariffs current in India, such as three dollars per minute for overseas calls, would have to be lowered, in line with international levels. If this is not done, consumers will find various other methods of surviving. For instance, they may start using the callback services from abroad, which are available at about a dollar per minute.

Telecom liberalisation is in progress. It will demonopolise the sector and allow liberal imports of equipment. All these will completely change the telecom environment.

There has been a burst of activity in the non-voice service area. INET has implemented Phase-II, and is waiting to be launched. It offers

about a thousand connections in each metropolitan city, and has spread all over India.

The Integrated Services Digital Network (ISDN) is also here, the latest arrival in the telecom scene in India. ISDN subscribers can get relatively inexpensive video conferencing. The picture you can see of the person at the other end of the conversation is rather small, but it is good. ISDN makes it possible to send faxes at the rate of one page every 7 or 8 seconds. ISDN also allows high speed data communication over dial-up data links.

There is need to stress the importance of creating a good regulatory environment. We should also improve managerial and marketing skills of our primary telecom service provider, DOT. This is no less important than the purely technical issues.

*(Dr. S. Ramani is presently the Director of National Centre for Software Technology in Bombay. This is an abstract of his talk during the Seminar on "Communication Revolution in India", organised for the 10th NIAS Course for the Senior Executives.)*

## AN EMPIRICAL FRAMEWORK FOR THE STUDY OF PRIMATE CONSCIOUSNESS

ANINDYA SINHA

Theoretical and experimental approaches to the study of primate consciousness have traditionally assumed that the cognitive abilities of nonhuman primates are most like our own, and that an understanding of their minds would reveal what it is like to be essentially human. This framework, however, coexists uneasily in our minds with the equally pervasive view that primates are fundamentally different from us in lacking language and hence, they may also lack many of the capacities necessary for reasoning and abstract thought. A reasonable position could be that research on primate cognition can indeed shed light on the evolution of human language, cognition and self-awareness; even if we do not understand completely what we are, we would at least know how we are different from our closest relatives, and also how we came to be so.

An empirical study of consciousness would first require that we can define it functionally. This becomes particularly difficult when studying animals - because consciousness then has to manifest itself as behaviour, behaviour that can be unambiguously ascribed to being an effect of being

conscious. Two functional aspects of consciousness can be broadly defined:

(1) Perceptual consciousness, or the state or faculty of being mentally conscious of anything. This is our most basic concept of consciousness because it is implicated in all our senses.

(2) Reflective consciousness, or the recognition by the thinking subject of its own actions and affections. The presence of such a property would imply that one is aware of one's own perception, thought or other occurrent mental episode.

Current thinking holds that primates may indeed be perceptually conscious, at least on occasions, but are extremely unlikely to be reflectively so. The principal reason for the bias against the belief that animals may have reflective consciousness, however, is methodological: people can tell us what they are aware of, animals cannot. Although it is possible that future investigations into primate vocal communication may reveal otherwise, much of the evidence so far does point against the ability of primates to reflect on their thoughts and actions.

An important functional manifestation of perceptual consciousness is attribution. To attribute beliefs, knowledge and emotions to both oneself and to others is to have what has been termed a theory of mind. Primates appear to be knowledgeable about each other's behaviour to different extents. But do they know as much about each other's beliefs, emotions and intentions? Are they adept at recognising the similarities and differences between their own and others' states of mind?

Functionally, the problem of attribution is best considered in terms of the intentional stance. In philosophical terms, intentional phenomena are largely restricted to mental states such as beliefs, desires and emotions. Whenever an individual thinks, believes, wants, likes, or fears something, it is in an intentional state. This construct provides an useful method for investigating communication and the attribution of mental states in primates and other animal species. Again, different levels of intentionality can be distinguished for any intentional system. Thus, a zero-order system has no beliefs or desires at all, while a first-order system has beliefs and desires, but no beliefs about beliefs. Second-, third- or higher-order systems, however, require some conception about both their own and other individuals' states of mind. Higher-order intentionality is interesting because it

often demands some ability to represent simultaneously two different states of mind. To do this, an individual must recognise that it has knowledge, others have knowledge, and there may be a discrepancy between them.

