



NIAS

NEWS

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This seventh issue of the NIAS Newsletter covers the activities for the period January 1, 1995 to December 31, 1995 in general and that of the second half of Ninety Five in particular.

This year's activity has decidedly been extremely hectic. The year commenced with the 9th NIAS Course on "An Integrated Approach to Knowledge and Information" for Senior Executives from the Government, Public and Private Sectors held between January 9, 1995 and February 4, 1995. Apart from the varied curriculum two important Symposia held during the course were on "Indian Industry : New opportunities and challenges" and "Relevance of Gandhi to modern India".

This course was followed by yet another major course i.e. 3rd NIAS Course on "An Integrated Approach to Knowledge and Information" for University/College Teachers held between July 3, 1995 and July 29, 1995. As is well known, this course is co-sponsored by the University Grants Commission, Jawaharlal Nehru Centre for Advanced Scientific Research and NIAS. The Symposium held during this course was on "My Experience with Research". An interesting aspect of the course was "Student-Teacher Interaction" wherein the participants and selected students from various Colleges and Schools of Bangalore interacted with one another for a day.



The Auditorium forming part of JRD Tata Memorial Centre nearing completion

The other activities of NIAS have decidedly increased manifold as can be seen from the various reports in this issue of NIASNEWS. A few years ago, the faculty strength was hardly about half a dozen and today it has grown almost four times. Highlights of important lectures were Mr. Mark Tully's "My Life and my work", Dr. Raja Ramanna's "Security and "Philosophical Approaches to Science", Mr. Sudeep Banerjee's "Adult literacy programmes in India", Prof. B.V. Sreekantan's "Astronomy". In addition, we had interesting programmes like "Ancient Yoga and Modern Science" by Prof. T.R. Anantharaman, "US - India Collaborative Opportunities" by Dr Anand Patwardhan, "India's Energy Environment Challenge: Imperatives and Impediments" by Dr R.K. Pachauri, "Telecommunication" by Mr S Gopalakrishnan, "Technology, Economic Growth and Sustainable Development" by Dr A. Ramachandran.

During this year, in keeping with the interdisciplinary spirit of NIAS, a series of lectures on social science has been introduced to develop active interaction between humanities and physical sciences.

The Institute is preparing for the 10th NIAS Course scheduled to be held between January 8, 1996 and February 3, 1996. The response from prospective participants from all disciplines is really good. The major seminar planned during the course is on "**Communication Revolution in India**".

The work on Particle Physics has been continued by Dr Raja Ramanna, Prof. B.V. Sreekantan with the participation of Prof. A.N. Mitra and Ms Anju Sharma.

The NIAS brochure for 1996 has been published and is under distribution.

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From the Director's Desk

The National Institute of Advanced Studies has been in existence now for nearly eight years. Being on the threshold of a new century, it is necessary to reconsider our programmes so that we do not get lost in obsolescent activities in the future. The lessons we have learnt from the past few years concern the great possibilities of looking at problems not only from an over-specialised point of view, but from an overall point of view. At first, we thought that getting "hard scientists to work constructively with sociologists, historians and others like them" would be a problem. As it turned out, just the opposite has happened. The great interest shown in the methods of mathematics and the sciences by those who at the most had used it loosely as statistics and the use of modern technology to understand the meaning of the ancient writings by our Sanskritists and students of dating in history is a measure of this change. The very fact that they see the use of the computer and other support facilities by the pure scientists as a daily tool make them feel that their methods are essentially incomplete. As an example, the work in our newly-started section on Epigraphy has attracted considerable attention of our classical Archeologists. The continued support we get from the Indian Institute of Science, especially in the use of computers, is of great help in these joint programmes.

On the other side, the close interaction between pure scientists, psychologists and sociologists have widened their horizons in the search for new problems which necessitate an in-depth interaction between each other. It is remarkable how people, given the necessary facilities, do overcome their initial lack of knowledge, if given a proper atmosphere and encouragement to learn from one another.

Our participation programmes was another way of spreading knowledge gained in one field of discipline into another. I am convinced that a senior administrator can learn a lot from an industrialist or scientist and vice versa. The necessary upto-date atmosphere is what we try to create from them, so that, in the decision-making process, they do not depend only on what they learned at some early stage at school or newspapers, but from experts in the field. Otherwise, they may take wrong decisions in ignorance and if at that time they be in power, it may have disastrous consequences. This aspect of participation programmes has been well appreciated by those who have taken part in our programmes, as well as visitors to NIAS from within and abroad. Only the people in power have yet to appreciate these new approaches to decision making and the value of time in making them effective.

