NIAS NEWS

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THE SECOND ANNIVERSARY ISSUE

This Fifth issue of the NIAS Newsletter also happens to be the second Anniversary Issue. While the first half of 1994 has been reported to have been busy and packed with activity, the second half was even busier as can be seen from this Newsletter. The regular schedule in addition to normal academic and research activity included conduct of the second NIAS Course jointly sponsored by the University Grants Commission (UGC), National Institute of Advanced Studies (NIAS) and the Jawaharlal Nehru Centre (JNC) for Advanced Scientific Research, for University/College Teachers, between July 4 and July 30, 1994. The quality of this course, from the point of view of resource input, participation and assimilation, has decidedly been good and did provide justifiable satisfaction to the participants, speakers and NIAS Staff as well.

A great deal of effort has been put in for the conduct of the NINTH NIAS Course for Senior Executives from Government and the Industries, scheduled to be held between January 9 and February 3, 1995.

Dr. Manmohan Singh the Hon'ble Finance Minister and Dr. Raja Ramanna with the participants of 2nd NIAS Course for University/College teachers, after Inauguration of the Course.

In addition to the already existing unit of Health and Human Behaviour, two additional units have been added during this period, to the Faculty. These are Philosophy of Science and Women's Policy Research and Advocacy. Consequently, there has been proportionate increase in Faculty Staff and other support staff.

So also there has been a spurt in project activities. Apart from the DRDO and DST projects, we have in

hand the Ford Foundation Project on Women's Policy Research and Advocacy; an INDO-US project is very much on the cards for commencement in early 1995.

This half also witnessed better participation in the Associates' Programme and an increase in the membership of Associates. Faculty lecture programme is yet another addition to the list of activities of NIAS. In this Programme, Faculty members deliver lectures or indicate the progress in the field of studies/research in which they are engaged.

NIASNEWS seems to be becoming very popular as we are getting requests for copies even six months after the date of publication. Yet another recent exhilarating experience is that there is a flood of contributions to NIASNEWS from the Faculty, Associates and well-wishers. At this rate, there is no alternative to the Editor but to be unpopular. An apology is due to the many who could not to be accommodated in this issue.

From the variety, quality and quantum of contents that fill the canvas of this issue, one recognises that NIASNEWS is a lot more than a Newsletter.

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THE FACULTY

UNIT - HEALTH AND HUMAN BEHAVIOUR

Prof. R L Kapur continues to head this unit which is also constituted by Dr Biswajit Sen and Ms Susmita Subramanyam.

Activities of the Unit:

a) CREATIVITY AMONGST INDIAN SCIENTISTS:
The study is in its final phase. Interviews are now being conducted with scientists who have been identified as "CREATIVE" by their peers. Susmita Subramanyam assists Prof. R L Kapur in this project.

b) A PSYCHO-SOCIAL STUDY OF ALIENATION AMONGST INDIAN YOUTH
This project, which began in 1992 with Prof. R L Kapur as Principal Investigator and Dr Biswajit Sen as the Co- investigator, is nearing completion. The statistical analysis of the survey data on 576 youth in the rural and urban areas of the centres of Delhi, Bangalore, Calcutta and Patiala is completed. Currently, relevant literature is being reviewed and the qualitative analysis of 80 interviews conducted across the country is in progress.

UNIT - PHILOSOPHY OF SCIENCE

This is a new unit in our faculty. Dr Raja Ramanna, Prof. B V Sreekantan and Dr Sundar Sarukkai constitute this unit.

Activities of the Unit:

The activities of the Unit encompass

(a) Various approaches to understanding consciousness with the help of Eastern and Western Philosophy.

(b) Philosophy of Mathematics

(c) Philosophy of Technology

(d) Epistemology - particular focus on concept of "rationality" and "reason" in various philosophical systems.

(e) Postmodern Philosophy.

UNIT - WOMEN'S POLICY RESEARCH AND ADVOCACY (WOPRA)

The Women's Policy Research and Advocacy project was launched in NIAS in August, 1994, with a grant from the Ford Foundation. The project unit is headed by Ms Srilatha Batliwala, a Fellow of the Institute, assisted by two Research Associates, Ms Anita Gurumurthy and Ms Anitha B.K. Prof M N Srinivas and Prof R L Kapur act as Research Consultants to the unit; in addition, an Advisory Group of six experts drawn from various disciplines has been set up to guide the project team.

OBJECTIVE:

To study the impact of social, economic and political policies and programmes in Karnataka state on securing women their constitutionally-guaranteed rights, and to advocate such policies, programmes and other interventions which will raise the status of women and ensure gender justice.

ACTIVITIES:

1) The unit has undertaken a two-year study of "The Status of Women in Karnataka State", drawing upon existing secondary data as well as primary research studies in the field.

2) The unit also organises periodic workshops and seminars on important issues affecting women.

ENVIRONMENT

Dr P K Shetty has conducted a preliminary survey on the use of chemical pesticides in Agriculture/Horticulture in and around Bangalore. He has proposed to initiate Collaborative Research in the area of bioremediation/

microbial degradation of a few selected pesticides in consultation with Scientists at the Indian Institute of Science, Bangalore and the Bhabha Atomic Research Centre, Bombay.

A REPORT ON SECOND NIAS COURSE ON "AN INTEGRATED APPROACH TO KNOWLEDGE AND INFORMATION" FOR UNIVERSITY AND COLLEGE TEACHERS

This course, co-sponsored with the University Grants Commission (UGC) and the Jawaharlal Nehru Centre for Advanced Scientific Research (JNC) was held between July 4 and 30, 1994.

Out of over 500 applications received from University and College Teachers from Universities all over the country, 24 were selected to attend. Ultimately 21 participants attended the course.

To quote from the report of the first course "the overall objective of the programme (is) to give the participants a broad base so that they could re-examine the very purpose of education. This we hope to achieve by exposing them to areas of knowledge beyond their own respective areas of expertise and through workshops and symposia; group discussions and review of important books. We wish to involve the participants in a critical examination of the national and global issues which influence development. We also want them to evaluate their own role as teachers and guides of the future generations". For the Second Course, another objective was added, i.e "to make the participants more aware of their national identity, understand the sources of inequality in our society and to make science and technology a major element in our cultural consciousness". Yet, another aim is "to make the participants aware of youth psychology and ways to help young people become more responsible members of the society".

Dr Raja Ramanna and Ms Carol Anonuevo (UNESCO Institute of Education, Hamburg) inaugurating the UNESCO-NIAS National Conference on Women and Literacy. Ms Srilatha Batliwala, Fellow - NIAS looks on.

The overall theme of this course was to emphasise a sense of social responsibility on the part of the participants. To that end the course received a fitting start with the inaugural address by the Hon'ble Finance Minister, Dr. Manmohan Singh. He spoke on the New Economic Scenario and social & economic needs of the nation.

There were lectures and workshops on "Discovering India's Past", "Constitution of India", "Cinema as a Vehicle for Social Change", "Rights and Responsibilities of Citizens", and "Women in India". Science and Technology - as a vehicle of social change - always receives emphasis in a NIAS course and to that end, we had lectures and discussions on "The History of Science and Technology in India", "Biotechnology", "Neuro physiology of Consciousness", "Astronomy" and "Atom and its sub-divisions". "AIDS", "Stress and its Management" and "Emotional problems of students" received due attention as these are inevitable fall-outs of the increasingly hi-tech, demanding, competitive and consumerist society. A NIAS course is incomplete without art and music. This time we had lectures on "Appreciation of the Art of (Indian) Painting", a music concert of Western Classical music by Dr. Raja Ramanna and a vocal recital of Carnatic music by Mrs. Geetha Raja.

In accordance with the theme of emphasising social responsibility we had two evocative lectures on "My Life and My Work" by the internationally renowned film director Mrinal Sen and the most famous Police Officer in India, Kiran Bedi. Both succeeded in mesmerizing the audience. The third lecturer in this series, our ex-foreign secretary, S.K. Singh was also received very well.

A symposium on "Energy options for India" was planned. We were fortunate to get speakers who, between them, covered the entire spectrum with precision, clarity and erudition. More time was kept for discussion than during the preceding symposia. The enthusiastic response obtained from the audience can be gauged from the fact that even the extended time was inadequate for accommodating all the questions.

Out of the two new features of this course, the first comprised two visits to voluntary organisations involved in community development (also called Non-Governmental Organisations or NGOs). The first was a women's development project in a slum of Bangalore city, where the participants paid an afternoon's visit. The

second was a watershed based community development project near the small town of Kadiri in Anantpur district of Andhra Pradesh. The participants arrived there during forenoon, and spent the rest of the day and most of the evening in visiting the watershed area and interacting with the people. They returned next morning. For the course, yet another unique feature which evoked an enthusiastic response - was a debate on the motion, "College/University courses have little impact on future career". More than 20 students from different institutions in Bangalore participated in the debate. A student and a teacher each spoke in favour and against the motion. Prof. Kapur chaired the session and conducted the proceedings. An intense discussion ensued & would have continued but for the scheduled end of the session.

(This report is an extract from the detailed report on the course submitted by NIAS to the UGC)

NINTH NIAS COURSE

The Ninth Course on **"An Integrated Approach to Knowledge and Information"** for senior executives of Government and Industry, is to be held from **January 9, 1995 to February 4, 1995.** Nominations have been received from the Government of Andhra Pradesh, Department of Atomic Energy, Ministry of Railways, Department of Science and Technology, Department of Posts, Department of Telecommunications, D.R.D.O., Army, Navy, etc. Private orgnisations which have sent in positive responses include Tata Iron and Steel Co. Ltd., Tata Chemicals Ltd., Mahindra & Mahindra Ltd., Digjam Woollen Mills., etc.

This course will particularly focus on **"Indian Industry: New Opportunities and Challenges".** To this end, lectures arranged for include Advances in Space Technology (Dr. K. Kasturirangan), Non-Conventional Energy Sources (Dr. C.V. Seshadri), New Advances in Bio-technology (Prof. K.P. Gopinathan), Recent Advances in Medicine - I [Management of Cardiovascular Diseases] (Prof. M.S. Valiathan), Recent Advances in Medicine - II [Advances in Immunology], Materials and Society (Prof. C.V. Sundaram) and Organisational Behaviour in Indian Culture (Dr. Durganand Sinha). In addition there will be lectures on Philosophy and Technology (Dr. Sundar Sarukkai), Problems of Indian Women (Ms. Srilatha Batliwala), National and International Politics (Mr. K. Subrahmanyam), Current Trends in Indian Society (Dr. Deepankar Gupta) and Constitution and the Law (Prof. N.R. Madhava Menon). Special lectures have been arranged for on certain evenings also. The lecturers include Mr. Mark Tully, Dr. A.P.J. Kalam, Ms. Ela Bhatt, in the series on 'My Life and My Work'. The inaugural address will be delivered by Mr. C. Subramaniam, President, Bharatiya Vidya Bhavan, Bombay.

VISITING CHAIRS

HOMI BHABHA CHAIR - PROF. C.V. SUNDARAM

In the case of the Project proposal entitled **"Marine Microbial Ecology in the vicinity of a coastal power station"**, with Dr. P.K. Shetty as the Principal Investigator - that had been submitted to the Atomic Energy Regulatory Board (AERB), Bombay, - the AERB has for the present deferred consideration of this proposal until the required supporting facilities become fully available at the Kalpakkam site.

During the period under review a study was undertaken on the subject of **"Light elements, Light metals, Light materials and Light structures".**

In the universe around us, the relatively light elements - starting with hydrogen and going up to iron, (accounting for about one fourth in number of the known chemical elements) -are considerably more abundant. According to the present understanding, hydrogen and helium were formed in the earliest stages of the universe in the intense heat of the 'big bang'. Subsequently elements like carbon, oxygen, silicon, aluminium, calcium and iron were formed by nucleo-synthesis, in the hot environment of the steadily burning stars. Elements heavier than iron are very much rarer in the universe as they get synthesized only under the very special shock wave conditions of supernova explosions. For example, for every 100 billion hydrogen atoms in the universe there is only one uranium atom. (Ref. Scientific American, October 1994).

Except for hydrogen and helium (which have not been gripped by the earth's small magnetic field) the relative abundance of elements on earth is about the same as in the universe.

In modern structural engineering, side by side with the dominant position still held by iron and steel, there is an increasing role played by the light structural metals like magnesium, aluminium and titanium. Particularly in the area of transportation (e.g. in automobiles, aircraft and space vehicles), there is an incentive to choose light metals and materials of construction, for savings in energy and running costs.

For example, in the case of the INSAT-2 series of indigenous communication satellites, the dry weight of the Satellite is around 1000 kg and the satellite carries an equal weight of fuel (for its service life), the total weight amounting to around 2000 kgs. The cost of launching of such a satellite is at present around Rs. 200 crores, and

every extra kg will cost an additional Rs. 10 lakhs in launching. Thus, in the structural design of the satellite there is a continuous emphasis on every possible weight saving. Aluminium honey combs, carbon-epoxy composites, magnesium-lithium alloys, titanium alloy containers for fuel, and beryllium mirrors are some of the special materials incorporated in the design, for weight saving.

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

The Introduction to "Caste, its 20th Century Avatar" is about to be completed.

Parts of the work on the autobiography have appeared in "The Reminiscences of a Bangalorean" and in "The Creator of Malgudi".

DR. S. RADHAKRISHNAN CHAIR - PROF. B.V. SREEKANTAN

Prof. B.V. Sreekantan has continued his efforts in collecting the information that is rapidly growing from different disciplines of Science on the subject of 'consciousness' and examining the same in the perspective of ancient and recent philosophical insights. (see note on 'Recent Developments in Consciousness Studies' in the same issue of NIAS NEWS).

He is also working with Dr. Raja Ramanna on some phenomenological aspects of fundamental particles (see the note on "Correlations of Masses and lifetimes in radionuclides and fundamental particles" in the same issue).

The book he is writing along with Prof. M.V.S. Rao of Tata Institute for Fundamental Research on "Extensive Air Showers of Cosmic Radiation" is nearing completion.

VISITING ASSOCIATES

Prof. J. Mohan Rao of the Department of Economics, University of Massachusetts at Amherst was Visiting Associate at NIAS during the academic year 1993-'94. Prof. Rao was full-time observer-participant in the first NIAS Course for University/College Teachers and an invited Lecturer in the Eighth NIAS Course for Senior Executives of Government and Industries in January 1994.

Prof. Rao delivered four lectures on the Indian Economic Scene in the January programme. While at NIAS, he pursued varied research projects and produced several papers as listed below:

(a) Whither India's Environment? Economic Reform and Ecological Refurbishment, paper prepared for World Institute for Development Economic Research (U.N. University), Helsinki.

(b) Judging Givers : Equity and Scale in Aid Allocation, **World Development** (forthcoming)

(c) Labour and Liberalisation in Less Developed Countries, paper prepared for International Labour Organisation, Geneva.

(d) Financial Liberalisation, Capital Rationing and the Informal Sector in Developing Countries, to appear in G. Epstein and H. Gintis (eds.), **Investment, Saving and Finance,** Cambridge University Press.

(e) Labour Regimes and Dualism, submitted to **International Labour Review.**

(f) Liberalisation and Growth, to appear in a volume on **Structural Adjustment in India** edited by Raghuram, Sievers and Vyasulu.

ASSOCIATES PROGRAMME

During the second half of 1994, the Associates Programmes have been very varied and interesting and as such well received by the Associates. There has been improvement in the participation by Associates in these programmes.

As on 31st December 1994, we have 319 Associates including 172 participant Associates i.e. Senior Executives of the Government and Industry, who have attended NIAS Course on "An Integrated Approach to Knoweldge and Information". Recently, 40 new Associates have been inducted to our fold. Of the total of Three hundred and nineteen, Ninety three are local Associates.

On October 27, an Associates Meeting was specially held, which was very well attended, mainly to discuss in what way the Associates Programme could be made more effective and useful. In the present day context of degraded civic facilities, pollution of environment, diminishing standards in education and lack of concern for social welfare, it was also important to consider what NIAS could do to raise discussion on these issues. Amongst many points discussed in this meeting it was unanimously decided that particpation of younger people from other institutions, univeristies etc. in the Associates Programme would benefit both.

The directory of the Associates indicating their address, telephone number etc. is under preparation. This would greatly facilitate Associates to interact with one another. We will be able to despatch the same to all participants by the beginning of the new year.

The topics presented in the Associates programme during this period were:-

(a) July 23, 1994 - Talk on "My Life and My Work" by Dr. (Mrs.) Kiran Bedi, Inspector General of Police (Prisons), Tihar Jail. This programme was a great success and was not only the hall totally filled up but also we had to make arrangements for additional capacity outside the hall.

(b) August 26, 1994 - Lecture on "Emerging Trends in Management Education & IIM - Bangalore" by Dr. K.R.S.Murthy, Director, Indian Institute of Management, Bangalore.

(c) September 23, 1994 - Lecture-Demonstration on "Bharatanatyam" by Dr. A.R. Sridhara, Bangalore.

(d) October 27, 1994 - Associates' General Meeting as mentioned earlier.

(e) November 25, 1994 - Lecture on "What is Psychotherapy?" by Prof. R.L. Kapur, Deputy Director, NIAS.