Recognition of motives in other individuals could indicate that a subject may be capable of attributing states of minds to others. This may manifest itself, for example, when individual primate cooperate to solve a problem; this ability obviously requires that each participant is able to recognise each other's aims and purposes to arrive at a common goal. One must be careful, however, to examine such attribution of motives in contexts that would be functionally and evolutionarily important to the animals themselves. Deception in the social sphere could be another important measure of attribution. Primates sometimes do falsify or conceal vocal signals, facial expressions and body gestures in varying social contexts. Since deception requires that the signaler create or support a false belief in another individual, these behavioural constructs could be investigated for their flexibility and applicability across contexts in order to ascertain whether higher-order intentionality can be invoked as an underlying mechanism.

Do primates actively transfer information or withhold it subject to whether the audience is knowledgeable or not? Do individuals teach each other as and when they recognise the differences in the states of mind, at least in the form of ignorance, between the instructor and his pupils? Is true imitation, which requires that an individual act with foresight to copy the form and function of a model, widespread in primates? These are some of the questions which can be addressed to in the realm of primate cognition and consciousness.

Finally, the ability to attribute mental states and perspectives to others would seem to require some degree of consciousness or self-awareness. It is difficult to see how a monkey could distinguish between his own thoughts and beliefs and those of others in the absence of some accessibility to his mind. Not surprisingly, though, the evidence of consciousness in primates is as patchy, inconsistent and puzzling as is the evidence for attribution. Experiments with self-recognition in mirrors or detailed analysis of the mechanism that underlie pretend-play in primates may throw light on the extent of self-awareness in these species. Another measure of reflective consciousness could involve the ability to apply knowledge gained in one

domain to stimuli encountered in another; this would require that knowledge be accessible. And such accessibility could be considerably facilitated if an individual is at least partially aware of what it knows. Can tests be designed that would require the formation of abstract hypotheses not only to solve problems, but more important, to generalise this ability to solve other problems with novel stimuli?

Not all our thoughts and knowledge are accessible to our consciousness. But the component of the mind's activity of which we are conscious is of special significance because it is what makes life real and important to us. Primates may carry out much of their interactions unconsciously, but insofar as they are conscious, this awareness could be extremely important to their lives and to their well-being.

*(Dr. Anindya Sinha is a Postdoctoral Fellow at Centre for Ecological Sciences, Indian Institute of Science. This is an abstract of the lecture given by him at NIAS, as a part of Consciousness Studies lecture series.)*

## ANCIENT YOGA AND MODERN SCIENCE

T.R. ANANTHARAMAN

Yoga constitutes one of the oldest, most fascinating and amazingly enduring contributions of India to the human family and world culture. It is common knowledge now that the theory as well as practice of Yoga was conceived and developed, studied and researched, debated and perfected, experimented upon and expanded in scope, primarily on the soil of the Indian Sub-Continent during the period of well over four millenia starting from the Indus Valley Civilization, period (3100-1900 B.C.). Today this magnificent inheritance of India as also its previous legacy to mankind, commands a strong and benevolent presence in our twentieth century world dominated by the astonishing range of discoveries and products, not always benevolent, conjured up by modern science with support from Technology and Engineering. In recent times, millions of eager and enthusiastic seekers from practically all countries of the world have responded positively to the call of Ancient Yoga and also reaped diverse benefits in terms of enhancement of the quality of life, particularly physical well-being, mental health, and intellectual vigour through regular Yogic practices. During the last three decades

numerous scientific studies and investigations have established beyond doubt the therapeutic value of yogic practices, over and above their enormous contribution to positive health of the practitioners. All the same, modern scientists are yet to understand and come to grips with the more important transcendental aspects of Classical Yoga, which seem to hold the key for the further growth and evolution of man and society.