THE FACULTY

UNIT: HEALTH AND HUMAN BEHAVIOUR

This unit composed of Prof. R L Kapur, Dr Biswajit Sen and Ms Susmita Subramanyam are engaged in major projects

a) CREATIVITY AMONGST INDIAN SCIENTISTS:

The collection of data for the third phase of the study is almost complete and will soon be processed. In the third phase, twenty scientists appropriately selected from the senior faculty of the Indian Institute of Science were interviewed in great detail regarding:

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

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

b) A PSYCHO-SOCIAL STUDY OF ALIENATION AMONGST INDIAN YOUTH:

This DRDO project is on schedule and to end around February 1996. A preliminary report of the results of the project has already been despatched to the Government of India. The individual analysis of the interviews will be completed by December, 1995. The write-up on the final report will be completed during January and February, 1996.

c) Arising out of the work done on 'Creativity amongst Indian Scientists', a personalised investigation of Indian Scientists is currently in progress. In this study, twenty scientists from the Indian Institute of Science will be examined in detail through interviews and psychological tests. The proposal has been prepared by Ms. Susmita Subramanyam, who under the guidance of Prof. Kapur, will be working on this project towards her Ph.D.

FUTURE ACTIVITIES OF THE UNIT:

1. A proposal for holding a National Seminar on "The Impact of Media Violence" has been mooted. A variety of scholars and eminent people concerned with this issue will be invited from across the country. This seminar will be held either at Bombay or Delhi. The exact date has not yet been finalised.

2. A National Conference on "Violence" is proposed to be held some time next year. In this conference scholars from different disciplines will

be invited to share their thoughts on this increasingly rampant phenomena in the country.

3. A seminar course on "Psychology and law" has been planned at the National Law School of India University in March, 1996.

4. A research proposal has been submitted to the MacArthur fellowship for "A study of sexuality" in urban Indian women.

5. A research project is being planned to examine the psychological characteristics of the young people who have volunteered to make the National Literacy Mission (NLM) a success.

UNIT: PHILOSOPHY OF SCIENCE

This unit is constituted by Dr. Raja Ramanna, Prof. B.V Sreekantan, Prof. R.L. Kapur, Dr Sundar Sarukkai and Dr. M.G. Narasimhan.

Work continues in the study of Consciousness, Epistemology, Philosophy of Mathematics, History and Philosophy of Biology.

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

The primary aims of WOPRA unit are to conduct a study of the status of women in Karnataka State, and to engage in advocacy activities for the upliftment of women.

Study of the Status of Women in Karnataka

Over the past one year, the project staff have tapped a wide range of sources for secondary data on women's status in the state, including major institutions, libraries and documentation centres, the census bureau, and government departments. A mass of secondary data has been collected and analysed, and three draft reports have been prepared on health status, work and employment, and education status. Papers on political status, and status of the girl child are under preparation.

The team is now ready to begin primary data collection, which will be carried out in approximately 10 districts of the state, in collaboration with local voluntary organisations. It is proposed to cover approximately 2000 women and 2000 men, through a purposive sampling approach in each district/project area. A questionnaire has been prepared, pre-tested and refined in consultation with the project consultants and other experts.

Advocacy

A number of advocacy activities have already been initiated. Srilatha Batliwala, is serving as a member of Chief Minister's Expert Committee for

Revising the Karnataka Panchayati Raj Act of 1993, and serves on a number of national and state government advisory committees. She also participated in the Fourth World Conference of Women held recently in Beijing, where she conducted several workshops on women's education and rights. Last December, the project team organised a National Conference on Women and Literacy. It was organised in collaboration with the UNESCO Institute of Education. The collection of books and reports on women's issues is being widely used by researchers and activists from other organisations.

UNIT: ENVIRONMENT

Project: Bioremediation of pesticide contaminated soils and effluents.

This project was started on June 15, 1995 with Dr. P. K. Shetty as Principal Investigator. The programme is supported by the Department of Atomic Energy. Dr. Shetty is collaborating with Prof. K. M. Madyastha, Chairman, Dept. of Organic Chemistry, IISc., Bangalore and Dr. K. Raghu, Head, Nuclear Agricultural Division, Bombay. The experimental work is organised in the Department of Organic Chemistry, IISc. Bangalore.