(f) December 30, 1994 - Lecture on "The Aircraft of the Future" by Dr. C.G.K. Nair, Managing Director, HAL, Bangalore Complex.

FACULTY LECTURE PROGRAMMES

Recently, a decision was taken to start "FACULTY LECTURE PROGRAMME". As a part of this programme, each faculty member would deliver a lecture on the subject of his/her studies or research, which in turn would benefit other faculty members also.

Lecture delivered by various faculty members during this period, are as under:

Date	Subject	Name
July 1, 1994	Current Ideas on Universe.	B V Sreekantan
Aug 19, 1994	Pesticides and the Bio-environment.	P K Shetty
Sep 23, 1994	Violence amongst the Indian Youth.	R L Kapur
Nov 21, 1994	Psycho-social Correlates of Creativity in Indian Science.	Sushmita - Subramanyam
Dec 30, 1994	The Concept of Ethnicity (Book review).	Biswajit Sen

During this period, Dr Sundar Sarukkai delivered a series of six lectures on Western Philosophy as a part of this faculty programme. A summary of his lectures appears elsewhere in the NIASNEWS.

DST PROJECT ON THE "FORMULATION OF CRITERIA FOR EFFECTIVE R & D FUNDING" A REPORT

This project aims to improve the methods for identifying competent research teams and good projects for extra-mural research programmes and to assess the strengths and limitations in the mechanisms followed by different agencies.

To obtain a first hand impression, Dr. Suchitra Mouly made a visit to Delhi and held discussions with senior scientists/administrators at the Department of Science &

Ms. Kiran Bedi is all smiles as she is being introduced.

Technology (DST), Department of Bio-technology (DBT), and the Department of Electronics (DOE). From the discussions held so far at these agencies, the following points are made.

DBT works with two other institutions namely the International Centre for Genetic Engineering and Bio-technology, and the New Delhi Center which has become an independent UN Organization. Projects are reviewed with the help of sixteen task forces consisting of external experts. The task forces identify their own referees for assessing research proposals. The time taken for the whole process of project selection is eight months to two years. The reasons for such a long time lag are that often the proposals are too long and too much of unnecessary detail is provided, proposals are written in a great hurry, there are problems such as unrealistic costs, excessive staff to be recruited and disproportionate demand of funds anticipating cuts by the agency.

Some times, there are not many competent referees in a particular field, and even they are pre-occupied. There is also the problem of 'vested interests' and favoritism. Comparing the Indian system with that abroad, Dr. Bhatia mentioned that in the US, once the project proposal is accepted, there is no allowance for any change (except a 10% extra funds for escalation in the prices) in the budget, which saves unnecessary correspondence. Researchers should not make exaggerated claims for budget. Funding agencies should encourage collaborative efforts from different research groups. This will speed up the research process. Researchers should also be encouraged to publish their findings promptly.

DOE operates efficiently with the 'working groups' (experts in the field) who interact with the researchers from the beginning since mutual interaction enables researchers to develop their project ideas into proposals. DOE follows a quarterly review system which includes field trips to help the researchers with the progress of the work. Thrust areas are decided every two years. It has been generally felt that management systems should be flexible and the administrative process not too rigid to improve the efficiency of implementation.

In the discussions held at DST, it was agreed that time lags in granting funds should be minimized, and the peer review system could be examined again to make it more purposeful to be supportive to scientists initiating proposals.

A common problem that has been faced by all the agencies is that often when a project is completed, the achievements do not always measure up to the objectives as envisaged in the proposal. This can be corrected only by a realistic assessment of projects at the outset, a proper system of monitoring to provide for mid-term corrections/additional inputs etc. In major projects, the follow-up action should be envisaged well ahead of the completion of the first phase.

It will be helpful if there can be a system for continuous cross-flow of information between the agencies for mutual sharing of experience.

CHRONOLOGY OF OTHER IMPORTANT ACTIVITES AT NIAS

(JULY 1, 1994 - DECEMBER 31, 1994)

1. August 6, 1994 - A symposium on "International nal Humanitarian Law and its Implementation" for Law Professors was jointly organised by the Regional Delegation of the International Committee of the Red Cross (ICRC) and the Indian Centre for Humanitarian Laws and Research (ICHLR), New Delhi.

The aim of the Symposium was to present the International Humanitarian Law to Law Professors, in order to promote its dissemination through academic circles and its teaching at univeristy level.

2 August 10, 1994 - Dr. Anwar Islam, Senior Program Officer, International Development Research Centre (IDRC), Ottawa, Canada visited the Institute and held discussions with the Director and other Faculty Members on feasibility of having IDRC-NIAS projects in Health Science in future.

3. September 8, 1994 - Dr. K.N. Raj, Emeritus Fellow, ow, Centre for Development Studies, Trivandrum and National Fellow, Government of India spoke on Kerala - A Success Story. He elaborated on how Kerala has achieved the status of a model state.

Dr. K.N. Raj gave the following reasons for the Kerala success story. Kerala has a zero population growth rate which has contributed to its development. On the literacy side, there have been (1) an increase in primary and elementary education and (2) an equality of the sexes in education. Medical services in Kerala are excellent. Every village has primary health centres. K.N. Raj stated how in Kerala, every house has a health centre within 2-3 miles radius. This has resulted in scientific medical care. There are 100% deliveries in primary health centres and this has reduced infant mortality. In fact, Kerala's infant mortaility rate (17 per thousand) is comparable to that of UK.

On the agricultural front, subsidized foodgrains are available to everyone ensuring minimum consumption by everyone. This has guaranteed basic good health. Kerala's good economy can also be attributed to migrations to the middle-East wherefrom money flows into the state. He also stated that the social responsibility of an average Keralite is high and this is reflected in the good care taken by Keralite parents of their children.

4. September 8, 1994 - Mr. David Arnold, the representative of the Ford Foundation, New Delhi visited NIAS. He attended the presentation by Ms. Srilatha Batliwala on the project entitled "Women's Policy Research and Advocacy" and had discussion with the Director and other faculty member of NIAS.

5. October 6, 1994 - Dr. Jaswinder Singh, Research Assistant Professor, Department of Psyhciatry & Behaviour Sciences, Northwestern Univeristy & University of Chicago spoke on "Current Status of Memory Research". Dr. Jaswinder Singh is currently engaged in memory studies using PET Scanning. He is specially interested in unconscious memories. The talk was well received by the NIAS faculty.

6. November 9, 1994 - A meeting was organised by NIAS on "Future directions for Electronics". Dr. Raja Ramanna, Dr. Kasthurirangan (Chariman, ISRO), Dr. S. Chandrashekhar, Dr. N. Vishwanadham, CSA, IISc, Prof. B.V. Sreekantan, Prof. C.V. Sundaram, Dr. P.K. Shetty, Dr. Suchitra Mouly, Dr. Sundar Sarukkai and Dr. H.K. Anasuya Devi attended the meeting.

7. November 17, 1994 - Dr. Helen Ullrich, Department of Psychiatry, Tulance Univeristy delivered a lecture on "Cultural Recognition of Competence: Women's Psychosocial Narratives in A South Indian Village".

8. November 24, 1994 - The NGO Consultation: In order to make the study of the Status of Women in Karnataka as participatory as possible, the WOPRA unit organised a one-day Consultation with about 50 Non-Governmental Organisations (NGOs) drawn from different parts of the state. The objectives and methodology of the project was presented and discussed in detail, and NGOs made valuable suggestions on what kind of specific issues and problems of women need to be taken up for micro-studies. Several of them also offered to assist the unit in conducting the field studies.

9. December 10, 1994 - A Seminar on "Privatisation and Social Justice - Strategies for the future" was organised by the Alumni Association, Jadavpur University, Bangalore Chapter. Prof. M.N. Srinivas, Distinguished Social Scientist & JDR Tata Visiting Professor, NIAS inaugurated the Seminar. The speakers at the Seminar were Mr. A.K. Vohra, MD, Tata BP Solar, Hon'ble Justice P.P. Bopanna, Prof. Amal Ray, Social Scientist, Mr. K.K. Nair, Sr. Vice President, Brooke Bond Lipton India Ltd., Ms. Srilatha Batliwala, Fellow, NIAS, Mr. Sudhir Kumar, IAS, National Law School of India University. Prof. C.V. Sundaram chaired the first session and Prof. Amal Ray chaired the second session of the Seminar.

10. December 13-15, 1994 - UNESCO-NIAS National Action Research Conference on Women and Literacy: The UNESCO Institute of Education, Hamburg, requested the WOPRA unit of NIAS to organise a National Action Research Conference on Women and Literacy, as part of their Asian Regional preparatory activities for the World Conference on Women, to be held in Beijing in September, 1995. The main goal of the conference was for literacy practitioners from different parts of the country to share experiences and insights, and cull lessons on the most effective strategies for achieving adult female literacy.

Over 20 delegates from various government, semi-government and non-governmental organisations involved in women's literacy work participated in the conference. Dr Raja Ramanna welcomed the delegates, and Ms Carol Medel-Anonuevo of the UNESCO Institute of Education lit the inaugural lamp. Smt Lalita Ramdas, President, International Council of Adult Education also attended. Over the three days, detailed case studies of innovative literacy programmes were presented, and discussed. A series of recommendations for effective literacy strategies were evolved.

11. December 16-17, 1994 - A Database Training Workshop for the INMEDPLAN (Indian Medicinal Plants Distributed Databases Network) Nodal Agency Staff was organised by the Foundation for Revitalisation of Local Health Traditions (FRLHT). The objective of the meeting was to train the participants on :

1. Data Modelling and Schema
2. Approach to User Friendly query
3. Model of communication (to transport data)

THOUGHTS ON EDUCATION, QUALITY AND POLICY

Dr. RAJA RAMANNA, in his Lal C. Verman Lecture on Standardisation and Industrial Culture

Industry has made great strides in India and some industries have done excellent work at the highest levels of technology, but too much is still left to chance.

The most important aspect of Standardisation is the person involved in actually assessing the samples. All theory assumes that such a person is an ideal man who is always conscientious, incorruptible and suitable for the job. The probability of finding such a person is considered reasonably high. However, when the Government itself gives guidelines which depart from pure merit, this probability will come down rapidly. One can understand reservations for the S.C. and S.T. who have suffered from all the rest in the past, but to make reservations in the educational sector at more than 80% is cruelty to those who have been left out. It would be more truthful to say that such reservations especially in education are persecutions of a particular class.

Reservations arise out of an anti-intellectual movement which usually emanates when a mafia has penetrated governmental systems. This last observation is not entirely mine, it has been made by eminent men, recently at a meeting in Bombay held to commemorate the 125th Birth Centenary of Mahatma Gandhi. Low quality educational standards destroy not only institutions but the entire educational pattern. This happened in Nazi Germany in spite of their old educational traditions. It will be worse here.

We have started a movement in the belief that if we make entry into higher education difficult to those who are merited, equity will follow, but actually it is mediocrity that settles down and becomes the general standard in the country leading to greater backwardness compared to what exists abroad. Unfortunately, all this is happening at a time when we want to compete with the rest of the world.

In any case to call anybody backward is an insult to any one. I would make a plea to all Indians, whether they are classified backward or forward, to renounce such classifications so that India can call itself a forward intellectual country and be an example to the rest of the world. Otherwise no one will care for our universities and their products will be treated as worthless. In fact, this has already happened.

Dr. N. R.SHETTY,Vice Chancellor,
Bangalore University

It is lamentable that though the country is set to become a major force in the comity of nations it lacks the pre-requisites for take off. It is only recently that attention has been given to literacy and basic hygiene. India is one of the few countries where expenditure on education is less than 6% of the gross domestic product (GDP). We need innovation in technical education. What is necessary is optimum management of our institutions. Many a time we have felt that our institutions promote mediocrity. Higher education should promote excellence. The rise in the number of sub-standard institutions should be curbed. The setting up of the National Council for Accreditation would go a long way in achieving this.

Sri. C.H. PRAHLADA RAO,Weekly columnist,
The Hindu, December 12, 1994

It was some sort of relief, listening to Dr. Raja Ramanna, talking of the need of educationists to think of reform. There are two approaches: you tinker with the system; or, you reach for an alternative. That depends on whether you are a conservative, or a radical. Radical, meaning (of all things) being a Gandhian!

Before Independence, it was fashionable to run down the system of education then in vogue, its lineage traced to Lord Macaulay, as one designed to produce clerks. After Independence, forgetting for a moment the preposterous irony, we have retained the same system, and with what results! Gandhiji knew his India. For him India meant its 700,000 villages. (I hope my memory serves me right). He visualised education as a means of enabling every adult, man and woman, to employ himself gainfully. He called it basic education.

But after Independence, the country deserted both the man and his ideas. What have we done to education, and what has education done to us? In nearly half a century, we have conditioned ourselves to believe that there is only one kind of economy, a mix of foreign aid and populist subsidy, and only one kind of education, herding along the weak and the strong, the willing and the unwilling, to one common goal- post, engineering or medicine.

We are perhaps the only country with an education system designed to produce goods without a market value!

Prof. C.R. RAO,Eminent Statistician, in conversation with Subbiah Arunachalam, science writer

We have a fairly good school system in India. But our university education is not very good compared to what is available in other countries. In our universities, the students do not have the freedom to choose their courses. Everything is fixed. Very little flexibility. The whole system is like a water-tight compartment. There is another problem. How can we get jobs for all those who graduate? Take my case. I produced 46 to 47 Ph.Ds. It was not at all possible for them to get jobs in India at the level at which they were competent. At best, institutions where people are trained could hire one or two of these Ph.D.s. But if I train many Ph.D.s, as I did, where can they find employment? At one stage my boss at ISI, Prof. Mahalanobis told me to stop producing Ph.D.s! He said I was only helping export people abroad!

Prof. M N SRINIVAS, extract from his address to the twentieth - All India Sociological Conference held in Mangalore

It is common knowledge that universities and other centres of higher learning are experiencing severe shortage of funds, and that the shortage is particularly acute in the social sciences and humanities. Among the social sciences, economics receives some consideration from the authorities as it is closely linked to policy, but the other social sciences do not, and there are no powerful voices to argue the case for funding orphaned disciplines. But I think that a country which wants to liberalize and

globalize its economy has to safeguard its long-term interests by investing considerable resources in higher education and research.

It cannot hope to be continuously parasitic on research carried out elsewhere. In this connection I must state categorically that it is not enough to invest in science and technology alone. If those who have power over us want science and technology to improve the living conditions of the people, they have to support sociology and social anthropology, for these disciplines are indispensable to smoothen the transition to a situation in which the state confines its activities to certain essential areas while releasing the people's energies to help themselves. The successful and swift application of the results of science and technology requires the aid of the social sciences, in particular those sciences which address themselves to the study of culture, institutions, ideas, beliefs and values of the people. Only when sociologists undertake to seriously study problems bearing on the rapid improvement of the living conditions of the poor and the oppressed will the discipline's relevance be appreciated by those in power. Students who opt for sociology will then have employment opportunities. This is necessary to attract able students who have an aptitude for sociology. Only then will sociology become an integral part of the intellectual discourse of this country.

* * *

WHY PHILOSOPHY OF SCIENCE ?

SUNDAR SARUKKAI

From the perspective of the distorted echo of a well-known quote, we arrive at - The child is the step-father of man. The step-father as a figure subsumed by the floating sign of a postmodern present and definitely as a cultural marker over biological origins. Perhaps more appropriately, is the question of adoption, the binary clash of origin and growth. When the child itself becomes the father of man, what becomes of his father? As much as this tension explodes into social myths, it leaves behind traces in this question masquerading as the title of this article.

If science, as is commonly perceived, is the child of philosophy, then what is philosophy today, especially through the growing eyes of science? Scientists having definitely discarded philosophy into a junk-space, a cybernetic heap of cluttered info-signifiers, philosophy becomes increasingly a metaphor of the old-age home, where even literally, it intrudes only on ageing scientists occupations. If as much of child as the father of man is reflected in a biological reproduction of roles, then science fails to fulfill this 'holy-duty' as it exists in the present. Science and scientists, in their repudiation of philosophy, mainly as a relegated antique, have forgotten not just their parent but their role too as a fertile 're-producer'. Philosophy has lost its umbilical claim on the sciences and become yet another victim of the 'generation gap' problem in epistemology. Thus science as the perennial teenager in the grasp of a growing problem with an indulgent, ageing father. But in denying its parent (at the least in a functional sense), science has put itself up for adoption in its adolescent stage.

Perhaps within this is a sneaky feeling of a holy transcendence in science - an inverted epistemological Madonna, where, by a holy grace, science is born out of wedlock, without parents, without origins. As Madonna stands for and beyond motherhood as a human symbol, science stands for an epistemological birth beyond reproach. Re-proof it allows in sententious theorems and asides, but only from within and for private circulation only. Science has staked its claim on the ancestral property of philosophy (most notably on the prayer room of 'The Mind') and abandoned philosophy to the attic. Even as it attempts to delegitimize itself (as not-philosophy) through disciplinarian games, the father comes to stake a claim on his property in a suit against the clause of 'freedom at eighteen'.

Thus arises the philosophy of science, almost a social outcast, a menial afterthought. Whose function, in reflected anthropomorphism, can never be fulfilled either as a parent or his surrogate. Rather this philosophy has to take over parenthood anew, in a narrative discourse of mathematical fiction. An outcast in a most tragic form - not just neither here nor there, but not anywhere, at least as far as a majority of scientists are concerned. Thus we are led to view science as the representative of the (red-tinted) spectacled observer of Kant.