A careful study of India's numerous ancient texts in the Sanskrit language brings out the fact that the verbal foundation of Classical Yoga rests securely on the true bedrock of some early Upanishads, the Yoga-Sutras of Patanjali and the Bhagavad-Gita, which forms part of India's great epic, the Mahabharata attributed to Vyasa. Despite uncertainties in the dates of these Sanskrit classics, it is generally accepted that their contents are pre-Buddhistic i.e., they do not draw from the teachings of the great Gautama Buddha (563-483 B.C.). As is well recognised the Yoga treatise of Patanjali with its 196 aphorisms and eight-fold division of Yogic practices has been the standard text book for Indian students of Yoga for over two thousand years, even though the Bhagavad-Gita has rightly been hailed as the best known and most widely read spiritual classic of India.

Today it is advisable for all concerned to start the study and practice of Yoga with the understanding that Yoga is in fact a rather unique scientific-cum-spiritual discipline. It requires not only study and experimentation in the realms of Matter and Energy like the traditional sciences, but also study and experiencing in the realm of Consciousness, which has not yet come in an effective way under the purview of science, but has played a prominent role in spirituality from time immemorial.

The eight limbs or constituents of Classical Yoga can be conveniently considered as follows under three heads:

### I. YOGA ETHICS OR WAY OF LIFE (YOGA-CARYA)

1. Yama (Abstentions viz, Non-Injury, Non-Falsehood, Non-stealing, Non-deviation from one's Sva-dharma and Non-covetousness, to promote Social Ecology or Harmony in Society).

2. Niyama (cultivations viz., of Purity, Positive Attitudes, Austerities, self-study and dedication to the Ideal of Isvara, to promote Internal Ecology or Inner Harmony).

## II YOGA PRACTICES-EXTERNAL (Bahiranga-Yoga)

3. Asana (Adoption of Body Postures).
4. Pranayam (Control of Energy Cycle, particularly breathing).
5. Pratyahara (practice of Relaxation through withdrawal of the senses from without).

## III YOGA PRACTICES - Internal (Antaranga-Yoga)

6. Dharana (Concentration of thought-Force on an object)
7. Dhyana (Uni-directional flow of thought-Force on an object)
8. Samadhi (unitive Experience devoid of subject-object duality).

The first two of these three sections can and have come under the purview of modern scientific study and research in appropriate fields of social, psychological and medical sciences. However, the third section has spiritual connotations and cannot be easily grasped and put across intellectually. Here it is repeated practice and tangible subjective experience, which matters to the Yoga practitioner. The first samadhi experience represents a breakthrough in the realm of consciousness and lifts the Yogi into what is generally referred to as the luminous domain of super-conscious states. A subtle and gradual transformation of the total personality of the Yogi now sets in, as beautifully and eloquently described in many an old yogic text and by many a modern yogi.

In understanding and reaping the benefits of Antaranga Yoga in general and meditation in particular, science and spirituality experiment and experience have to be integrated, with a many-pronged attack on that most elusive, most fascinating and yet inescapable of all phenomena - CONSCIOUSNESS. Such a desirable development has already started through well attended International Conferences on Consciousness and sophisticated Research Projects for probing secrets underlying the amazing activity of nearly a billion interconnected neurons in every human brain. The pronouncements of Modern Scientists, including some Nobel Prize winners, have begun to watch in spirit, if not in letter, the profound insights recorded by Ancient Yogis in the foundation texts of Classical Yoga.