During the last 6 months, experiments were carried out with the following objectives - 1) Isolation of Atrazine and Endosulfan degrading microorganisms by enrichment culture technique and 2) To test the efficiency of pesticide degrading microorganisms by analytical methods.

Five soil types from different agroclimatic regions of Karnataka were collected, sieved and airdried. These soils were subjected to enrichment technique, by spraying commercial atrazine and endosulfan at weekly intervals. From these enriched soils, several bacterial and fungal species which utilised atrazine and endosulfan as sole source of carbon were isolated. The promising strains were subjected to liquid broth culture technique. The pH profile and growth parameters of these strains have also been established. These cultures are being tested for their degradation ability by different analytical methods. Further screening of other isolates and attempts to isolate more number of microorganisms degrading the pesticide in question is under progress.

Ms K R Vidya and Ms Jayashree Sitarama are assisting Dr Shetty in this programme. Sri N Ramesh has recently joined this programme as a Research Associate.

Two Research Programmes were completed under the guidance of Dr P K Shetty. (1) Effect of Atrazine on the microbial population in the Rhizosphere of maize (*Zea mays.L*) M.Sc thesis, submitted to Dept of Environment Sciences, Bangalore University by Kanchan Garg and (2) Analysis of Atrazine residues in Ground and surface waters from selected field stations of Karnataka. MSc. Thesis, submitted to Dept of Environmental Sciences, Bangalore University by G. Vishwanath.

UNIT: EPIGRAPHY CENTRE

Dr. H. K. Anasuya Devi is continuing her research in Computer Based Epigraphy under the guidance of Dr. Raja Ramanna and Dr. R Narasimhan. Mr. M Murali Babu has recently joined the unit as a Visiting Associate.

The objectives included in the study are :-

i) The role of a computer in creating an environment for the epigraphists to assist in the analyses and interpretations of epigraphic materials.

ii) The environment created would enable the experts to focus attention on newer areas not contemplated so far.

As a first exercise in collaboration with the Archeological Survey of India (Mysore), ten photographic images of stone inscriptions belonging to Fourth Century B.C to First Century B.C have been collected.

All these photographs have been scanned at grey levels using Hawlett Packard Jet Scanner to get good images of the original pictures. For the first time, using Matlab version 4.2C on IBM, both background and foreground noise on the images considered for the study have been eliminated to some extent. These images would be examined with the domain experts to assess the information content and to decide upon the next course of action.

In addition, for the first time, the user-friendly highly interactive KHOROS 2.01 version image-processing software, that works on Sunsparc20 Workstation has been used to process the different set of data taken to filter the noise and further process on the machine recognition of characters in the subimages.

The following photographs have been reproduced to illustrate the above.

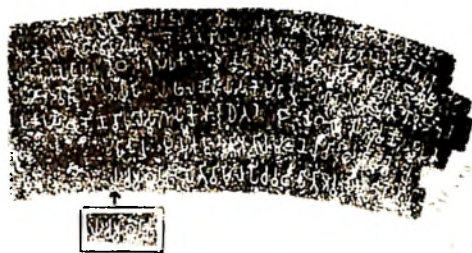


Fig.1

Fig.1 describes Ashokan Brahmi Inscriptions - Brahmagiri, belonging to Third Century B.C. Using Matlab, as a random sample the bottom most line has been considered for noise elimination and to produce a clearer image of the script (fig.2)



Fig.2

Fig 2 represents the processed thinned subimage Brahmagiri. Many steps are involved to get the final thinned image.



Fig 3

Fig. 3 represents Bhattiprolu Relic Casket inscriptions belonging to Fourth Century B.C.



Fig.4

KHOROS software has been used to process the data. Fig. 4 represents a processed zoomed

medium filtered subimage considered at random for the study. Several steps are involved in obtaining the above. The results so obtained is a break-through. It is on record for the first time. Further sets of data are being analysed for building up a knowledge based image interpretation system for epigraphic materials.