So philosophy of science simulates a parenthood while becoming just a long-forgotten cousin of science. Weinberg worries about the 'unreasonable ineffectiveness' of the philosophy of science but this diffused vision just points to problems of incommensurability. Philosophy of science is not just to bridge a cultural gap nor to be accorded a 'third-world' status in epistemology. Primary concerns of what experiments mean or how theories work or even facile paradigmatic explanations cannot be bounded in 'theorematical' structures or even experimentally 'measured'. Rather, this domain of thinking aims to illumine from elsewhere and perhaps even light the workings and motives of the scientific method.

Science, believing in objective reality, has to answer the question of what an objective description of the

relation between a subject and the 'objective' external reality should be. This leads into further deliberations as to whether there is an objective reality at all or whether science is just a coherent theory of knowledge. If the relation is described in terms of language, then philosophy of language has to be addressed to. As some philosophers have argued, the question whether science 'works' because of a 'solidarity' among its practitioners becomes important. Philosophy of science becomes necessary in the sense that it can articulate such a position and develop on it. Again, limitations of empirical methods, meaning of meaning, understanding narratives as legitimate expressions of truth, nature of mathematical 'objects', the role of multi-logic systems, the meaning of human consciousness all become dominant problems in philosophy of science and which conceivably cannot be explained in terms of the scientific praxis. Much of our understanding in these 'fundamental' areas cannot (and need not) be regulated within the grammar of scientific work and its unique 'dialectic of argumentation and proof'.

Epistemology encompasses a view of knowledge ranging from *a priori* categories to knowledge as language games. The range of arguments and conflicts within such readings shows the proliferating interpretations available within a philosophical discourse. The discipline of science via imposed commonality, the supposed classlessness of experimental method, cannot derive much from such a narrative discipline as philosophy. But to ignore it too is to lose the key to the treasure-room.

Finally, it is perhaps with the help of philosophy of science that science can be held accountable not just on its own grounds but on the grounds of a more important battle for primacy of knowledge which it holds a claim to. Science cannot deal with systems without control parameters and systems which have no such obvious parameters like ethical and moral theories have their own legitimation. As Medawar and Lyotard have argued, science can perhaps be legitimated by according it a status of a game where its only role is the production of new ideas, independent of any empirical correlation to its theories. It is only when science is conjugated with a diverse range of disciplines and subdisciplines within philosophy that it can mature to become the father of man. Right now, science is blinded by the production of new rules and newer games, but to introspect and grow it needs to accept its parent and consummate the role of a child as the father of man.

(Dr. Sundar Sarukkai is a Research Fellow in our Institute)

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TOWARDS GENDER JUSTICE

Understanding the Status of Women in India

SRILATHA BATLIWALA

In order to design gender-sensitive policies for women, we must first understand their situation in the larger socio-economic and political framework of the nation. This is best done by examining women's status at two distinct levels: **position** and **condition**. While *condition* refers to the material state in which poor women live - low wages, poor nutrition, lack of adequate health care, education, and training, lack of access to water, fuel, fodder; *position* is the social, economic, legal and political status of women as compared to men in a given society - for instance, equality before the law, equal representation in political bodies, equal access to all types of employment, equal wages for equal work, and the absence of gender-based violence such as rape.

In this article, a brief review of the position and condition of women in India is presented through a series of data, covering their legal status, economic status, health and education status, and vulnerability to violence.

Legal Status:

The Indian Constitution has given guarantees of equality to all its citizens through Articles 14, 15, 15(3) and 16; these have created an enabling condition for women to obtain equal rights, and inversely, for the state to discriminate in favour of women to correct imbalances in their position vis-a-vis men. Specifically,

Article 14 guarantees

- Equality for all before the law
- Equal protection for all under law

Article 15 & 15 (3) guarantee

- No discrimination against any citizen on grounds of religion, race, caste, sex or place of birth
- That the state can discriminate in favour of women (through special policies, programmes, reservations, etc.) without contravening Articles 14, 15 or 16

Article 16 guarantees

- Equality of opportunity for all citizens
- No discrimination in employment

Unfortunately, the Constitutional provision of equality is meaningless to most women who are unaware of it, and whose daily lives are governed by customs and traditions, enshrined in the personal laws of different religious groups, which were exempted from the purview of these Consititutional guarantees. Thus, Hindu, Muslim

and Christian personal laws in India have remained biased against women; attempts at reform have faced stiff opposition and have been passed, if at all, only in diluted forms.

Economic Status:

Women's role in the economic life of societies has been largely unrecognised and hence undervalued. Over the past two decades, however, women's studies researches worldwide have highlighted women's economic role through both theoretical and empirical work. Beginning with Esther Boserup's pioneering work, studies all over the world and in India have stressed the fact that 'work' itself would have to be re-defined, and the gender-based division of labour taken into account in order to render women's contribution visible.

Table 1 below shows that as soon as one adopts an expanded definition of "work", by including important subsistence activities performed by women such as fuel, fodder and water collection, we get a truer picture of the work participation rates of women. However, even this does not result in an adequate reflection of all the work done by women for family survival, especially non-waged labour in family occupations (which are therefore included in reporting of men's work).

Table 2 corrects the balance somewhat by showing that while only 13% of men are engaged in unpaid family labour, 38% of women in the labour force are so occupied. It also shows how many more women than men are dependent on casual labour, with all its attendant insecurities, and also have far less access to self-employment than men. For those outside the labour force, the gender differences in reasons for non-participation is startling: while 62% of men reported education as a reason, only 21% of women can do so. The double-burden of women is also clearly depicted in the fact that only 2% of men reported being engaged in conventional and expanded categories of domestic work, whereas an overwhelming 55% of women are so engaged, and hence unable to participate in income-earning activities. Some of these figures are much higher in the report of National Commission on Self-employed Women: for instance, 51.4% of women (71.6% rural and 28.6% urban) covered reported themselves as engaged in unpaid family labour, and also in wage labour outside the home (57.9%).

Table 1: MALE-FEMALE WORK PARTICIPATION RATES BY CONVENTIONAL AND EXPANDED DEFINITION, 1983/84

	RURAL		URBAN		TOTAL	
Definition	M	F	M	F	M	F
Conventional(%)	68.22	38.74	57.71	17.31	62.97	28.03
Expanded(%)	63.83	50.97	57.88	25.06	60.85	38.02

Table 2: OCCUPATION-WISE LABOUR DISTRIBUTION OF WOMEN WORKERS

Inside Labour Force	**Men**	**Women**
Casual Labour	26%	34%
Self-Employed	43%	23%
Regular Wages/Salaried	19%	6%
Unpaid Family Labour	13%	38%
Total	100%	100%
Outside Labour Force		
Education	62%	21%
Conventional Domestic Work	1%	38%
Expanded Domestic Work	1%	17%
Old Age & Other Reasons	36%	24%
Total	100%	100%

The national work participation rate for women - i.e. 38% - tends to give a false impression that the majority of women sit at home, idle, which is far from the truth. We have yet to find adequate statistical measures for assessing women's total contributions to the economy.

Health Status:

The health status of women is often the most sensititve indicator of the overall position of women in a society. Nature decreed that the female of the species is biologically stronger, since the survival and propagation of the species is dependent on her. Thus, more females than males are conceived, the female foetus is less likely to be deformed or spontaneously aborted, and female babies have a greater capacity to survive, post-natally, than males. Similary, women have a slightly greater life-expectancy than men. In a society where women enjoy relatively good access to food and health care - i.e., where discrimination against them is not severe - basic health statistics would reflect this. Specifically, the sex ratio (number of females for every 1000 males), female-male infant and child mortality rates, and life expectancy figures would all show a marginal bias *in favour* of females.

TABLE 3 : STATE-WISE SEX RATIO, 1991

Arunachal Pradesh	859	Maharastra	934
Haryana	865	Tripura	945
Uttar Pradesh	879	Meghalaya	955
Punjab	882	Manipur	958
Nagaland	886	Karnataka	960
Rajasthan	910	Goa	967
Bihar	911	Orissa	971
West Bengal	917	Andhra Pradesh	972
Mizoram	921	Tamilnadu	974
Assam	923	Himachal Pradesh	976
Jammu & Kashmir	923	Kerala	1,036
Madhya Pradesh	931		
Gujarat	934	ALL INDIA	929

The devaluation of women is expressed through systematic deprivation and neglect, if not through outright violence. This is most evident in the sex-ratio, which should normally favour women - i.e., females should constitute slightly more than 50% of the total population.

Table 3 shows us that not only is the sex ratio in India below the norm in 24 of the 25 states, but it is below 950 per 1000 in 15 states, and below even 900 in 5 states. Kerala appears to be the only state in India when women are getting what they need to realise the biological advantage nature gives them. In all others, man-made forces are diminishing the female populace.

Moreover, the sex-ratio has been steadily *declining* since Independence (when it was roughly 946 per 1000) inidcating that discrimination has worsened, rather than improved.

There are many other factors, apart from sex-ratio, which contribute to the poor health status of our women - such as the low priority given to girls and women for medical care. Meera Chatterjee posits five key factors which determine women's access to health care: need, perception of need, permission, ability and availability. When three of these critical factors, viz., perception of need, permission and ability (meaning having the financial or other resources), are mediated by the family, the girl child invariably gets a poor deal. And so arise the stunting of growth, the lower capacity for healthy pregnancy and childbirth, and the greater morbidity and mortality among women throughout their lives.

It is surprising that in a society where reproduction is considered women's most sacred duty, this system of deprivation does not cease even in the child-bearing years. A combination of superstitions, dietary beliefs and practices, neglect (especially of pregnant women who have failed to produce sons), and poor access to and availability of good maternity services, results in India having one of the highest maternal mortality rates in the world - 550 per 100,000 livebirths. The rate is even higher - 823 - in the so called "Bimaru" states of Bihar, Madhya Pradesh, Rajasthan and UP.

TABLE 4: CAUSES OF MATERNAL DEATHS, 1987

Causes of Death	Percent
Bleeding in Pregnancy or puerperium	27.9
Anemia	17.8
Puerperal sepsis	10.7
Malposition of foetus	10.1
Abortion	7.6
Toxemia	6.6
Not classified	19.3
TOTAL	100.0

The continuing low rate of births taking place with trained attendants in relatively aseptic conditions - only 42% all-India and only 25% in the "Bimaru" states - is only one of the factors contributing significantly to maternal mortality. Equally important are undernutrition (manifesting most often in anaemia) and general overwork, which add directly and indirectly to the causes of maternal deaths - and to infant mortality : at least 30% of all babies born in India are of low birth weight (a figure which increases with birth order), with poor chances of surviving their first birthday.

In fact, with the over-riding focus on promoting contraception (particularly female sterilization) and reducing birth rates, other aspects of women's reproductive health has been grossly neglected. This is a self-defeating practice which has negated, rather than promoted, the acceptance of birth control. A recent study by Rani Bang in Gadchiroli district of Maharastra found that 92% of the 650 women covered suffered from some gynaecological disorder - mainly reproductive tract infections (RTIs). Of these, only 8% had sought treatment. Very similar findings have been noted in studies conducted in other regions, including rural and urban Gujarat, West Bengal, and Bombay slums.

Women's mental health status clearly shows the impact of the unfair burdens placed upon them by our society. Mental health surveys have shown that the prevelance of clinical neuroses is between 50 to 100 per 1000 population, and that the majority of these are women. A study of over 1800 patients in a general health centre found that most of the 193 patients found to have "psychosocial" problems were women aged 16 - 45 years - the reproductive age group. The most common causes of stress were problems in: personal and family life, finances, health, and marital and sexual relations. In fact, it is surprising that women's mental illness rates are not even higher, given the overwhelming physical and psychological pressures under which they live. Possibly this is because most women are conditioned from birth to accept their situation as "normal" and "natural".

Education Status:

The discrimination against women is as evident in their education status as it is in health. Formal schooling for daughters is considered unnecessary, unaffordable, or unfeasible because their labour is required to home. Secondary education for those girls who are permitted to go through primary school, is often curtailed as soon as they reach puberty. For the vast majority of poor girls, particularly in rural areas, a couple of years of schooling is all they can attain.

The data in Table 5 shows that nearly twice as many girls as boys drop out of school between the primary and

secondary stages. Nor is there any clear evidence that attendance rates for girls have improved over the last decade. Moreover, these are All-India figures - the female enrolment ratios even at the primary school level are much lower in some of the Northern states, as are female school attendance rates. There are also wide variations by socio-economic class. As a result, the **female literacy rate** in India even in 1991 was a paltry **34%**, whereas more significant strides had been made among men **(62%)**. Only about 9% of rural and 35% of urban girls are enrolled in college.

TABLE 5 : GROSS MALE/FEMALE ENROLMENT RATIOS (1991/92) AND SCHOOL ATTENDANCE RATES (1981)

Gross Enrolment Ratio	Male	Female	Total
Class 1 - 5 (6 - 10 years)	115.6	88.1	102.7
Class 6 - 8 (11 - 14 years)	74.2	47.4	61.2
School Attendance Rate			
(6 - 14 years)	58.0	35.5	46.8

The lack of equal educational opportunities for women directly weakens both their position and condition. Lack of education means women are handicapped in obtaining better jobs and economic independence, decision-making positions, and above all, the knowledge and ideas which might enable them to question their status in society and demand change. This potential danger to the social order is clearly understood by many parents, whose answer to why they don't want their daughters to have education is telling: "She will become too smart, get funny ideas, and not be happy with her place in life."

Violence:

The oppression of women reaches its logical extreme in violence. In India, violence is not limited to rape and molestation, which are universal phenomena, and are expressions of the male wish to bodily dominate and terrify women into sexual submission. We also have social customs which create the conditions and justification for other crimes, such as dowry harassment and bride-burning.

The figures in Table 6 are only the tip of the iceberg, since the vast majority of crimes against women go unreported and unrecorded. The percentage change over time in number of recorded crimes is not necessarily a real increase in incidence, but possibly a ray of hope: more women and their families are coming forward to report their experience of violence, and to seek justice.

TABLE 6: VIOLENCE ON WOMEN BY CRIME 1987 - 1991

CRIME	**1987**	**1991**	**% Increase**
Rape	8,559	10,410	21.6
Molestation	16,292	20,611	26.5
Kidnapping/Abduction	9,016	12,300	36.4
Eve-teasing	7,270	10,283	41.4
Dowry deaths	1,912	5,157	169.7
Cruelty by husband/ in-laws	11,603	15,949	37.5
TOTAL	54,652	74710	36.7

Summary:

We have examined the status of women in India through the prisms of the economy, health, education and violence. The picture that emerges is amply clear: in every sector, the same set of underlying cultural/ideological, economic and systemic barriers operate in tandem to keep women in a subordinate and disadvantaged situation. Gender-sensitive policiies and programmes must therefore, strike at the roots of women's subordination if they wish to bring about gender equity and a truly just social order.

*(**Ms. Srilatha Batliwala** heads the Women's Policy Research and Advocacy Cell at NIAS, which is a Ford Foundation Project)*

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A NOTE ON CORRELATIONS OF MASSES AND LIFETIMES OF RADIONUCLIDES AND FUNDAMENTAL PARTICLES

Starting with a simple quantization relation $MT=\hbar(2^n/n)$ where M is mass in ergs, T is decay lifetime in seconds, $\hbar$ the Plank constant and n an integer, Dr. Raja Ramanna and Prof. B.V. Sreekantan have analysed all the data on unstable fundamental particles including resonances and all the β and α emitters among radio nuclides. The analysis has revealed significant correlations between masses, lifetimes and flavours in the case of fundamental particles and effective masses and lifetimes in the case of β and α emitters. These provide some new insights into decay phenomenon which will be discussed in a forthcoming paper.

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ARCHITECTURAL HERITAGE - WITH FOCUS ON KARNATAKA

T.P. ISSAR

Our architectural heritage is precious because it is a visible and highly evocative link with the past. It often tells much more about the life and times of past eras -- social mores, living styles, stage of culture and sophistication, governmental attitude to people and *vice versa*, commerce, industry and trade, city aesthetics and planning -- than whole volumes of history can.

A proper and undistorted awareness of the past and the true value of heritage is often taken for granted by people who are lucky enough to be born in an ancient culture. How true this is, can be seen from the lengths to which governments, thinkers and scholars have gone in preserving whatever little heritage they have in countries like America and Australia. In India, for centuries we have ignored our heritage and it is a miracle that so much of it survives.

It would be neither possible nor worthwhile to encapsulate the evolution of architectural styles in the Indian sub-continent within the confines of a few pages. An attempt is made here to very briefly go over the distinct architectural styles which constitute Karnataka's great heritage.

Karnataka can claim diverse architectural styles, which evolved here with great dynamism, achieving heights of excellence - both as regards the builder-craftsman and the carver.