Summing-up, a new world beckons to us unmistakably, a happy and harmonious world, a creative world inspired and illumined by a new

Light, a world where Science and spirituality walk together, hand in hand, like a newly wedded couple. Ancient Yoga joins hands with Modern Science in helping mind to grow towards further in Consciousness, to become, in fact, Supramental-Being. The thrill of a new adventure fills our being and there is a sympathetic echo deep within us to Sri. Aurobindo's prophetic utterance:

"All is not finished in the Unseen's decree!  
A mind beyond our mind demands our ken;  
A life of unimagined harmony  
Awaits, concealed, the grasp of unborn men"

*(Prof. T. R. Anantharaman, formerly Director, Institute of Technology and Rector, Banaras Hindu University, Varanasi, and presently INSA senior Scientist, National Physical Laboratory, New Delhi, gave a lecture on the above subject at NIAS.)*

## BIOREMEDIATION - A SAFE ECO TECHNOLOGY

P.K. SHETTY

The application of biotechnology for pollution reduction has been receiving increasing attention. Both physical and chemical processes may be essential for pollution-control technologies. Controlled bioremediation process offers significant promise in this direction.

Bioremediation is the process by which microorganisms are stimulated to rapidly convert the complex environmental contaminants into less toxic by-products preferably to carbon dioxide, water and inorganic salts. This technique is used to degrade the contaminants that are sorbed to surface/subsurface materials or dissolved in water.

Bioremediation methods attained widespread recognition with the wake of the Exxon Valdez oil spill in U.S.A. during March 1989. When the Exxon Valdez - loaded with more than 50 million gallons of crude oil - ran into a reef in Alaska's Prince William Sound and began spreading the oil. In their first desperate effort to save 900 miles of affected shore lines, cleanup crews and scientists introduced microorganisms and other nutrients to enhance the degradation of oil, this was found to be successful. Later, similar techniques were also applied during Mega Borg oil spills and also oil spills during Iraq-Kuwait War.

Today, bioremediation has been demonstrated to be a viable option for treating a variety of soils contaminated with synthetic pollutants. The most

frequently used biological agents for bioremediation are the microorganisms, commonly bacteria and fungi. Microorganisms may utilise these compounds as sole source of nutrients and also as energy source. Several points have to be taken into consideration, before applying bioremediation as safe environmental technology. While treating the contaminated sites, naturally - occurring microorganisms (indigenous to the contaminated area) must be used or they may be isolated or engineered elsewhere and brought to the contaminated sites. Selection of microorganisms is also an important step for bioremediation. Microbes should convert the organic contaminants to non-toxic/less toxic metabolites, which can be accommodated without any harm to the environment and living organisms. Apart from this, proper environmental conditions should be created for growth and multiplication of introduced organisms at contaminated sites.

Bioremediation, like other technologies, has its own limitations. However, decontamination of pollutants by traditional methods is costly, it does not always eliminate the problem, and more often it just moves it somewhere else. In this case, neither government nor private industry can afford the cost to clean up physically the toxic waste sites. Therefore, a renewed interest in bioremediation has developed. The sustained effort in this direction will help in the elimination of past and future environmental pollutants.

## A LETTER TO THE EDITOR

Dear Editor,

*It has been a wonderful experience to enjoy the hospitality of NIAS as a Visiting Professor on sabbatical leave. This institution is unique in its promotion of a real inter- disciplinary outlook on contemporary issues. Seldom is one to witness such a deep respect and authentic effort at understanding points of view from various horizons, an openness to the messages of philosophy and spirituality, a readiness to question each other's claims at truth and, not the least, an inclination to practice and enjoy music and arts. From cricket to the corruption of national politicians, from the status of women to the liberalization of the economy and the nuclear threat, no worthy topic eludes the critical evaluation of daily exchanges.*

*I would like to formulate a special thanks to the staff, at all levels, for their dedicated attention and unfailing spirit of collaboration, especially to Dr. Ravi Kapur and Ms. Susmita Subramanyam who have been my hosts and have made landing into Indian life so smooth. I am leaving with some regret and hope the mission of NIAS will continue for a long time to come.*

**AVEC MES SALUTATIONS AMICALES,  
MICHEL TOUSIGNANT**

*(Dr. Michel Tousignant is Professor of Psychology and Researcher at the University of Quebec in Montreal. His interests include the social and cultural factors of suicide and the mental health of immigrants and refugees).*

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