VISITING CHAIRS

HOMI BHABHA VISITING CHAIR PROF. C.V. SUNDARAM

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

Aug 6, 1995 marked the fiftieth anniversary of the dropping of an atom bomb over Hiroshima City in Japan, in World War II. Considering the far-reaching impact of this event, a study has been made of the historical aspects of the development of the atom bomb and the consequences of the strategies of nuclear deterrence pursued by the two superpowers, USA and USSR, during the cold war period 1945-1988. The study is important as concerns about nuclear - proliferation and the health effects of exposure to nuclear radiation continue to overshadow the growth of civilian nuclear programmes.

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

Work on the autobiography - "Looking at Society and its Changes through the life of an individual" - continues. A chapter of it entitled, "Prof. Ghurye and I, a troubled Relationship", will be published by the Department of Sociology, Bombay University, in the very near future as part of a collection of essays edited by Prof. A.R Momin, Professor of Sociology, Bombay University.

SENIOR HOMI BHABHA FELLOW PROF. B.V. SREEKANTAN

Prof. B. V. Sreekantan who was holding the S. Radhakrishnan Chair at NIAS, has accepted w.e.f. Ist April 1995 the Senior Homi Bhabha Fellowship awarded to him by the Homi Bhabha Fellowship Council. He will continue to work at NIAS and among other activities will also be engaged in writing a comprehensive book on "Cosmic Rays".

SIR ASHUTOSH MUKHERJEE CHAIR

The above Visiting Chair supported by M/s Peerless General Finance and Investment Company Ltd will be instituted shortly.

VISITING PROFESSOR

PROF. A.N. MITRA

Prof. A.N. Mitra joined NIAS as Visiting Professor for a year in the beginning of 1995.

His assignment was:

a) Active interaction with the Director's program of further investigations on the Ramanna-Sreekantan Theory of mass-lifetime duality in particle physics, and in particular to explore the possibilities of an 'understanding' of these results from more orthodox premises of quantum mechanics and field theory. A major fraction of his time at NIAS has been devoted to this specific activity.

b) Interacting with the group headed by Prof. Sundaram on an on-going DST project. Prof. Mitra was asked to prepare a broad-spectrum review of the state of basic science in the country with reference to the university system. This was prepared and submitted for possible inclusion as a part of the final report. Prof. Mitra spoke on this theme at other public forum as well. This topic duly modified has since appeared in 69, Nov 25 (1995) Issue of the Current Science.

c) Other activities of Prof. A.N. Mitra related to his on-going research interests in quark-physics and general science topics which are reflected in the list of publications, etc.

ASSOCIATES PROGRAMMGE

During the second half of 1995, there has been varied and interesting programmes for the associates. The topics of the Associates Programmes during this period were:-

1. July 26, 1995 - a lecture-cum-demonstration of a Concert on "INDIAN CLASSICAL MUSIC (HINDUSTANI VOCALIST)" by Ms. Aditi Upadhyia.

Ms Aditi Upadhyia gave a presentation of a lecture-cum- demonstration on "Concept of Sound to Present day Raag-Sangeet", which was composed by Pt. Dinkar Kaikini. In the forenoon, she briefly spoke on ancient history of Indian Music and covered topics such as origin of Sound, Swara, Saptak, Arohana & Avarohana and Raag, in addition to the aspect of Rhythm and Laya. This was aptly interspersed with demonstration of the same and was followed in the evening by a thrilling, full-fledged and well received concert.

2. September 29, 1995 - a lecture on "TELE-COMMUNICATION" by Mr S Gopalakrishnan.

3. November 24, 1995 - a lecture on "TECHNOLOGY, ECONOMIC GROWTH & SUSTAINABLE DEVELOPMENT" by Dr A Ramachandran.

4. December 29, 1995 - performance on "VOCAL HINDUSTANI CLASSICAL MUSIC CONCERT" by Pt. Jagadish Prasad (Patiala Gharana), accompanied by Mr Gaurang Kodikal on Tabla & Mr Vyasamurthy Katti on Harmonium.

OTHER ACTIVITIES

1. August 8-10, 1995 - International Conference organised on "INDIA, SOUTHEAST ASIA AND THE UNITED STATES: NEW OPPORTUNITIES AND PROSPECTS OF CO-OPERATION" conducted by Rajiv Gandhi Foundation.

2. October 17, 1995 - a workshop on "HUMAN RIGHTS LAW AND PRACTICE" organised by the National Law School of India University, Bangalore.

The workshop was inaugurated by Hon'ble Mr Justice Ranganath Misra, Chairman, National Human Rights Commission. A total of 38 participants including advocates from Bangladesh, Nepal, Sri Lanka, attended the workshop. Former judges and leading practising advocates formed the resource persons.