The Chalukyas (Early Chalukyas or "Badami Chalukyas" - about 500 to 750 A.D.) of Northern Karnataka were great builders of temples -- they must have done equally remarkable civic buildings but there is no trace of any of them -- and some of the temples built during the early Chalukyan times are considered as landmarks in "Hindu temple formation". Aihole in the Malaprabha valley (Bijapur District) has been described as "one of the cradles of temple architecture" by Percy Brown. In fact, Charles Fabri has zeroed in on one of the humble, unlikely-looking temples at Aihole (dating back to about 550 A.D.) as one of the earliest known structural temples, marking a stage in the evolution of temple-craft from the cave to the structural. The only other surviving structural temples are those built -- a little earlier -- during the Gupta era.

Buddists and Jains were the earliest builders of cave temples. In the ancient Hindu or Vedic tradition, there was no worship of idols in temples. In the pre-Buddist era, Hindus did their prayers and performed their religious rites in *Yagnashalas* where havanas and sacrifices were conducted. Image-worship among Hindus thus came from the Buddists and Jains : the earliest extant Hindu temples were therefore cave temples. It is quite possible that before Hindus started building their structural temples in stone they had been building wooden temples or mud-structures in which images were kept and worshipped. However, only the stone structures remain, marking the abovesaid evolution from the cave temple era.

The Buddist cave temples, referred to above, were in fact combinations of *chaitya* (prayer hall) and *vihara* (monastry), Caves were apparently selected as offering the ideal setting for housing both the Chaitya and Vihara. Outside the caves, the Buddists built stupas -- which were essentially memorials, built in solid brick-work, usually built over a sacred relic.

At Pattadakal (near Aihole and Badami) we have a virtual museum of temple styles -- the locally--evolved rudimentary shrines alongside the Northern style curvilinear temple with high gopura, the stepped pyramidal Dravidian *shikhara* and the hybrid *vesara* shikara which developed during the Vijayanagar days. The *vesara* style influenced the building of many temples in Southern India. This style was a synthesis of the Northern and Dravidian styles - pillared halls and *gopuras* (called *rayagopuras* since the Vijayanagar times) and a distinct *shikhara* elevation in which the sharp edges of the stepped Dravidian line were "softened" with curving sculptural detail.

Thanks to the connection between royal dynasties and the mobility of master builders and craftsmen across territories (there is no doubt that there was constant "borrowing and lending" of such people between friendly monarchs) Karnataka styles constantly interacted with other styles. For example, the rock-cut temple at Ellora was clearly modelled on the Virupaksha temple at Pattadakal (of the early Chalukyas) which was in turn influenced by the style of an important Pallava temple at Kanchi. Again, the cave temples at Badami, which show highly-cultivated skills in rock-cutting and carving, influenced the Pallava rock-cut art at Mahabalipuram. In turn, the styles developed under Cholas, who succeeded Pallavas, influenced the design of many temples in Southern Karnataka, where they offer a contrast with the celebrated Hoysala style of lathe-turned pillars and exuberant detail of carving.

Some of the temples at Aihole and Pattadakal are the creation of Rashtrakutas (750 to 970 A.D.) of Gulbarga who succeeded the Badami Chalukyas and whose greatest creation is the Kailasa temple at Ellora (in Maharastra) - the 95 ft. high monolithic monument which is regarded as a wonder in the rock- cutting and carving art. Says Percy

Brown about it, "... its beauty and singularity have always excited the astonishment of travellers". "Singularity" because of the fact that the edifice has been shaped by cutting a single rock from the top downwards, hewing on the way all the elaborate elements of a temple, dictated by the contemporary mode -- the garbagriha, the *ardhamantapa*, the *rangamantapa*, shrines of *parivaradevatas* (family deities) and even a *dhwajasthamba* (flag staff).

A truly remarkable group of temples, constituting a distinct style, was built during the Hoysala era. The Hoysalas were feudatories of the Chalukyas who shook off Chalukya rule from Southern Karnataka. The famous Chanakesava Temple at Belur was built to commemorate Vishnuvardhan's victory over the Cholas in AD 1114.

These temples -- at Halebid, Belur and Somnathpur (near Mysore) - have been built and carved in soap-stone and follow the stellar plan, which continued right to the top of the *shikhara*. The zig-zag pattern of projections and recesses thus created allows a most fascinating play of light and shade, especially with the sheer exuberance of detailed carvings interspersed with bigger sculptures and brackets. The bell or pot-shaped pillars are so intricately and precisely carved in horizontal lines that is widely believed that they were lathe-turned (some experts contest that view).

Among the noteworthy features of temples in Hoysala style, besides the stellar plan and the lathe-turned" columns, are the horizontal, minutely-carved strips which run all round the temple's circumferance. The minute carving of the scores of columns within, the finish and size of the figures, the almost lace-like finish of some of the brackets -- all these led Percy Brown, the art historian, to remark that this art marks "the supreme climax of Indian architecture in its most prodigal manifestation". Never were such liberties taken with stone.

The Hoysala temple at Somnathapur (near Mysore) which has everything which the more famous temples at Halebid and Belur have, has one remarkable feature in which it scores over the latter -- it has its *shikara* intact.

As noted by Suryanath Kamath, distinguished scholar and gazetteer, "the synthesis of South Indian culture which the Vijayanagar empire represented is very much reflected in its art form". The builders and carvers of the time borrowed and adapted many features of the earlier schools of architecture -- the raised plinth of the Chalukya and Hoysala temples and the turret- like niches and curved chhajjas of the Chalukyas. There is extensive use of the jumping-animal motif -- horses, elephants and yalis (mythical lion - crocodile with legs and protruding tongue) poised for the jump, standing on hind legs -- borrowed from the Pandya temples of Tamil Nadu.

The pyramidal gopuras *(rayagopuras)* rising high at the entrance of the temple are an improved version of the Chola and Pandya *gopura*, while the *shikharas* over the sanctum are of the locally evolved *vesara* style. These synthesised and evolved styles represented "a life of – greater fulness" (Percy Brown) a new richness and robustness -- a consciousness of the glory of the Empire. The soft stone favoured by the Chalukyas and Hoysalas was discarded and granite was once again used even for intricate carving. The buildings became imposingly bigger in size.

Temples during the Vijayanagar days were the venue of elaborate celebrations of seasonal festivals and wedding functions. These were held in *mantapas*, which have elevated platforms reached through steps flanked by *yalis* or elephants.

The Vijayanagar kings - great builders and devotees - have left their impact on the temple architecture of almost the whole of Southern India. Many of the great temple settings of present-day Tamil Nadu were created by the Vijayanagar kings, who added *gopuras* and *mantapas* -- thus enlarging the original setting considerably -- to whichever temple they visited in their devotion.

Among the city-relics of the world, Hampi is perhaps the biggest and the most extensive, covering an area of 30 square kilometres. Hampi is not just the venue of some great temples, which represent the flowering of the temple-building art under the patronage of the Vijayanagar kings : it gives us, in tangible form and decipherable detail, the outline and planning of a great metropolis. It evokes the socio-economic life of a past eara as few other relics do. Besides the temples, briefly referred to in the preceding para, there are palaces, bazaars, plazas, parade-viewing pavilions, swimming pools and baths, aquaducts, secretariat-complexes, audience halls and auditoriums.

The elaborately planned city of Hampi, as seen from the ruins, was a series of walled cities, ending with the core city. These walls had elaborately-designed gates which regulated entry to the inner areas.

The remains at Hampi testify to a highly developed civic organisation. They evoke a great era-- providing endless fascination to lay visitors and scholars alike -- of a highly evolved and sophisticated polity, administration and civilisation.

The Portuguese and, later, the British, brought to India the European tradition of architectural style -- the

Gothic, the Baroque and the Renaissance Graeco-Roman (also called European Classical).

The first Portuguese settlements were forts, churches and residential houses on strategically located points on the Western Coast. These were simple structures built by people who were not yet sure whether they will be able to dig in or whether they will be driven out. The locations selected were those which would afford a quick get-away in their vessels. There was no attempt yet to impress the locals with the architectural sophistication which had been attained in the "cultural commonwealth" of Europe - the high, pointed arches and vaults of Gothic churches, soaring heavenward; the Romanesque grand columns, capitals, pediments, rich entablature and domes.

The Portuguese showed off these attainments, together with the exuberance and extravagance of Baroque art forms, only when they had consolidated their hold in the Goa locality and in Daman and Diu. Meanwhile, they studied and absorbed much from the indigenously developed skills of the Indian carver and from the Indian temple tradition (some early Portuguese churches have dwarapalika-like figures at the entrance). It is significant that most of the detailed carving in Portuguese churches -- even the stunningly magnificent creations of the "Indian - Baroque" period of building and carving in Portuguese India of the Seventeenth and Eighteenth centuries -- was done by Indian carvers and master craftsmen, who naturally, used these skills when they were employed in building Hindu temples and secular buildings, including residential houses. The Hindu wayside shrines inspired the building of innumerable Christian wayside shrines, which were octagonal towers carved in rich Baroque detail. These were in turn copied in the Hindu temple-towers -- octagonal structures, topped with a dome, with niches at each level for enclosing lamps (the Mangesh Temple).

The earliest buildings -- the "factory" buildings -- built by the British were simple, functional structures which did for housing, storage and office work. As in the case of the Portuguese, it was only when they consolidated their hold in Bengal and Madras that the British traders and "Company" officers started building imposing structures with a consciousness of style. The early churches were mostly in the accustomed Gothic style, while the European-Classical style was favoured for houses, offices and clubs. The typical layout of a cantonment consisted of a shopping mall (thandi Sadak), bungalows and rest houses for important offices, a club, a church and a parade route, with formally laid out gardens of "annuals" and potted plants and manicured hedges, interspersed here and there.

Because of the need to adapt to local eco-systems, the European- classical lines soon underwent local adaptation of building style and architectural features -- the sloping tiled roof and gable, the verandah, the porch covered with trellis- work, the "monkey-topped" windows, additional shutters with wooden-louvres to keep out heat and glare -- and all other typical features of what came to be known as the 'colonial bungalow' style. The 'Raj" era has left a remarkable heritage of public buildings in European-Classical style.

*(**Sri. T.P. Issar,** the former Chief Secretary to the Government of Karnataka is an Associate of NIAS.)*

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NIAS-AS I HAVE SEEN IT

C.V. SUNDARAM

A few weeks back, the driver of a 3-wheeler, who was bringing me to the National Institute of Advanced Studies (NIAS), exclaimed with wide-eyed interest, as we entered through the gate, "What is this beautiful building? What is it that goes on here?" It immediately summoned to my mind an essay by C.F. Andrews - that I had studied at school - starting with the statement " Words cannot describe the beauty of Santiniketan". Yes, NIAS like Santiniketan is a refreshingly novel initiative, an intellectual and spirtual quest, a new cultural ambience. The spontaneous response from the auto-driver was also testimony that aesthetic sensibilities are not the sole preserve of the so- called elite.

It is stated that when that great patriot and visionary Jamsedji Nusserwanji Tata had thought of creating an Institution for advanced Science education - that later came to be established as the Indian Institute of Science (I.I.Sc.) in Bangalore - he had desired that that institution should place as much emphasis on the Humanities and the Social Sciences as on the Physical, the Engineering and the Life Sciences. In the event, it has however taken more than 80 years for the full realisation of Tata's dream. Between the sprawling campus of the I.I.Sc. and the new campus of NIAS, there is a small air-strip, and one may well say that NIAS has taken off where I.I.Sc stopped short.

When I joined NIAS in November 1991 - to pursue studies in the general area of Energy, Materials and the Environment - NIAS was three years young, having been established in 1988. The Institute had just then moved into its own premises in a 5 acre compound at the far end of the I.I.Sc. Campus. The first phase of construction was over - with a strikingly distinctive architecture of pleasant and elegant lines, bright-red tiled facading, spacious and

cheerfully furnished rooms, and an arched corridor running the full length of the building gently adding to the Conference space. The fifth NIAS course on "An Integrated Approach to Knowledge and Information" had been held in the new premises during Sept-Oct 1991, and the planning for the sixth course, scheduled for Jan-Feb 1992, was in progress.

One of my first experiences of savouring the flavour of the Institute's activities was when I listened to a recorded tape of Prof. Romila Thapar's lecture on 'The Ramayan'. I hadn't had the opportunity to listen to her before; as soon as I switched on the tape, I was captivated by the voice, the diction and the flow of ideas, and I listened to the entire tape with unflagging attention and interest. I had not realised that there were so many versions of the Ramayana, and that the original story (or legend) could have undergone major transformations over the millenia. Only towards the end, I realised that the talk had a topical bearing on the Ayodhya dispute. The tape left me in a mood of deep reflection, and it was a stirring experience that stayed with me for a long time. (With some ten courses already completed, the cassette library at NIAS now is a rich collection, and a growing asset for the future).

In an Institute devoted to Advanced Studies, along with the facets of the individual intellectual and cultural personalities of the Faculty and the Associates, the Library offers its own reflection of the soul of the Institution. From my school and college days, the colourful variety of Indian literature in the regional languages has held forth a great fascination for me, though the access was only through translations in English and Tamil. So it was an exciting discovery when I spotted the anthology 'Women Writing in India' (from the earliest to the modern times), skillfully edited by Susie Tharu and K. Lalitha (of Hyderabad), in the NIAS collection. I was enchanted by the exquisite quality of the selection and the translations, and the brilliant and revealing introductions to the individual authors. The work as a whole made me feel proud as an Indian.

The Seventh NIAS course (Jan-Feb, 1993) was inaugurated by Prof. Sarvepalli Gopal, the eminent historian, who spoke on the concept of Nationhood. I have had high regard for Prof. Gopal's erudition, and his gifts as a writer as evident in his splendid biographies of Jawaharlal Nehru and of his illustrious father Sir S. Radhakrishnan. Gopal's address at the NIAS course was just brilliant. He spoke from notes, and it was a master-piece of cogent argument and refined expression. One of the essential points that he made was that for a nation to grow as a living organism it should have a collective pride in its achievements as a Civilisation, and the strength and the faith to defend itself. Ayn Rand has written somewhere that when the U.S.A. launched its first manned Apollo flight to the moon (25 years ago), more than a million Americans had thronged around the Cape Canaveral launch site, with a sense of legitimate pride in the nation's achievement, and to share the joy of the event.

But then, how far should this sense of national pride be exclusively pursued? Is it not obvious that at some stage it should be tempered by global concerns? The extent of divisiveness that one finds today not only among the nations of the world but even inside one nation is disturbing, alarming. How are we going to spread the message of sanity and wisdom that can influence the whole of human society to shed narrow prejudices, anachronistic beliefs and perverse strategies - so that the peoples of the world can get closer for their mutual well-being? How can the achievements of modern Science and Technology be widely diseminated to alleviate the sufferings of the majority of the world's population? These are representative of some of the crucial issues that an Institute like NIAS could pursue in its studies.

At one stage in the discussion in the Bhagavat Gita Krishna tells Arjuna:

बहूनां जन्मनामन्ते ज्ञानवान् माम् प्रपद्यते ।
वासुदेवः सर्वमिति स महात्मा स दुर्लभः ॥

"It is after innumerable births - re-incarnations - that an individual arrives at the knowledge that there is One Supreme Being, one all-prevading Reality. Such an individual is a realised soul, He is so rare".

Krishna also proceeds to describe that state of dynamic Equilibrium:

यं लब्ध्वा चापरं लाभं मन्यते नाधिकं ततः ।
यस्मिन् स्थिते न दुःखेन गुरुणापि विचाल्यते ॥

"Having attained to that state, He does not look for anything else as a greater gain. In that state, even the deepest grief does not confuse him".

But even ahead of this supreme Realisation, there are various intermediate levels of integration, that confer their own benefits of elevated perspectives.

We know of the inspiring legend of Prince Siddhartha, who - troubled by the sufferings and sorrows of the people around him - withdrew into the seclusion of the forest, for reflection and meditation, and came back into the world as Gautama, the Buddha, the Enlightened One. It should be the ambition of NIAS to provide the atmosphere for such a process - a modern version of the Bodhi Tree - where individuals from different callings,

pursuing their special problems, will discover their true potential and go back into the world, enriched and invigorated, with a new-found Mission.

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PROFITABLE INVESTMENT IN SHARES

RADHAKRISHNA SHARMA

Recent developments in the capital market coupled with the 1992 stock scam have made 'share' a business word. There are many people who made and lost money in the share market. Investment in shares and stocks is a very high risk proposition and many of us believe that investment in shares is little different from gambling. But if our investment decisions are based on analysis and reasoning and not based on whims, fancies and rumours, it becomes a calculated investment with lesser risk.

An equity share is evidence of ownership in a company. The physical evidence of this ownership is a document called share certificate. A shareholder is part owner of the company. The face value of the share is indicated in the share certificate. It continues to retain this value irrespective of the price at which it may later on be bought or sold in the market.

Every investor has some basic objective. Firstly he would expect safety of investment. The amount invested in any form of assets should be safe at any cost. Secondly, he may expect regular income in the form of interest, dividend, rent etc. Thirdly, it is also natural to expect capital appreciation. Lastly, everyone desires that the investments made should be marketable or saleable in times of need.

If we consider the above objectives, investment in shares has an edge over all other forms of investment. The person who parks his money in gold or silver is getting only capital appreciation, without any regular income during the period of investment. Similarly, a person who invests his money in Fixed Deposits or in Company's Debentures is getting only regular income. His original investment will not increase in value. But a shareholder in a company is gettting regular income, in the form of dividend, and also over a period of time, the market value of the share is expected to increase. In fact, this double benefit of income and capital appreciation makes even a disinterested person feel interested in shares.

Now our country is facing a problem of inflation which is about 10% per annnum. Our purchasing power and standard of living continuously falls during inflation. In order to protect ourselves against inflation, we should earn on our investments a rate of return more than the inflation rate. For this, we should have a basic knowledge of investments so that we can manage our investments efficiently and wisely.

How much money can you expect to make from your investments in shares? To answer this question, let us look at the performance of five well-known companies in 16 years from 1974-1990. If you had bought shares worth Rs. 1000 in each of the following five companies in 1979, your investments of Rs. 5000 would have multiplied by 55 times to Rs. 277719. This amount excludes the dividend income. The companies are Bajaj Auto, Kirloskar Cummins, Raymond, Indian Hotels and Woollen Hindustan Lever. It is also interesting to note that if you had invested in the shares listed on the BSE randomly your investments would have earned a return of more than 25% per annum.

The shares of a company are freely transferable from one person to another. There is a ready market for shares, which is called Stock Exchange. To be traded in the stock exchange, the company's share must be listed. Listing is the inclusion of the name of the company in the official list maintained in the stock exchange for the purpose of trading. The company has to comply with various conditions for the purpose of listing.

The investing public cannot buy and sell shares in the stock exchange directly, as only members of the stock exchange are allowed to trade there. The members are called as brokers and jobbers. A broker is an agent of the investing public and as such he gets commission for his work. On the other hand a jobber is a dealer in a few securities. He buys and sells shares for himself. The difference between selling price and purchase price is his profit. When the investing public places an order with the broker he has to buy or sell the shares either from another broker or from a jobber.

The price of a share in the market like any other commodity is determined by the market forces of demand and supply. All the factors influencing the price such as performance of the company, general state of the economy, political factors, change in the management etc. will ultimately affect either demand for shares or supply of shares. If there is excess of demand over supply, the price will go up. On the other hand, if supply exceeds demand the price will come down.

There are different kinds of people who deal in shares. Some buy the shares and hold it more or less permanently. They are married to the company and normally they do not sell and make quick profits. They are called investors. On the other hand, there are some people who buy the shares to sell at a higher price immediately. People belonging to this category are called as speculators.

Speculators go by different names such as Bulls, Bears, Stags etc. A Bull is a speculator who expects an increase in the price of a share. A Bear is a speculator who expects a fall in the price of a share. A stag is a person who merely applies for public issues and, on allotment, sells his share and makes profit. He is not interested to take more risk.

Before we invest our money in shares, we should consider certain factors in order to achieve the objectives of investment of maximising the return with minimum risk. One should not buy the unlisted shares. Unlisted shares cannot be sold in the stock exchange. In case of listed shares, we should not buy inactive shares, which are not regularly traded in the stock exchange. Further, it is better to avoid buying the shares of a closely held company having shareholders of less than 4000.

After the above preliminary screening the following points should be evaluated before making investments:

1. What is the quality of management? It is said that a company can be only as good, or as bad as its management.

2. How large is the company ? It is better to avoid a company with equity capital of less than 2 crores and sales of less than 10 crores.

3. Is the company sufficiently diversified? One product, one plant, one market companies are riskier than a widely diversified company.

4. Is it a growth company? A growing company has a lot of profitable investment opportunities and it will be more profitable.

5. Does the company have labour problems?

After considering the above factors we should look into the company's financial position and performance. Here we can make use of profit and loss accounts and balance sheets of the previous five years. From the financial statements we should find out the following-

1. *Book value per share:* This is the sum of the amount contributed by a shareholder plus the amount the profit kept in the business on behalf of a shareholder. This is the amount available to a shareholder if the company is liquidated today.

2. *Earnings per share (EPS):* This gives us the earnings enjoyed by one share.

3. *Dividend per share (DPS):* A company need not distribute all the profits as dividend. Dividend per share is normally a part of the earnings per share.

4. *Price earning ratio (PER):* This ratio shows the extent to which earnings of a share are covered by its price. The lower P/E ratio requires lesser time to recover the orginal investment.

5. *Yield:* It is the rate of return to a investor who buys the share at the current market price.

6. *Fixed and current assests:* It gives us an idea as to how the capital of a company is deployed.

7. *Fixed assets and long term liabilities:* It gives an idea about long term financial position of the company.

8. *Current assets and current liabilities:* It gives an idea about short term financial position of the company.

Besides the above factors, one can look into yearly high and low prices of that company's shares. It is better to buy a share at the yearly high price. It is also necessary to invest our money in many companies instead of investing our money only in one company. It is said that we should not put all eggs in one basket. Therefore one should invest the available money in many companies belonging to differnt industries. There are opportunities for investment at all times. For example when there is a failure of monsoon, we should not think that the company as well as all the companies are going to do badly. In fact, a company doing borewell contracting business will do very well during that period. Similarly, in case of depression the red ink manufacturer will perform extremely well.

In order to get maximum return from shares one should follow "pig farmer" approach, instead of "holy cow" approach. The person belonging to holy cow approach will never sell the shares even if the price reaches astronomical level. He believes that cows are not for slaughter. The people following pig farmer approach know that pigs are only for slaughter. So they buy the shares wait till it grows and then sell the shares and make profits. If the price comes down afterwards they may buy the same shares later on.

There are 2 approaches for making investment decisions. They are Fundamental analysis and Technical analysis.

Fundamental analysts try to estimate the intrinsic worth of a company's share by studying its sales, earnings, profits dividends and host of other factors, Then they try to estimate what price of a particular company's share ought to be and consider this price as true value. This value is then compared with the market value to judge whether the company's share is overpriced or under priced. The fundamentalists make money by buying

underpriced shares and later on selling them when they become overpriced.

On the other hand, Technical analysis is concerned with predicting future price movements on the basis of past price behaviour. Technical analysts use charts and graphs. This would be useful to predict short-term view and hence normally speculators use Technical analysis. In the ultimate analysis we can say that for best results, Fundamental analysis should be supplemented with Technical analysis for making good investment decisions.

To conclude, investing in shares may not be regarded as gambling provided the decisions are made on the basis of analysis and reasoning and are not guided by whims, fancies, and rumours. In the coming years, the fruits of liberalisation process will make the investment in companies more profitable than in the past. So let us not miss this golden opportunity that is knocking on our doors.

*(**Sri. Radhakrishna Sharma** was a participant of the second NIAS Course for University/College Teachers).*

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ONE HUNDRED YEARS OF ELEMENTARY PARTICLE PHYSICS:

B. V. SREEKANTAN

The quest for understanding the ultimate constituents of nature and the types of interactions between them responsible for all the phenomena that we see around us, has been the pre-occupation of philosophers for ages and of scientists for the last 400 years. It is only in the last 100 years that the scientific quest has led to deeper insights, at the same time making it clear that there is much more to be known than what is known. While the methodology of science began with experience and common sense notions, the advancements over the last 100 years have shown that our common sense ideas of matter, radiation, space, time, causality and determinism are not valid in the domain of the fundamental entities.

The new developments have come about because of (i) the power of modern technology and instrumentation that has made it possible to probe nature in a much more minute way than was possible before and (ii) the very liberal use of mathematics in the formulation, solution and prediction of physical phenomena. However, mathematics according to many scientists and mathematicians, is a creation of the human mind and depends on its own logical consistency without any reference to nature for its validity.

The First "Elementary Particles":

An important landmark in this "holygrail" was the occurrence of a "hat-trick" - three major discoveries in three consecutive years - the discovery of X-rays (1895), of Radioactivity (1896), and of the Electron (1897) that opened the door to the "Micro-world" of Elementary Particles beyond the "atom".

Very early in this century, Einstein very deftly used the "quantum hypothesis" advanced by Max Planck to explain the photo-electric effect and highlighted the "particle" aspect of electromagnetic radiation. Rutherford making use of the α-particles emitted by radioactive sustances identified the "nucleus" inside the atom and Bohr formulated his famous theory of the quantized orbits of the electrons around the nucleus and explained the structure of spectral lines. The atomic and nuclear story was complete with the discovery of the "neutron" in 1932 and the recognition that all nuclei comprised of protons and neutrons. An intriguing feature was that while the neutron was stable inside the nucleus, it decayed spontaneously into a proton and an electron when 'free' with a life time of about 1000 seconds.

To save the principles of conservation of energy, momentum and spin, Pauli hypothesised another neutral particle which was given the name 'Neutrino' by Fermi who formulated the theory of the β-decay of the neutron. Thus by 1932, there were just five particles - the proton, the neutron, the photon the electron and the neutrino. It was thought that everything could be explained in terms of just these five particles. The special theory of relativity proposed by Einstein in 1905 and the Quantum theory of De Broglie, Schrodinger, Heisenberg, Dirac, Max Born and others became extremely relevant in the context of elementary particle physics and many of the consequences of these theories found immediate confirmation. The superposition principle, the statistical interpretation of quantum mechanics, Heisenberg's principle of uncertainty, and the relativistic connotations of space and time while highly successful in quantitatively explaining many of the phenomena in the microworld domain, moved physics away from picturisation in terms of every day concepts of space, time and matter and rendered it highly mathematical and abstract. Interestingly however the seriousness with which the mathematical formulations were pursued and the boldness with which the consequences were interpreted in terms of unorthodox ideas paid off as convincingly demonstrated by the next most exciting phase of particle physics.

Cosmic Rays and Elementary particles:

Mysterious are the ways of nature in revealing her secrets. In 1912 Victor Hess established the presence of a radiation that is extra-terrestrial and extra-solar, pouring down everywhere on the earth both during day and night

Millikan gave it the very appropriate name "Cosmic Radiation. It is in the course of experimental analysis of this radiation that many new aspects of the microworld of elementary particles came to light. In 1932, Carl Anderson discovered in cosmic radiation, a particle which had the same mass as the electron, but which had the opposite positive electric charge. The particle was given the name "positron". Earlier Paul Dirac formulating the relativistic wave equation for the electrons had come to the conclusion that there must be a positively charged particle in nature, the counter part of the electron. In coming to this conclusion, he had taken seriously the 'negative energy' solutions of his relativistic electron wave equation and had made a bold hypothesis that it is a 'hole' in the sea of negative energy states of the electron that corresponded to the positively charged counter part. With the experimental discovery of the positron it became clear that this is the anti-particle of the electron which Dirac's theory had predicted.

The theory also meant that every particle obeying the Direc's equation had to have a corresponding anti-particle. Thus the exclusive realm of anti-particles, anti-matter and anti- worlds came to our knowledge. A consequence of the theory was that particles and anti-particles when they come into close contact explode into radiation. Thus anti-worlds composed of anti-matter, if they existed had to be necessarily segregated from normal worlds.

The next particle to be discovered in Cosmic radiation, again by Anderson, was the Mu-meson which turned out to be the most penetrating charged radiation in Cosmic rays. The Mu-meson however was an unstable particle that decayed in its own rest frame in about 2 micro seconds into an electron and two neutrinos. The long lifetime of several milliseconds for which it lived in travelling the atmosphere was because of the time dilatation effect predicted by the theory of relativity. It had a mass of about 200 times that of the electron and satisfied the properties of a heavy electron, and interacted very weakly with nuclei and did not quite fit into the particle that had been postulated by Yukawa in connection with the nuclear forces binding protons and neutrons inside nuclei. This anomaly was resolved in 1947 by the discovery of the Pi-meson which had mass of 280 me and decayed into a Mu-meson and a neutrino.

So, by 1947 a very elegant picture of the role of fundamental particles in explaining practically all the features of nuclear physics and cosmic rays had emerged. However big surprises were in store.

"Strange" Particles:

In 1947, the same year in which the Pi-meson had been discovered, a cloud chamber experiment on Cosmic rays at Manchester in England showed two examples of decays of unstable particles which could not be the known particles - Mu-mesons or Pi-mesons. The follow up of those observations opened up yet another more subtle world of elementary particles, which were least suspected by any theories. Two new types of particles the K-mesons with a mass higher than the Pi-mesons and the Hypérons ($\wedge^o$, $\Sigma^{\pm}$, $\equiv^-$) with mass higher than the nucleons were identified in the further searches. What was intriguing was the fact that these new particles were always produced in "associated" pairs. All these particles decayed with a lifetime of ~ 10^{-10} seconds.

These discoveries in the field of Cosmic radiation provided the incentive and justification for the construction of higher and higher energy accelerators.

Accelerator Era of Particles:

At the accelerator laboratories it became possible to study in detail many aspects of thse particles and their interactions and also discover a host of new particles whose number swelled into several hundred. The intricate interactions and the delicate connections between different types of particles and the behaviour of many of the parameters at higher and higher energies provided a fertile and challenging field for the theoretical physicists. A continuous interaction between theorists and experimentalists became an unprecedented feature of this new discipline of high energy physics. While conservation laws of energy momentum, angular momentum and electric charge continued to be the guiding factors, entirely new conservation laws like "strangeness" conservation had to be invoked to account for some of the special features like "associated" pair production.

One of the spectacular discoveries made with the accelerators was the discovery of the Ω^-meson with just the properties predicted by Gell-Mann on the basis of classification of particles into supermultiplets, incorporating isotopic invariance and strangeness invariance in strong interactions. This scheme fitted all the particles that had been discovered in Cosmic Rays and also the early 'resonances' Δ^o, Δ^o, Δ^+, Δ^-, Δ^{++} discovered at accelerators.

The major experiental discoveries at the accelerators in the last three decades are:

Among hadrons hundreds of 'resonances' - particles with lifetime less than 10^{-20} seconds corresponding to all the long lived particles discovered in Cosmic rays; the charmed mesons $D^{\pm}$, D^o and resonances; the charmed strange mesons $D^{\pm}$ and resonances; the Bottom Mesons $B^{\pm}$ B^o and resonances; the Charmoniums $c\bar{c}$ and the Bottomniums $b\bar{b}$ and their resonances.

Among leptons the only new discovery was τ^- meson with a mass of 1.78 Gev higher than the nucleon mass. In recent years, the most spectacular discoveries have been the intermediate Vector Bosons $W^{\pm}$ with a mass of 80.22 Gev and Z^o with a mass of 91.17 Gev.

The Standard Model:

The existence of such a large number of elementary particles did not make sense. It was thought that these had to be composites of more fundamental units, much smaller in number. Efforts in this direction resulted in the "Standard Model" of particle physics.

The standard model is based on the Quark Theory, according to which all hadrons are composites of quarks and anti-quarks. As of now there are 18 quarks which come in 6 flavours (termed up (u), down (d) strange (s), charm (c), bottom (b) and top (t) and three colours (red, green and blue). All the quarks have fractional charges $\frac{1}{3}e$ or $\frac{2}{3}e$ and fractional baryon number 1/3. The proton for example is made of u, u and d and the neutron of u, d and d and the strange hyperon $\wedge$ of u, d, and s. The mesons are combinations of quarks and antiquarks. Only those colour combinations that result in "no colour" for the particle are allowed. Thus the three quarks in the proton or neutron have to be red, green and blue type. The quarks are permanently trapped in the particles with the consequence that there can be no "free quarks" which can be detected directly in any experiment. The quarks are held together inside the particles by Gluons. The force becomes stronger when the separation of the quarks is large and becomes zero when they come together. The gluons have colour combinations like red-blue, blue-green etc,. and have the property of transforming the colour characteristics of the quarks. For example a red quark turns into a blue one with the virtual emission of red-blue gluon, which may be absorbed by a blue quark and turn it into a red one. The quark-quark forces have a special feature very different from the gravitational and electromagnetic forces. Thus the different combinations of quarks and their interactions by exchange of gluons lead to the hundreds of hadrons observed. The quark-quark forces have a special feature very different from the gravitational and electromagnetic forces.

It is important to note that the Leptons (the electron positron, positive and negative Mu-mesons, the τ^- and all the corresponding neutrinos (υ_e, υ_μ, υ_τ, $\bar{\upsilon}_e$, $\bar{\upsilon}_\mu$, $\bar{\upsilon}_\tau$) are not made of quarks. They are point particles without any structure.

The intermediate vector bosons and the protons are also to be classified as gluons. Exchange of these particles is responsible for weak interactions and the spontaneous decay of all lthe unstable particles. For example in the spontaneous decay of the neutron, the gluon W changes a down quark (d) into an up-quark (u) thus transforming the neutron into a proton and the W decays into e and anti electron neutrino. Exchange of photon results in electromagnetic interaction. What is disturbing about the standard model is the large number of particles (quarks and antiquarks 12, leptons and anti-leptons 36, gluons 12 including the $W^{\pm}$, Z^o and the photon) adding up to 60. In addition, one more particle which is not discovered yet, the Higgson responsible for masses of the particles should also be there. That makes it 61.

According to quantum theory, these particles are all quanta of corresponding fields, one field for each particle. A serious drawback of the standard model has been the non- discovery yet of the top quark and the Higgson. (Very recently, some evidence for a top quark in the mass range of ~ 170 Gev has been presented by the CDF collaboration at the Fermi lab). Another important ingredient of the model is the τ-neutrino for which there is no direct experimental evidence yet.