3. November 3-5, 1995 - a workshop on "INVOLUNTARY RESETTLEMENT AND REHABILITATION" organised by the The National Law School of India University, Bangalore.

The workshop was sponsored by the World Bank, at which leading advocates, social activists, besides administrators and academics, who are actually involved in resettlement and rehabilitation work of different projects, participated. Dr Mohan Gopal and Dr. Gordon Appleby represented the World Bank at the Workshop.

4. December 15, 1995 - a meeting on "WORKING GROUP ON SEXUALITY & SEXUAL BEHAVIOUR RESEARCH" by Foundation for Research in Health Systems, AHMEDABAD.

The meeting of the above group held at NIAS, is an initiative of the Johns Hopkins University

within the Ford Foundation - supported project on "Building Social, Science Research for Women's Reproduction Health in India". The theme of the meeting was on theoretical and conceptual issues related to research on sexuality and sexual behaviour.

5. Workshop on "CONSERVATION OF MEDICAL PLANTS" for DFOs from Medicinal Plants conservation Areas (MPCAs) and Medicinal Plants Development Areas (MPDAs).

On Dec 22 & 23 1995 - Foundation for Revitalisation of Local Health traditions (FRLHT) organised a two day workshop at NIAS for DFOs from Karnataka, Kerala and Tamil Nadu, responsible for implementation of the institute conservation programme for medicinal plants. This is part of a project being co-ordinated by FRLHT, Bangalore, a NGO dedicated to medicinal plants conservation and revitalization of Local Health Traditions.

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

Following the questionnaire analysis based on the observations made by scientists in various institutions on Science & Technology (S&T) funding, an interim report was prepared for the DST project. Dr Suchitra Mouly also made a visit to a CSIR Laboratory to obtain first hand impression of its functioning and also to elicit scientists' opinions on the problems related to sponsored research funding. A report based on this trip has been prepared.

S&T policies of different countries such as the UK, New Zealand, Malaysia, Thailand and Japan were studied to draw lessons that may be relevant to the S&T scene in India.

SOCIAL SCIENCES LECTURE SERIES

(In keeping with the interdisciplinary spirit of NIAS, Prof M.N. Srinivas has initiated the Social Science Lecture Series in order to develop active interaction between humanities and physical sciences. Ms. Dhanu Nayak was the first speaker in the series. Dr Sundar Sarukkai gave the next two talks.)

1. INTRODUCTION TO POST MODERNISM

August 30, 1995 - Summary of talk by Ms. Dhanu Nayak.

This was the first of three lectures on the foundations of postmodernism. Postmodernism has its roots in the Western philosophical tradition dating back to at least the Enlightenment. Due to the appropriation and diffusion of science, information technology, media, consumerism, globalization etc., which have blurred the boundaries between the Western countries and the rest of the world, it becomes even more important to look at postmodernism even though it is Western in origin. It is essentially a critique of Western metaphysics and culture, and challenges the presuppositions of at least the last two hundred years of Western history. What were these presuppositions? To answer this and to understand the historical basis of postmodernism, we have to look at modernism.

Modern is a term commonly used: we have modern nations, modern thought, modern women, modern art, etc., all conveying to greater or lesser extent ideas such as newness, breaking with the past, forward thought, advancement, the avant-garde. These are all characteristics associated with the epoch we call Modernity which began around the Middle Ages. Modernity thus self consciously defined itself in contrast to the Ancients or Classics and generally includes all these ideas; in using the word 'modern' we thus imply one or other of the above mentioned characteristics.

We can take this a little deeper and talk of the 'spirit' of Modernism: this is best captured by the spirit of the Enlightenment which aimed at human emancipation from myth, superstition and belief via the critical application of reason. We can thus easily see science as a completely modern project. Critical reason would become creative precisely by its capacity for empowering the individual and enabling his /her freedom. We can see feminism as being born from such an ethos. It is in such a frame that the Enlightenment and Modernism can be understood. The work of diverse people such as Darwin, Marx, Cezanne, Baudelaire etc., all contain these assumptions; they all broke with the past, with the tradition of the Ancients, and contributed to the idea of a ceaseless march towards increasing knowledge and therefore progress. We can take each of the ideals of modernism, reveal its actual characteristic, and posit a postmodern position.

2. FOUNDATIONS OF POSTMODERNISM:

September 6 & 19, 1995 - Summary of talks by Dr. Sundar Sarukkai.

Postmodernism has become an important movement in the literary and philosophical circles in the West and increasingly in the other parts of the academic world. To understand Postmodernism, is to first understand Modernism and its dependence on the Western Enlightenment project. The emphasis on rationality, on reason, on abstraction, on the character of knowledge as converging were some of the crucial elements of Modernist project of Knowledge. This epistemology is also masculine, while at the same time, it rejects the feminine as being in the domain of the subject, with its attendant problems of subjectivity. Postmodernism, attempts to liberate itself from the male-dominated, Euro-centric descriptions which dominate the academic and political world, and in the process give alternate views of knowledge, politics, literature, arts and so on. The talks established these view-points by developing, systematically, a critique of the philosophical foundations of Western Philosophy.

DUALITY OF MASS AND TIME

Raja Ramanna

Almost hundred years back when atom was considered to be indivisible, the discovery of X-rays by Roentgen in 1895 followed by radioactivity by Henri Becquerel in 1896, set up a path for exploring the interiors of atom. Especially, the phenomenon of radioactivity may be seen as the cradle for all what follows. This is because three ways in which radioactive substance decays, viz., emission of α , β and γ rays result from three main fundamental forces of nature effective within the atoms, i.e. strong, weak and electromagnetic.

On the occasion of the hundredth year of discovery of radioactivity, it is appropriate to look afresh at its implications in the context of a recent finding by Ramanna and Sreekantan [RS] which relates masses and life-times for particles ranging from α , β - emitting radio-nuclides to fundamental particles within the same premises. The mass-lifetime relation in [RS] theory reads as

$$\frac{h}{MT} = \frac{\Gamma}{M} = \frac{n}{2^n} \quad (1)$$

where h is the Planck's constant and Γ is the decay width. M , T for fundamental particles are mass and mean life-time of the decaying particle. For β -emitters M , T represent the neutron mass (responsible for β -decay process) and the half-life, while for α -emitters, M denotes the total binding energy of the emitting nucleus. In equation (1) 'n'

is an integer or a discrete multiple of an integer. The expression $n/2^n$ is obtained from the Cantor's theory of Cardinality in close relation to fractals. In this respect, n with Cardinality 1 can be regarded as the set of n discrete elements, while 2^n represents the corresponding set of continuous elements with Cardinality 2. Thus eq.(1) suggests duality of mass and life-time in terms of discreteness and continuity which, in the present formalism, seems to be more powerful concept than the wave-particle duality, the foundation of Quantum Mechanics.

Since eq.(1) holds for each strong, weak and electromagnetic interacting particles (thus showing a kind of unification), n can have dependence on strength of the interaction. By examining the decay modes of particles classified according to n , it is noted that particle decaying through strong-, e.m.- and weak-forces have values of $n < 10$, $10 \rightarrow 30$ and > 40 respectively, with some significant gaps in between.

It is also interesting to note that $p = \log(2^n/n)$ is a prime integer for every n being the sum of three consecutive integers. In this way, we can easily show that the total width (Γ) of a particle can be written as the sum of the partial widths.

In case of β -emitters, the Binding Energy per nucleon (BE/A) can be expressed as

$$8.45 (M_n - M_p) [\log(Zn/n_0) - .317 (\log(Zn/n_0))^2]$$

Since β -decay involves the decay of neutron into proton, $M_n - M_p (=1.29 \text{ MeV})$, the difference between their masses plays an important role in contributing to the Binding Energy. BE/A shows its proportionality to the "n" of RS Theory via the logarithmic argument Zn/n_0 , n_0 being minimum value of n for β -emitters. The factor Zn/n_0 shows a smooth variation from Z to A as we go to heavier systems. The agreement of the BE/A thus calculated with that of the standard values is found to be good. Further investigation is going on to find out a more refined connection between the binding energies and Cantor n in the case of β radionuclides.

In conclusion, various aspects of agreement of the present theory with the Quantum Mechanics suggest that in the present context, discreteness and continuity plays a major role in preference to wave-particle duality concept.

WHAT IS PSYCHOTHERAPY?