The standard model has 21 parameters as input from experiment and it does not include gravity and principles of general theory of relativity. While the electro-weak unification has been incorporated, the unification of the strong field has not been done. In an extension of the standard model, in the Grand Unification theory (GUT), 12 additional gluons have been considered in addition to 12 discused above and these have enormously large masses in the region of 10^{15} Gev. An important prediction of this GUT model was the decay of the proton. This however, despite considerable experimentation, has not been seen. The theorists have gone beyond and proposed models which go by the names of supersymmetry, supergravity, string theory and so on which require discovery of a very larger number of particles perhaps all in the mass range beyond that of present day accelerators.

Particle Physics and Astronomy:

The fields of astronomy, astrophysics and cosmology have advanced considerably in the past 100 years. The knowledge gained in the field of elementary particles and their interactions has played a key role in this advancement. For example we are getting to know much more about the physical processes in the interior of the sun through the detection and analysis of the "solar neutrinos". Many aspects of stellar explosions - the supernova explosions as they are called become clear through the detection of the neutrinos, x-rays, γ-rays from the 1987 - a Supernova that exploded in the Large Megellanic cloud. It is the large scale interactions of high energy particles and electric and magnetic fields that dominate the most interesting stellar objects - the quasars; the neutron stars and the black holes.

What is most exciting is the connection between elementary particles and the happenings in the first moments of the universe in the Big Bang scenario, constructed on the basis of the observed expansion of the universe and the 3 microwave radiation.

The "very early universe" is the best accelerator laboratory that one could think where every type of particle that has been seen at man made accelerators are supposed to have been produced at different stages. More than that even those particles like the heavy gauge bosons that were invoked in the grand unification theories and led to prediction of proton decay, could have been produced and influenced the course of evolution of the universe. Some of the challenging problems of astrophysics like dominance of matter over antimattter and of radiation over matter found simple explanations in such a scenario.

Elementary Particles and Philosophy of Science:

Yet another influence of the developments in the field of elementary particle physics has been on the Philosophy of Science. The studies on the production and interactions of elementary particles support the radically different notions of space, time and matter that have emerged from the applications of the special theory of relativity and quantum mechanics.

As an illustration of the impact on philosophy, let us consider just one concept - the Quantum Mechanical Vacuum - the empty space that is in between everything and that pervades everything big and small. Quantum Field Theory makes us abandon the distinction between material particles and vacuum or void. The vacuum is nothing other than the quantum mechanical fields and the particles are the quanta of these fields. There is continuous spontaneous creation of pairs of particles and anti-particles and their annihilations. The duration of these virtual creations is dictated by the Heisenberg's principle of uncertainty - the larger the energy of the particle, the smaller the duration. Real particles are created when there is input of sufficient energy from outside like in nuclear collisions. Virtual creations due to spontaneous fluctuations can lead to real particle creations when the curvature of space is high as at the time of the Big Bang. According to some of the more recent theories like the superstring theory, the universe began as a ten dimensional universe with six of them compactified immediately leaving behind the four dimensions (3 space + 1 time) we are familiar with. If space and time got created at the Big Bang and space expanded what about the laws of physics ? Did they also evolve ? Such questions take us to the examination of the relation between mathematics and the physical universe. Why should the universe obey mathematical laws if mathematics is only a creation of the human mind ? Elementary particle physics theory has depended on mathematics more than any other area of physics or science. The intertwining of physics, mathematics, the universe and reality remains intriguing and mysterious.

The Future:

The way the field of particle physics has progressed in the last hundred years is instructive. During the first 50 years when discoveries were made with Cosmic rays, it is the experimentalists who dominated. They went about in an open- ended way and discovered particle after particle and the interaction properties of these. The theorists tried to bring all the findings into a certain framework. While this trend continued in the early years of accelerator based searches, soon the field was taken over by theorists who started telling the experimentalists what types of particles and interactions they should look for. The experimentalists started designing experiments from these specific points of view. While this has no doubt resulted in remarkable sucesses and has been most satisfying particularly to the theorists, one wonders whether this is a too straight jacketed way of looking at nature and whether in this process one has missed out some essential and vital aspects of nature. Ofcourse this approach on the part of the experimentalists is partly connected with the difficulties in the design of general purpose experiments at high energies where the fluxes are low and the backgrounds are high and the collimation of produced particles pose serious problems. Perhaps over the next hundred years the particle physics that is being planned to be pursued away from accelerators also may bring a rich harvest.

Despite the stunning successes of the present theories and models, since there are still too many arbitrary parameters in them, it may be very worthwhile to examine the entire gold mine of particle physics data from new perspectives, unprejudiced by the existing theories. That was the approach taken by the great pioneers of the early part of this centurry. May be such an approach is called for again.

The Indian contribution to the field of elementary particle physics has been substantial and significant. The pioneering works of S N Bose on photon statistics, which later came to be known as Bose-Einstein Statics, and of Homi Bhabha on cascade theory and algebras of elementary particles were followed by theoretical contributions on a variety of aspects of elementary particles by scientists in the Universities and Research Institutions all over the country.

Experimental Cosmic Ray research began in a major way in the late 40's and continued as such for several decades making use of the special and unique advantages of the equatorial latitudes for statospheric balloon flights

and the deep underground levels in the Kolar Gold Mines. While India has not been lucky to have had a high energy accelerator of its own, the opportunities made available at the accelerators like the CERN, the FERMILAB, the SERPUKOV have been made use of in participating in large scale international collaborative experiments. In recent decades, particle physics away from accelerators and astroparticle physics have emerged as new areas of great promise and substantial Indian effort has gone in this direction too.

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HOW SAFE IS OUR FOOD?

P.K. SHETTY

Bangalore is commonly referred to as the Garden City of India. It is also one of the fastest growing cities in the Asian continent. Bangalore is situated in 12°57 north latitude and 77°35 east longitude with an elevation of 3,000 feet above sea level. Bangalore has a congenial climate for cultivation of a variety of agricultural crops and the city also houses several national and international business establishments.

The farmers in Bangalore district have taken up intensive cultivation of vegetables and horticultural crops. These farm products are in high demand in the local market as well as in other metropolitan areas. During 1990-91, vegetables alone grown in an area of 13032 hectares that accounted for an output of 2.1 lakh tons.

Pesticides are widely used in Bangalore to protect the agricultural crops from pests and diseases. During 1992-93, the farmland in Bangalore has been treated with approximately 172 tons of technical grades of pesticides. While a liberal use of chemical pesticides might bring higher returns, their impact on the farm products are looked at with suspicion because of possible presence of toxic residues. Some of the pesticides that are commonly used in Bangalore include Monocrotophos, Endosulfan, Atrazine, Dimethoate, Malathion, Methylparathion, Quinolphos, DDT, BHC, Mancozeb, Corbendazim, Glyphosate, 2,4,D, Fenvalerate, Cypromethrin.

Currently there are several hundreds of different pesticide formulations available in the market, and many more are continuously added to that list. Pesticides have been toxic not only to the pests at which they are aimed, but also to other non-target organisms, including human beings. Indiscriminate and improper use of pesticides - leading to increasing concentrations as they are passed along the food chain - is a cause of concern to the general public.

Repeated surveys elsewhere in India have revealed the presence of pesticide residues in human food, fruits and vegetables, dairy products, animal feeds, breast milk and in some infant foods. Continuous exposure to pesticides results in birth defects, kidney and liver damage, skin allergies, heart diseases, nerve and eye damage and even cancer. Today, pesticide pollution is a world-wide problem; it is estimated that pesticides cause about five million cases of accidental human poisoning and approximately 40,000 deaths each year. Most of the pesticide-related accidents occur in developing countries like India.

A preliminary discussion with farmers and horticultural officers in Bangalore has revealed that most of the agricultural fields receive more than the recommended levels of chemical pesticides. Some of the farmers in rural Bangalore immerse fresh vegetables in concentrated solution of systemic fungicides to preserve the quality of produce before it reaches the market.

It is extremely important to monitor the concentration of pesticide residues in soil, water, agroproducts and in food samples in and around Bangalore. Regular market surveys will help us to know the build-up of toxins in the food commodities. It will be interesting and informative to organize a study to correlate the pattern of health problems with corresponding usage of pesticides and also to use bioremediation techniques to decontaminate the pesticide contaminated soils.

*(**Dr. P.K. Shetty** is a Research Fellow of NIAS)*

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MEDIA INVASION OF THE INDIAN PSYCHE

BISWAJIT SEN

Last year, the mother of a 2 year old related to me that the child, when happy, occasionally breaks out into "DHAK DHAK KARNE LAGA", the apparently "heart-stopping" number enacted by a well-known actress from Bollywood. Last week, a friend of mine said that when his 8 year old son heard that his father was familiar with the WWF playing cards, he was delighted and immediately broke out into a dance complemented by the song "TU CHEEZ BARI HAI MAST MAST", from a film which was officially released only months later.

These incidents can be intepreted in various ways. They show, for example, that the children are happy & healthy. From personal knowledge I know that both the children are being brought up with love, care and

affection. Both sets of parents are persons of honesty & integrity. So is there anything significant or sinister in these events? Are these not examples of perfectly normal behaviour? To address these issues we will need to understand, briefly, certain aspects of the psychological development of the child and youth.

Cognitive development:

The word "cognition" is defined in the dictionary as "knowing or perceiving or conceiving". Psychologists tend to use the term to denote THINKING faculties of the mind as distinguished from the FEELING or affective faculties. The pioneer in understanding the cognitive development is held to be Jean Piaget (1896-1980), the famous Swiss psychologist. From direct observation of children (mostly his own) he came to the following conclusions. I will discuss some of his major findings supplemented with more current ones in the context of media invasion.

Between the 3rd and 7th year, the child is *egocentric*, quite prepared to believe that the sun follows him by the day and moon by the night. He (more observations are available on males than females) is the centre of the universe. He finds it difficult to accept that all his demands cannot be instantly met. He is *animistic*, and can be made to believe that all things have life, fairies, ghosts and Santa Claus are all out there somewhere. His reasoning is *precausal* - when you pour water from a small glass of large diameter to a tall glass of small diameter, the second glass contains MORE because the water level is higher.

The most significant aspect of this period is that the child learns his value systems by a strong process of conditioning which becomes difficult to shed later, though this can and does happen. His cultural orientation is also almost defined at the end of the period. For example, if he repeatedly hears from his parents and others that Muslims (or Hindus) are evil it will be a herculean task for him to reverse this belief later in spite of evidence to the contrary. If he continuously gets the message that the father is an important figure but his mother is not, that he is but his sister is not, the consequences of that message is what we see anywhere around us. Repeated viewing of women shown as objects of male lust in the screen strengthens, in a male, the feeling of disrespect for women. The female child grows up with a negative image of herself as a consequence.

The average child finds it difficult to think in the abstract before the age of 11 or 12. For example, it is not enough to tell him about the virtues of being moral. It is necessary to relate to him real life stories of people who actually practise these virtues. Better still, his parents and elders should set an example, for the sake of the child, if not for anything else. Folk tales and epics are also great sources of inspiration for the child during this period. So would have been cinema and television if it were not for the fact that it is vice rather than virtue that is glamourised. What message, for example, does the infamous "Sexy Sexy" number - enacted by a teenager - carry to a child of 12?

Moral Development

Perhaps it is a sad commentary on the state of our society as a whole that the development of morality is usually taken for granted by parents, teachers and scholars or worse, not thought to be important in the interest of being "pragmatic" as against "idealistc".

According to child psychologist Jerome Kagan of Harvard University, children become aware of standards (improper or bad versus proper or good) as early as the end of their second year. The implication of this observation is profound because it suggests that morality has a biological root, in addition to the socio-cultural. In turn, this conclusion gives us the hope that "immorality" (e.g. corruption, our national vice) is reversible because we are biologically groomed to act morally than otherwise.

During the years just before puberty - according to Kagan another standard emerges. This is the child's ability to judge consistency between beliefs and actions. Thus, when the child learns from her parents that violence is bad and from her experience that sexual desires should be controlled, and is then bombarded by television, cinema and magazines (the magazine DEBONAIR for example) declaring that the reverse appears to be true, she can easily face a moral crisis. The consequences of that crisis can be far-reaching and occasionally, damaging.

"By the fourth year, children have an unconscious appreciation of some of their psychological qualities, and an identification with the belief that some of the distinctive qualities of another person belong to the self". This leads to identification with role models (usually parents, siblings and teachers) who appear to have desirable characteristics - "like nurturance, kindness, competence and power". Usually, that model's standards are adopted (the direct opposite may also happen if the child is emotionally disturbed). What are the role models we have in India today? Confused parents, glamorous film heroes who get away with murder (fortunately only on screen, but that is bad enough), and a media blitz which ruthlessly advocate a hedonistic and consumerist approach. Some of these are dangerous, like the motor cycle ads which strongly signal that speed is "macho" and hence desirable. The effect is that the average daily death rate from two-wheeler accidents is 2 in Delhi and Bangalore. Most of the deceased are teenagers. Who is to

blame? This directly addresses the question of the psychology of teenagers.

Psychology of Youth:

Erik Erikson (1902-1994) had been known as America's most influential living psychiologist till his death very recently. To quote a pscyhiatrist "he can be regarded as one of the most influential psychoanalysts in the world". He is the originator of the world "identity crisis" which stemmed from his observation of youth. His seminal contributions on the development of youth are yet to be contradicted. I will attempt only a bare outline of some of his conclusions and simultaneously to relate these to the current context.

Erikson believes that a healthy child grows into adolescence with two cardinal emotions, HOPE and FIDELITY. This means that the teenager is likely to react strongly when faced with frustration (i.e. hopes dashed). They will also respond with intense loyalty (fidelity) to a concept, image, ideology, or to a "person, place or thing", whatever happens to fire the adolescent imagination. The consequences of media explosion on the early teenage mind can, therefore, be disastrous. Extreme violence may appear extremely attractive (soon I will provide another Eriksonian observation to emphasise this) and desirable because of the "macho" image the silver screen heroes project. To give even a neutral example, why do you think karate coaching has mushroomed all over urban India in the last decade? Could it be related to the unbelievable violence on the big and small screen? In the early 1970's ARADHANA - a tragic romance - became so popular that the youth of those days still hum the tunes in their middle age. In the early 1990's, it is BAAZIGAR and DARR which provoke the same fire. In both films the central character is a psychopath who commits a series of murders in the former and who inflicts unimaginable horror on a woman he desires to marry in the latter. In both films, he manages to retain the sympathy of the audience. What does one conclude?

Erikson has made two other profound observations about youth. They have tremenous ENERGY and ENTHUSIASM on the one had and crave CHANGE, on the other. These two characteristics, combined with hope and fidelity can be channelised to produce the highest levels of creativity of a Tagore, Uday Shankar or Ramanujam. What we are seeing, in India today, though, are these very characteristics being twisted and combined to produce the destruction of the Babri Masjid coupled with hopes of a "Ram Rajya". I am not holding the media directly responsible for the destruction of the Babri mosque. I am suggesting though, that the television serial RAMAYAN (and MAHABHARAT) coupled with violence glorified and elevated to a heroic level in cinema cannot but be contributory to that destruction.

Research has shown that in children raptly their favourite TV programmes show a drop in, their metabolic rate, into a trance-like state. The result can roughly be compared to that of a post- hypnotic suggestion. One or several strong messages go straight into the unconscious mind through the conscious. The ultimate effect is that the child (or youngester) may not even be aware of the strength or nature of the message (sexual or aggressive, Western versus Indian) he or she has imbibed. Certain value systems are picked up and internalised with the conviction that it HAS TO BE TRUE. It is thus possible to argue that the Eriksonian identity crisis of our nation is, in part, from the media. It is also possible to argue that as the "media-blitzed" child of today grows to be the father of tomorrow, the crisis can only increase in intensity.

The future in the light of the present

Where does one go from here? The first question that comes to mind is that in the midst of all the confusion and despair, is there any room for hepe? The answer should be a cautious yes. Even amidst the plethora of mindless consumerism there appear to be socially conscious (and perhaps responsible) filmmakers and admakers who try to deliver a positive message. The current Raymond's ad, for example, with its emphasis on the young boy, nature and environment impresses me most. There are many young (and some old) filmmakers who keep coming up with first-rate video and film documentaries and features which explore the Indian psyche and ask uncomfortable, but socially relevant and necessary questions. There is evidence that their number is slowly increasing. Whether there impact will be significant enough to make history is difficult to say. One can only wait with bated breath.

It is always hazardous and perhaps immature to make predictions for the future. But if such predictions are positive with regard to humankind, this risk may be taken particularly because predictions of impending disaster are all too frequent. I wish to conclude this article with two such predictions, one short-term and the other long-term.

For the short-term prediction I go back to Jerome Kagan. He has theorised that there are universal moral standards which are set during childhood (perhaps continuing into adolescence) by the desire to defend oneself from unpleasant emotions. One of them is "the feeling and/or ennui following repeated gratifications of a desire". Let us explore this statement a little further. What our youngsters (and, of course, adults) are doing today are OPENLY gratifying repeatedly what are called the "baser" instincts at the cost of moral values. If Kagan is right, then "fatigue/ennui" should set in sooner or later. Note here that I am speculating that Kagan's theories on the moral development of the child could be extended well into young adulthood. Again from personal experience I venture to state that there are signs of such a thing

happening all over the country. There are many college-going youth who are sick of our "sick" society. They are already thinking in terms of entering the social arena to work with street children, slum- dwellers and women's issues. They are also confident that success can be achieved. Hence, I hazard the prediction that positive social change is already occuring and will increase in intensity. Will the media give them a chance by focusing the spotlight on them at least occasionally?