R.L. Kapur

What is psychotherapy? It is not an easy question to answer. Words and phrases which require a rational structure are often unable to convey the meaning of an enterprise which operates largely through emotions. However, in spite of this limitation, I shall try my best to explain the process of psychotherapy and the qualities of a good therapist.

Let us, first of all, put psychotherapy in its proper context by saying that it is one of the tools psychiatrists employ to do their job which is to relieve the distress, either of the patient who cannot cope with his or her morbid emotions or that of the family who cannot cope with the inappropriate destructive behaviour of the patient. This has been the job of priests, shamans and wise men ever since civilisation began but as our understanding of the brain functions has increased, newer techniques of doing this task have emerged which require a great amount of sophistication, scholarship and technical expertise on the part of the healer. The task has become the prerogative of the professional psychiatrists and psychologists who have to understand life at many different levels each with its own laws which cannot be fully derived from laws which operate at another level. The human mind and as a corollary, its pathology can be understood at the atomic, molecular, cellular, organic, psychological and many other levels above and below this hierarchy, which have not yet even been conceived. There is a tendency on part of some psychiatrists to believe that as we understand more of the neurochemistry and neurophysiology, we shall not need to bother about the laws which determine interaction between people or questions regarding social justice or purpose of life. I am afraid this optimism is grossly exaggerated. The understanding of neurochemistry, neurophysiology and neuro-anatomy have given us wonderful new methods to heal mental distress but to imagine that one day we shall discover one precise chemical to counteract a precise morbid emotion is wrong. Even with the knowledge we possess we know that many different neurotransmitters are involved in the experience of the emotion of anxiety, some of these can combine with some others to produce a feeling of depression or suspicion and so on, but only under certain circumstances. If the environmental situation is different the same chemicals produce a different experience.

Psychotherapy operates at the psychological level. This is the level at which meanings emerge from a complex interaction between our brain processes and the life around. By entering into a relationship with the patient a psychologist encourages the emergence of new meanings which replace negative preoccupations by a sense of hope and enthusiasm - enough to goad the individual towards newer ways of living.

What does the therapist do in this whole process? First he listens. He allows the patient to tell her story and express her distress. It is sad that so many persons in the world have no one who would listen to them. Telling of the story has a very important function. Very often distress is caused by a confused understanding of what actually happened. One often builds up resentments, suspicions, anguish and depression because the mind does not have a clear sense of the sequence of events which led to pain and the precise role of others in the chronology. Very often we find a person seething with anger because of some insult caused by the other, forgetting that he himself provoked that insult. Not only does the therapist listen but through a disciplined process of history taking he systematically uncovers the life events in their precise order on the mental screen of the patient so that the latter gets to have more accurate understanding of what happened. One has known patients feel better just after one session of therapy not because the therapist did anything miraculous but only because they saw things more clearly.

The therapist often encourages the expression of distress through a process which is called 'catharsis'. Technically the term means 'reliving of those experience which originally caused the emotional build up". The loss of a loved one or of a relationship or even of material possessions is often so painful that the patient blocks the experience. The classic case is of a young adolescent unable to cry after the death of a parent. By encouraging the patient to relate the event in detail, repeatedly - from different angles - a therapist opens the flood gates which allow the person to cry. Mourning and crying after a loss are healthy behaviours which are unfortunately getting unfashionable in the modern society.

A very important function of psychotherapy is the offering of support and reassurance. A distressed person is often a lost person, feeling very alone and with a very low self opinion. A good therapist assures the patient that in spite of

his problems he is still a worthy person, deserving love and respect.

Once the patient has expressed his distress and received reassurance the stage is set for the process of education. Very often the distress is caused by patients' own mistakes, difficulties in forming relationships, excitable temperament or irritating behaviour traits. Once snug in the warmth of the therapist's acceptance the patient is more willing to face his errors rather than going on the defensive.

The errors and mistakes are, in most cases, based on personality traits which were formed early in childhood and which get exhibited repeatedly either because the patient is not conscious of their origin or because he is helpless against them. The most ambitious form of psychotherapy aims at discovering these sources, and in the light of this discovery help the patient in altering his or her personality structure. Freudian psychoanalysis is one such form of depth psychotherapy, but there are many others, following different theoretical frameworks and practical strategies.