For the second prediction I borrow from the ideas of Prof Ravi Kapur, Deputy Director of the National Institute of Advanced Studies in Bangalore. Prof. Kapur is among the most influential psychiatrists in the country. In a paper presented more than a decade ago, he had predicted "The emergence of the new man". Briefly, he suggested HOMO SAPIENS are still evolving. The "baser" and the more powerful instincts of today will be matched in strength by moral values (which are relatively weaker today) in future. Prof. Kapur suggests that there are signs this has been happening for some time. Buddha, Christ, Aurobindo, Ramakrishna and Gandhi are biologically as human as we are. Perhaps, Jayaprakash Narayan and Vinoba Bhave can also be added to the list. In terms of evolution, however, they do not compare with ordinary mortals. A moral fibre of steel seems to have guided them through then life. The last three were powerful enough to rock the conscience of the nation. At least two of them continue to do so. Hence, the second long-term prediction: provided humankind does not self-destruct in a nuclear (or biological) holocaust, "the new man" will take over in the future. Plato's "philosopher kings" will exert sufficient power to guide the nation's destiny.

But can we afford to wait for Darwinian evolution to take its slow and tortuous course and risk an adolescent nation like ours to commit suicide? This is the question which readers must ponder. Adolescence, as you know, is a period of great emotional turbulence, of heights of hope and depths of despair. The adolescent requires careful nurture to grow into a mature adult. Will the media contribute to such nurture?

(Dr Biswajit Sen is a fellow of NIAS)

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RECENT DEVELOPMENT IN CONSCIOUSNESS STUDIES

In continuation of an earlier article entitled "An Integrated Approach to Consciousness" which appeared in NIAS NEWS of July 1993, Prof. Sreekantan would like to update the readers of NIAS NEWS with some recent developments in the field of Conscousness Studies. A large number of new books have appeared some of which are available in India: "Consciousness Explained" by Danniel Dennet, "Bright Air, Bright Fire" by G.E Eldeman, "The Astonishing Hypothesis" by Francis Crick, "The Elemental Mind" by Nick Herbert, "The Rediscovery of the Mind" by John Searle, "The Self-Aware Universe" by Amit Goswami, "The Shadows of the Mind" by Roger Penrose.

The views continue to be diverse. But a growing number of scientists are coming to the conclusion that despite the subjective aspects of consciousness it could be made into a legitimate subject for scientific study. This realisation has come about because of the progress that has been made in probing the deep recesses of the brain and the neuronal network making use of micro electrodes that can record happenings in individual neurons, nuclear magnetic resonance imaging and positron emission tomography techniques that provide three dimensional spatial resolution. The current status and outlook is well summarised by John Horgan in an article in Scientific American of July 1994, which is based on the presentations and discussions that took place at a conference on "Towards Scientific Basis for Consciousness" at Arizona University in April 1994 attended by more than 300 investigators among whom were in addition to the mainstream neuroscientists, philosophers, computer scientists and psychiatrists. While Crick takes the extreme materialistic view "Your joys, your sorrows, your memories and your ambitions, your sense of personal identity and freewill, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules", Brian Josephson another Nobel Laureate in Physics, calls for a unified theory that takes into account the mystical and psychical experiences. Andrew T. Weil of the University of Arizona, who is considered an authority on psychedelia emphasises the need for being able to explain phenomena such as the *identical* hallucinatioins that are experienced by American Indians when they consume certain psychedelic drugs.

The necessity of a quantum mechanical approach to brain processes has been stressed by Roger Penrose. In this context, a recent experiment reported by the Southompton University Group is highly suggestive and may lead to a chain of further experiments on similar or improved lines. In this experiment, it is claimed that the act of recording brain waves by an EEG influences the decision making process involved in recognizing the right set of numbers among many others flashed randomly in front of the subject under study. The act of recognition may be some kind of a quantum mechanical process requiring the collapse of an associated wave function. Such is the interpretation given by Dr. Chris Nunn, a psychiatrist involved in the study. There is no other known neural mechanism that can explain the observation.

L Bass, an Australian physicist and Fred Alan Wolf of USA have independently observed that for intelligence to operate, the simultaneous firing of neurons separated by several centimeters is essential. Such coherent firings over long distances find a more natural explanation in terms of quantum mechanics rather than in classical terms. Clearly in the coming years we can hope to have much greater insights into the mechanisms operating in the realm of consciousness.

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"SOME REFLECTIONS ON A.K. RAMANUJAN" (1929-1993)

SACHIDANANDA MOHANTY

My first meaningful contact with modern Indian English Poetry was through A. K. Ramanujan. The figures in our poetry pantheon then were few: Adil Jussawala, Keki Daruwala, Dom Moraes, R. Parthasarathy, Jayanta Mahapatra, Arun Kolatkar and of course Ramanujan. You could count them on your fingertips. Both students and teachers tended to approach the subject with an air of apology. "Should Indians write poetry in Engish?" was a question we learned to anticipate in all our exams and attempt with a vengeance.

Times have changed! Indian English Poetry has come of age. It will be hard for readers today to pick their favourites. The sheer number is so daunting !

Classics and celebrity poets have their use of course. They can be admired-safely from a distance. The young, both in life and letters, however, make an appeal the old can seldom match. Their boldness and iconocalsm, their constant search for new voices are after all what lend excitement to youth.

Ramanujan was special. It's hard to fit him into any category-traditional or modern. He began his pioneering work in ethnic writing, regional literature, folklore and culture. The fruits of these efforts have been harvested by the academia only recently. That way Ramanujan was far ahead of his times.

Born in Mysore in 1929, A.K. Ramanujan left behind an impressive crop of work. *The striders* (1966), a Poetry Society Recommendation, *Hokkulallai Huvilla* (1969), *Relations* (1971), *Mattu Itara Padyagalu* (1977), *The Interior Landscape* (1967), *Speaking of Shiva* (1972), *Samskara* (1977), a translation of UR Ananthmurthy's celebrated novel, *Mattobbana Atmakate* (1979), *Second Sight* (1986), *Kunto Bille* (1990) and of course the most recent *Folk Tales from India.*

Impeccable use of imagery, a flawless dexterity with language are what normally come to mind when we think of Ramanujan's poetry. The poems, many of whom are family life cameos enter thorough what a critic aptly called "a personal continuum of time where events swing backwards and forwards, from place to place and from childhood to age."

An ironic detachment, a constant recapitulation of the past through the prism of memory and the ability to harness at once the resources of many disciplines are what lend strength to this poetry. Of his work, Ramanujan once said:

> English and my disciplines (linguistics, anthropology) give me my "outer forms" - linguistic metrical, logical and other such ways of shaping experience; and my first thirty years in India, my frequent visits and field trips, my personal and professional preoccupations with Kannada, Tamil, the classics and folklore give me my substance, my "inner" forms, images and symbols. They are continuous with each other and I no longer can tell what comes from where.

The location of the persona is of crucial importance in Ramanujan's poetry. It was in Chicago University as the Professor in the Department of South Asian languages and civilisations that he spent much of his life. Many poems, therefore, embody a native experience sharpened by the expartriate sensibility. They exhibit a meticulous structure and an extraordinary sharpness of focus. Images like "breaded fish", "a river" and "snakes" enable the poet to evoke and image at once detached and sympathetic:

> A basketful of ritual cobras comes into the tame little house, their brown-wheat glisten ringed with ripples. They like the room with their bodies, curves uncurling, writing a sibilant alphabet of panic on my floor. Mother gives them milk.

Similarly, the poem "Conventions of Despair" employs a conversational tone and a dramatic opening. Caught between two cultures, the persona examines traditional strategies for coping with despair. Strategies like "big game hunting, "becoming a marginal man" and "an outsider" are considered and given up in favour of a more native experience, possibly a more fundamental kind of despair:

> But sorry. I cannot unlearn
> Conventions of despair
> They have their pride
> I must seek and will find
> my particular hell only in my hind mind.

Likewise, in "Love Poem for Wife I," conjugal love is shown bereft of closeness and meaning. The only thing common between the persona and his wife is the unshared childhood. Various places like Chicago, Aleppy and Kuwait are evoked to suggest modern rootlessness.

The search for self-definition is insistent and nagging and is brilliantly expressed in a short poem called "Self-Portrait":

I resemble everyone
but myself and sometimes see
in shop windows
despite the well known lens
of optics
the portrait of a stranger
date unknown
often signed in a corner
by my father.

Ramanujan's expatriate experience is often ominous than benign. The poem "Take Care," for instance, encapsulates the sense of fear, anxiety and the unknown associated with the metropolis, constantly mediated by a covert humour and a clever word play :

Think of the stink
bomb in the barber's
chair. Expect the knife on the
museum stair.
When you are there
take special care
not to stare
    at peppergrinders,
    salt shakers, or the box
    of matches on the black
    and white squares
of your kitchen cloth.
They take on the look
of meat grinders
    cement shakers,
    boxes against boxes
    in the grilled
    city: intersections
of wet black splinter

A. K. Ramanujan will be sorely missed. His position in the field is sure to remain secure regardless of any change in poetic taste, now or in future. Working and living on the other side of the Atlantic for many years, Ramanujan had come to symbolise for the discerning literati, here as well as abroad, the best of the Indian English Poetry and the richness of India's indigenous pluralistic tradition.

(Prof. Sachidananda Mohanty was a participant of the first NIAS Course for University/College Teachers)

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A TREE PLANTATION PROGRAMME AT NIAS

There is a concerted effort to make NIAS as green as possible within a short period of time. This effort got a further boost when a tree plantation programme was arranged on 23.08.94 in the premises of NIAS. This programme was arranged to commemorate the *"INTERNATIONAL CONSULTATION ON BIOLOGICAL DIVERSITY (SAARC ASEAN AND OTHER REGIONAL COUNTRIES)"*

The foreign delegates who attended this International Consultation and also participated in the tree plantation programme hailed from Afghanistan, Bangladesh, Bhutan, Japan, Maldives, Malaysia, Myanmar, Philippines, Thailand and Vietnam.

Others who participated in the programme are Mr H. Jedan from UNEP, Mr R Rajamani, Secy, Ministry of Environment & Forest, Government of India, Dr Raja Ramanna, Director, NIAS and Mr S Parameshwarappa, Principal Chief Conservator of Forests, and other Senior Officers from the Department of Environment and Forest, Government of Karnataka.

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SUMMARY OF LECTURES ON WESTERN PHILOSOPHY

SUNDAR SARUKKAI

An introduction to Western Philosophy in six lectures can just be a postscript to the immense volume of work in this field. To perhaps reflect this, the talks began with Heidegger's important essay called the 'Question Concerning Technology'. Heidegger leads us to an understanding of the essence of technology as a process of revealing, as a pre-modern 'bringing-forth' and a modern 'challenging-forth'. Even as technology instills in us a will to master it, even as it loses its character when viewed as a 'mere' collection of gadgets and instruments, it draws us into an ontological realm of our forgetting Being. Heidegger's urgent summons to us then, is not to view technology, this collection of odds and ends, as dangerous but to understand the enfarming essence of modern technology (understood as a product of modern science) as inimical to opening ourselves into the question of our Being.

Discussion of Heidegger's seminal book - Being and Time - was a natural extension to the first talk. Through this monumental work we learn the forgotten way to think, to focus philosophy back to 'fundamental' questions lost in the traditions of Western philosophy, to

reflect again on metaphysics, this time with a difference. Heidegger's point of enquiry on the 'isness' of existence, on the meaning of this 'isness' implicit in statements of Being, opens with the fundamental role that everyday life plays in a philosophy. Heidegger's focus on Dasein, the being who questions Being, brings philosophy back to us as everyday 'talk' and concerns. To live, to know, to interact all become problems as they propel us into 'inauthentic' modes of existence. Finally, Being confronts temporality - Being is Time, generating through this existential query a different formulation of the ecstasis of time. The primacy of the present yielding way to the primacy of the future.

Continuing in this reverse approach to the growth of Western philosophy, and acknowledging the importance of Husserl's influence on the phenomenologists and existentialists, and also as a way to bridge immediate points of contact between Eastern and Western philosophy, the third lecture dealt with Husserlian phenomenology. The difficulty of understanding consciousness played out via Husserl's method and part of the talk focussed on a comparison of the status of consciousness in Indian philosophy and Western phenomenology.

Even a casual saunter through Western philosophy has to pass through the arch of Kantian categories and the fourth lecture focussed on Kant and primarily his epistemology. The categories of human understanding were developed and critiqued and the impact of this theoretical structure discussed. A general preliminary to a philosophy of science was situated in this context.

The last two lectures summarized the previous discussions, first emphasizing on the philosophy of language beginning from Saussure's linguistics and Peircian semiotics. Philosophy of language has become one of the most fundamental ways of understanding the co-constitutive nature of language within ourselves.

The final talk concluded with a summary of the works of Popper, Kuhn, Feyerabend and Lyotard. The gradual shift in the nature of understanding situated within a sociology of science was developed and finally critiqued with help of a postmodern approach, where scientific and narrative knowledge systems were contrasted in some detail. This continued struggle for primacy in knowledge systems is bound to be a dominant one in current research. As continued and articulate discussions showed, this subject is open to many interpretations and deeper study.

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WORKSHOP ON QUALITATIVE METHODS IN RESEARCH

Workshop on **"Qualitative Methods in Research"** will be held from **10 to 12 April, 1995** at the National Institute of Advanced Studies with the support of International Development Research Centre (IDRC). The participants will be drawn from India, Srilanka, Bangladesh and Nepal.

Prof. R.L. Kapur, Deputy Director, National Institute of Advanced Studies, is organising the workshop. The international faculty includes amongst others: **Prof. M.N. Srinivas**, Chairman, Institute for Social and Economic Change, Bangalore, and also Visiting Professor, National Institute of Advanced Studies; **Prof. Veena Das**, Professor of Sociology, Delhi School of Economics, University of Delhi; **Prof. Arthur Kleinman**, Professor of Medical Anthropology & Chairman, Department of Social Medicine and Professor of Psychiatry, Harvard Medical School, and Professor, Department of Anthropology, Harvard University, U.S.A.; **Dr. Mitchell Weiss**, Culture, Community, and Health Studies, University of Toronto, Canada; **Dr. Gilles Bibeau**, Ottawa, Canada; **Dr. Helmut L Sell**, Regional Adviser on Health & Behaviour, WHO-SEARO.

The workshop is intended primarily for researchers in Mental Health disciplines (psychiatry, clinical psychology and psychiatric social work) and also for researchers in non- governmental organisations who are collecting data related to mental health. While M.D./Ph.D./post doctoral students in the mental health disciplines get a fair amount of training in survey methods and other quantitative research techniques, they have little training in the field of qualitative research. At the same time there is a substantial increase in research projects which depend on qualitative information: e.g. phenomenology of psychiatric disorder, relationship of familial and cultural factors to the aetiology and prognosis of psychiatric illness, evaluation of psychotherapeutic techniques, etc. These young researchers are not familiar with the standard and newly emerging anthropological techniques which can enhance the quality of information. Most importantly even when the qualitative data has been gathered reasonably well, the researcher often does not know how to analyse it, causing loss of valuable information. The workshop will acquaint the participants with the methods of collecting and analysing qualitative information.

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LECTURES/PUBLICATIONS/ADDRESSES /PRESENATATIONS/SYMPOSIUMS BY FACULTY MEMBERS

(1st July 1994 to 31st December 1994)

DR. RAJA RAMANNA, DIRECTOR

Lectures:

1. July 19, 1994 - Delivered Lecture on "Science Applications and Technology" at the Defence Staff Services College, Wellington, Ooty

2. July 28, 1994 - Delivered Lecture on the "Sub-division of the Atom" to the participants of the Second NIAS Teachers' Course organised by the National Institute of Advanced Studies, Bangalore

3. August 2, 1994 - Delivered a talk on "India's Nuclear Policy" to the participants in the IFS EDP on General Management at the Indian Institute of Management, Bangalore

4. August 3, 1994 - Inauguration of the MES College Students Association activites for the year 1994-95 at MES College, Malleswaram, Bangalore

5. August 9, 1994 - Delivered Lecture "On a new look at Elementary Particles" at the ISRO Satallite Centre, Indian Space Research Organisation, Bangalore

6. August 22, 1994 - Welcome address delivered during the Inaugural Session of the Official Consultation among SAARC, ASEAN & other countires of the Region organised by the Ministry of Environment and Forests, Government of India, at the Indian Institute of Science, Bangalore

7. September 4, 1994 - Participated as the Chief Guest in the Annual Day Function of the Institute of Physics, Bhubaneswar

8. September 15&16, 1994 - Presided over the programme "Krishna in Science, History and Art" organised by International Centre for Indian Art and Cultural Studies, Bangalore.

9. September 16, 1994 - Delivered Lal C Verman Memorial Lecture on "Standardisation and Industrial Culture" organised by the Institute of Standards Engineers, Bangalore.

10. September 26, 1994 - Inaugurated the International Symposium on "Snow and related Manifestation" organised by Snow and Avalanche Study Establishment, Manali, H.P.

11. September 29, 1994 - Chief Guest at the Valedictory function of the Students Association organised by the Student Association of Bangalore Medical College, Bangalore.

12. October 7, 1994 - Presided over Prof. Brahm Prakash Memorial Materials Quiz, 1994 organised by Indian Institute of Metals, Kalpakkam Chapter at Kalpakkam

13. October 9, 1994 - Inaugurated the Seminar on "Sanskrit and Science" organised by The Kuppuswami Sastri Research Institute, Mylapore, Madras

14. November 12, 1994 - Participated in the 2-day Symposium in connection with 75th Birth Anniversary of Prof. Vikram Sarabhai organised by the Gujarat Science Academy, Ahmedabad.

15. November 16, 1994 - Inaugurated the CAD-CAM/Simulation Laboratory and First Semester Classes of academic session 1994-95 at the People's Education Society, Hanumanthanagar, Bangalore.

16. November 19, 1994 'PIANO Recital' given at The Southern Star Hotel organised by the Mysore Music Association, Mysore

17. November 22, 1994 - Participated in the Science and Technology session at the second Golden Jubilee Symposium on "People in Democracy and Development" organised by the Rajiv Gandhi Instiute for Contemporary Studies, Rajiv Gandhi Foundation, New Delhi.

18. November 29, 1994 - Delivered a talk on "Nuclear Problems of the next Century" to the participants of the conference organised by the Airforce Training Command, Bangalore

19. December 4, 1994 - Participated in the Pacer Meet organised by the BMS Engineering College, Bangalore (Seminar Hall of BMS Engg. College Campus)

20. December 12, 1994 - Piano recital at the National Centre for the Performing Arts, at the Experimental Theater, Bombay.

21. December 26, 1994 - Inauguration of the thirtyfirst Annual Convention of Indian Geophysical Union at (NGRI) Hyderabad and Prof. K.R. Ramanathan Memorial Lecuture entitled "Decay in Nuclear Systems" at NGRI, Hyderabad

PROF. R.L. KAPUR, DEPUTY DIRECTOR

Lectures:

1. August 7, 1994 - Delivered D.S. Raju Memorial Oration during XIV Annual Conference of Indian Psychiatric Society, A.P. Chapter at Hyderabad. *Topic:* Creativity in Arts and Science.

2. August 20, 1994 - Delivered a talk at the All India Institute of Medical Sciences, New Delhi. *Topic:* "Personal Dimensions of a Psychotherapist"

3. September 10, 1994 - Lecture delivered at the 4th Annual Conference of Indian Psychiatric Society - Karnataka Branch, Dept of Psychiatry, Kasturba Medical College, Manipal. *Topic:* Personal Dimensions of a Psychotherapist.

4. October 11, 1994 - Lecture delivered at Sena Bhawan, Defence Research and Development Organisation (DRDO), New Delhi. *Topic:* Alienation amongst the Indian Youth.

5. October 12, 1994 - Lecture delivered at the Defence Institute of Physiology and Allied Sciences (DIPAS), New Delhi. *Topic:* Violent Redressal of Socio-economic Problems.

6. October 15 & 16, 1994 - Delivered a Guest Lecture at the North Zone Indian Psychiatric Society Annual Conference at Patiala. *Topic:* Violence amongst the Indian Youth.

7. October 29, 1994 - Delivered a talk at the Karnataka Association of Clinical Psychologists, Bangalore. *Topic:* Creativity.

8. November 16, 1994 - Delivered a talk at Law School of India University, Bangalore. *Topic:* "Violence in India: A Psychological Perspective.

9. November 25, 1994 - Gave a lecture at the NIAS Associates' Programme in the NIAS Lecture Hall. *Topic:* "What is Psychotherapy?

10. November 26 & 27, 1994 - Participated in a national workshop on "Social and Behaviour Sciences in Medical Undergraduate Training", New Delhi. *Topic:* Psychotherapy Skills.

11. December 20, 1994 - Lecture in the series "Window-to-the- World" at the Tata Iron & Steel Co Ltd., Jamshedpur.

Publications:

1. "Yoga and the State of Mind" published in SEMINAR - March, 1994.

2. "Community Involvement in Mental Health Care", National Medical Journal of India, (New Delhi) Vol. 7, No. 6, Nov./Dec. 1994, pp. 292-4.

3. "Violence in India: A Psychological Perspective" published in Indian Journal of Psychiatry, Vol. 36, No.4, October 1994, page 163 to 169.

PROF. C.V. SUNDARAM,
HOMI BHABHA VISITING PROFESSOR

Lectures:

1. July 9, 1994 - Lecture on 'Nuclear Energy Options' in the Symposium 'Energy Options for India in the 21st Century', in the Second NIAS Course for University and College Teachers (July 1994)

2. August 5, 1994 - Lecture on 'Nuclear Energy and the Environment' in the Refresher Course for Chemistry Teachers in Engineering Colleges on 'Energy and Environment - A Chemical Perspective', Central College, Bangalore.

3. October 7, 1994 - Lecture on 'Light elements, Light Metals and Light Materials', in the Inaugural Session of the Prof. Brahm Prakash Memorial All India Materials Quiz Competition for Junior College Students, at the Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu 603 102.

4. October 27 & 28, 1994 - *TWO* Lectures on 'Energy, Materials and the Environment' and on 'Challenges and opportunities in Technical Education' under the auspices of the Indian Society for Technical Education, Karnataka Regional Engineering College, Suratkal.

5. November 21, 1994 - Lecture on 'Materials and Society', as the S.D. Thirumal Rao Memorial Lecture, under the auspices of the Oil Technological Research Institute, Anantapur.

6. November 22, 1994 - Lecture on 'Energy Options for India' under the auspices of the Physics Society, Sri Krishnadevaraya University, Ananthapur.

7. December 9, 1994 - Lecture on 'Architecture and Energy' to the Association of Practising Architects (Bangalore Chapter) at the Bangalore Club.

Paper under publication:-

1. Paper on "Development of Technologies for large scale production of Titanium and Magnesium Metals" (with R.B. Subramanyam of DMRL, Hyderabad) to be presented at the forthcoming Indian Science Congress (Calcutta, January 1995)

PROF. M.N. SRINIVAS, J.R.D. TATA VISITING PROFESSOR

Papers:

1. "Sociology in India and its Future", *Sociological Bulletin*, Vol. 43 (1), 1994

2. The Creator of Malgudi", an Essay on R.K. Narayan in *The Sunday Times of India*, June 5, 1994

Kannada

3. "Bhaktimārgada Haravu Avakāshagalu" in Bhāktipanthadalli Samajakāryada Berugalu edited by Dr. H.M. Marulasiddaiah, Bangalore, 1994

Seminars etc.

1. September 11-12, 1994 - Paper on "From Structural Adjustment to Structural Change" M.N. Srinivas and G.S. Arora, Round Table on Liberalisation and Economic Reforms at ISEC, Bangalore

2. November 12-13, 1994 - Paper on "Some Tentative Reflection on Indian 'Secularism' in a seminar on "Religion and Society" in Baroda

3. November 27-28, 1994 - Address on "Are all Ideologies Becoming Obsolescent?" in the seminar on "Is the Nation-State Withering Away?" at the Lesile Swhney Programme of Training for Democracy, Bombay, (Seminar Dedicated to the Memory of J.R.D. Tata)

4. October 15-19, 1994 - Keynote Address on "Rural India: Continuity and Change" at the Ninasam Annual Culture Course, Heggodu, Shimoga District

Award

1. Swami Pranavananda Award for 1990, for contributions to Anthropology and Sociology, by the University Grants Commission, New Delhi, November 8, 1994

Books

1. "Reminiscences of a Bangalorean" in Bangalore, Scenes from an Indian City, Gangaram and Sons, Bangalore, 1994

2. Social Change in Modern India, Orient Longman, New Delhi, 1994 (New edition, with an additional chapter).

PROF. B V SREEKANTAN DR. S. RADHAKRISHNAN VISITING PROFESSOR

Lectures:

1. July 1, 1994 - lecture on 'Early Universe' at NIAS.

2. July 15, 1994 - lecture on 'Elementary particles' at Bangalore Science Forum

3. July 21, 1994 - lecture on 'Astronomy' at NIAS

4. August 8, 1994-talk on 'Particles' at All India Radio, Bangalore

5. September 4, 1994 - lecture on 'Physics and Mind Body Interaction' at Karnataka Association of Clinical Psychologists, Bangalore

6. October 28, 1994 - lecture on 'Homi Bhabha - life and works' at Karnataka Vigyan Parishad, Bangalore

7. December 20, 1994 - lecture on 'Recent Developments in High Energy Astronomy and Astrophysics' at National Space Symposium, Trivandrum

DR. BISWAJIT SEN, FELLOW

Lectures

1. August 1994 - Lecture at the Centre for Electronic Design and Technology of Indian Institute of Science on**"Youth Psychology".**

2. September, 1994 - A series of 4 lectures for a women's group - MANGALIKA on various aspects of human psychology.

3. December, 1994 - A day's programme with teachers of engineering colleges from different parts of India on **"Understanding Indian Youth"** at IIT, Bombay.

Publications:

1. "Media Invasion of the Indian Psyche" - Published in November, 1994 in Madhyam Journal.

2. "The Psychology of Personal Transformation" - to be published.

MS SRILATHA BATLIWALA, FELLOW

Lectures:

1. September 22, 1994 - "Raising the Status of Adolescent Girls in India", at SNDT College of Home Science, Bombay

2. September 24, 1994 - Vocational Guidance talk on "Social Work as a Career" at Mallya-Aditi International School, Bangalore.

3. October 13, 1994 - "The Concept and Practice of Women's Empowerment", at Hengasara Hakkina Sangha, Bangalore.

4. November 16, 1994 "Social Construction of Gender in the Family", at United Theological College, Bangalore

Workshops/seminars

1. September 22, 1994 - Empowerment of Women Through the Courts", organised by USIS, Madras, and NLSIU, Bangalore, at Lalitha Mahal Hotel, Mysore.

Publications:

1. Book to be published by Kali for Women Press, New Delhi: "Women's Empowerment in South Asia - Concepts and Practices"

DR. P.K. SHETTY, RESEARCH FELLOW

Lectures

1. December 17, 1994 - Lecture on "Pesticide Pollution : Problems and approaches to remediation" at the Lal Bahadur Arts, Science and S.B. Solabanna Setty Commerce College, Sagar

2. December 17, 1994, Lecture on "Ecological Farming" jointly organised by the Rotary Club and Vikasana, Sagar

Publications

1. "Agriculture and the Environment - an overview". Accepted for publication in Encology.

2. 'Pesticides and the Bio-environment' in Sevavani, Bharat Electronics Publication, Vol. IX, No. 10, October, 1994.

3. "Krishi Matthu Parisara" published by Parisara Prajna Kendra, Doddaballapur, Bangalore (Kannada).

DR. SUCHITRA MOULY, RESEARCH FELLOW

Publications:

1. A paper titled "Barriers to the cohesiveness and effectiveness of public sector R&D teams in India: A qualitative Investigation", co-authored with Dr. J.K. Sankaran of Indian Institute of Science is accepted for presentation at the *International Conference on Entrepreneurship and R&D* to be held in Hyderabad between 4th and 7th January 1995. This conference is jointly organized by the Manchester Business School, UK and the Administrative Staff College of India, Hyderabad.

2 A comprehensive report titled 'An ethnographic approach to the study of R&D teams : A comparative study' is submitted to the Indian Council of Social Science Research (ICSSR) based on a study carried out by her as an ICSSR Senior Fellow between January 1993 and May 1994.

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SYMPOSIUM ON "ENERGY OPTIONS FOR INDIA IN THE 21ST CENTURY" - JULY 9, 1994

During the second integrated course for University and College Teachers, a one day Symposium on the theme **"Energy Options for India in the 21st Century"** was organised. The speakers included Prof. D.P. Sen Gupta (IISc), Prof. C.V. Sundaram (NIAS), Shri S. Shamsundar (Former Principal Chief Conservator of Forests, Bangalore), Dr. C.V. Seshadri (Shri Murugappa Chettiar Research Centre, Madras) and Dr. A. Gopalakrishnan (Atomic Energy Regulatory Board, Bombay) who respectively dealt with the topics of Indian Energy scene: Confronting the coming century, the Nuclear Energy Option, Issues related to bio-mass energy, the wind, solar and tidal energy options, and Safety, economy and environmental impact of alternative energy options. In the concluding session Shri T.R Satish Chandran (ISEC) presented an analytical summary of the proceedings.

In the present patterns of commercial energy consumption in India, industry accounts for 50.4%, transport 24.5%, the domestic sector 13.8%, agriculture 9.0% and others 2.3%. The distribution of contribution from the various primary sources of energy is; coal 58.4%, oil 27.2%, industrial gas 7.6%, lignite 3.7% hydro 2.8% and nuclear 0.3%. Installed electricity capacity in the country has grown from 1700 MW in 1950 to 79,000 MW in 1993. For an annual growth rate of 5.5% in GDP the Planning Commission has projected an installed electricity capacity of 1,67,000 MW by the year 2000. To achieve this, a capital outlay of Rs. 3,20,000 crores will be required.

With regard to non-conventional energy sources the available potential has been estimated as wind power 20,000 MW, mini and micro hydel 5000 MW, bio-mass 17,000 MW and, solar energy 5×10^5 KWh per year. The achievements so far have been in wind farms 54 MW, Mini Micro hydel 94 MW, Bio- mass 16 MW and solar photo voltaic 400 KW. The capital investment in wind farms for electricity generation has been of the order of Rs. 4 crores per MW, and the installation time of the order of 7 months.

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MEETING OF THE COUNCIL OF MANAGEMENT

The Twelth Meeting of the Council of Management of the Institute was held on November 4, 1994 at NIAS.

The meeting was attended by Dr. Raja Ramanna, Prof. C.N.R. Rao, Mr. T.R. Satish Chandran, Prof. R.L.

Kapur, Dr. V.S. Arunachalam, Prof. G. Padmanabhan, Mr. J.P. Sharma and Maj Gen MK Paul (Retd) (Secretary).

Apart from resolutions on audited statement of accounts together with auditors' report for the year 1993-'94, Director's report on the activities of the Institute and future activities were discussed.

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THOSE WHO JOINED US

During this half of the year, as we have additional new projects in hand, there has been a rise in the strength of our faculty members and staff. Those who joined us are:-

(a)	August 1, 1994	-	Dr. Sundar Sarukkai
(b)	August 16, 1994	-	Ms. Srilatha Batliwala
(c)	August 22, 1994	-	Ms. Anitha Gurumurthy
(d)	September 1, 1994	-	Mr. M.N. Sridhar
(e)	September 5, 1994	-	Ms. Gayathri N Lokhande
(f)	October 31, 1994	-	Dr. H.K. Anasuya Devi

FAREWELL

Mr. G.D. David, Executive Assistant to the Director retired on November 30, 1994 after 7 years of meritorius service in the Institute. He has been with the Institute right from its inception. His contributions to NIAS in the formative years of the Institute till his laying down of office will always be remembered by the Institute. We wish him and his family the very best.

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INFRA-STRUCTURAL BUILD-UP

The construction of the Auditorium which forms a part of the J.R.D Tata Memorial Centre, is in progress. This is likely to be ready by the end of 1995.

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THE FOUNDER'S DAY

The **FOUNDER'S DAY** was observed on July 29, 1994, the birthday of Mr J.R.D Tata. The Director, Dr Raja Ramanna briefly addressed the Faculty and other staff of NIAS and referred to the contributions made by Late Mr J.R.D Tata to the country in general and to the Institute in particular.

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VISITS ABROAD

Ms. Srilatha Batliwala, Fellow:

"From Basic Needs to Basic Rights", workshop organised by Institute for Women, Law and Development, Washington, DC, and the International Women's Rights Action Watch, Asia-Pacific, in Kuala Lampur, Malaysia, October 24 - 28, 1994.

Dr V Suchitra Mouly, Research Fellow:

University of Canterbury at Christchurch, New Zealand between 24th November and 3rd December 1994 to deliver two lectures titled "Barriers to the productivity of Indian Public Sector R&D teams" and "Organizational Ethnography" under the Faculty Recruitment Seminar series. Her trip was sponsored by the University of Canterbury, New Zealand.

Ms. Anita Gurumurthy, Research Associate (WOPRA Unit):

Training of Trainers Workshop for Implementation of CEDAW (Convention on Elimination of All forms of Discrimination Against Women), organised by International Women's Rights Action Watch, Asia-Pacific and Naripokkho, in Bangladesh, December 18-22, 1994.

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A LETTER TO THE EDITOR

NIAS gave me a serene and salubrious environment in which to pursue my research. It is an institution that is surprisingly free from bureaucratic cobwebs and political cabals. I fondly remember our daily lunch congregation: the simple yet delectable food was ingested to the accompaniment of intellectual exchanges that would have done Plato proud. NIAS is an exciting blend of ivory tower research, unconventional learning programmes and active engagement in current debates. I look forward to future opportunities for being there.

Sincerely yours,
J. MOHAN RAO

*(**Prof. J. Mohan Rao** was a Visiting Associate at NIAS (1993-'94) from the Department of Economics, University of Massachusetts at Amherst)*

The NIAS Wishes its Readers a very Happy & Prosperous NINETEEN NINETY FIVE

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