One particular phenomenon which always occurs in course of psychotherapy is that of transference and counter transference. In transference, the patient projects on to the therapist such emotions which she had for her father, brother or a lover. In counter-transference, the therapist responds to these emotions. This is not necessarily bad because such unconscious mental expectations, provide the fuel for the progress of the therapist-patient relationship. However, if the game was allowed to proceed at its own momentum, there would be only a replay of the past and no growth. A good therapist anticipates this drama, uses it judiciously and interprets it to the patient at an appropriate time so that the latter does not escape reality but instead learns to examine the old relationships in a new light.

In the preceding paras, I have examined the various stages of psychotherapy as well as the techniques and strategies used but let me assure you the techniques and strategies are only a small part of the whole process. The most important instrument used in psychotherapy is the therapist himself and it is this instrument I shall examine in course of the rest of this paper. What kind of a person must a psychotherapist be to be competent and successful in his vocation? I shall endeavour to answer this question with illustrations from my own growth as a psychotherapist.

Before anything else, a therapist must be able to love. Put like this it sounds rather trite but I do not mean 'love' in romantic or sentimental fashion. People often assume that if one loves it necessarily results in greater pleasure. I do not see it that way. In my view, loving makes one's life larger, not necessarily more pleasant (Angyal, 1964). This ability to love implies ability to suffer along with the other, for the other. This suffering often goes beyond the one hour you assign to your patient. You may well ask whether this kind of suffering would not paralyse one's day-to-day functioning. That is possible. I still occasionally stay awake thinking of my patients. However, as you grow as a therapist, you realise that this ache for the other gives meaning to your existence and you learn to pass on this insight to your patients.

Let me illustrate this by telling the story of a Zen master (Smith, 1983) who was considered by all to be a realised Soul. One evening when he was taking a walk he heard wailing sounds in a house he was passing by. On entering quietly he found that the householder had died and his family was crying. Immediately he sat down and tears started flowing down his eyes. A gentleman who was shaken by the display of such emotion in a famous master remarked, "I would have thought that you at least were beyond such things." "But it is this which puts me beyond it", the master replied, through his sobs. What did the master mean? The master was talking of a particular kind of peace which comes when the pain of life is in fact not relieved. This kind of peace comes to a therapist slowly as he learns to surrender to the power of love. It is my belief that a lot of patients suffer because of their inability to accept that suffering is a natural part of existence. "Why me" is a common complaint in my clinic.

A patient of mine, a woman of 50 years had lost her husband at the age of 28. A lively, fun loving woman, she had two young children at that time. As the time passed her in-laws' robbed her of much of her husband's wealth. She had a very difficult time bringing up the two children by herself, both of whom required psychiatric help at one time or another. Being beautiful, affectionate and naive she entered many relationships only to be rudely abandoned time and again. Finally, she got married two years ago to a widower. This man recently discovered that while she had told him of all her previous unfortunate relationships she had hidden one of which she was very ashamed. He came to know of it from someone else. Confronting her with this deception he said he would never be

able to trust her and sought divorce. She went into depression and having been unsuccessfully treated with antidepressants she came to me. After listening to her, my eyes filled with tears and I said spontaneously, "you have suffered a lot, haven't you?" She also cried and after that we sat together for a long time watching the stars which were shining outside my window. Following this reverie we started talking again and this time the talk automatically turned to plans she would have to make for starting once again a single person's existence: renting a flat, taking a job, claiming for alimony, developing a social circle etc. I learnt later that the previous therapy was unsuccessful because she constantly kept on saying "why me" and the therapist constantly went on philosophising about life being difficult for everybody, etc.

While I talk of love, I would like to make it clear that the therapists' need for dependency, approval, exploitation and control must not be equated with love. It is very easy to make the patient infatuated with you. There are several women who come to me with the anguish that their husbands have never allowed them any individuality. This is the first time they encounter a man who is listening to them sympathetically. The signals of gratitude sent by these extremely vulnerable women are powerful enough to fuel your own egotistical needs. This is anything but love and can lead both the patient and the therapist into trouble.

This understanding of what love means in psychotherapy has changed my preoccupations as a therapist. There was a time when it was very important for me to discover the 'truth' behind the patients' problems. Their blocks and resistances used to annoy me and impatient as I was, I would probe furiously and even use techniques like hypnotism, abreaction, truth serum, etc., to reach the heart of the matter. Now I find it much easier to let the patient divulge himself at his own pace or not divulge himself if he is inclined that way. The essence of psychotherapy is affectionate and respectful relationship, not excavation. Incidentally, this reduction in my anxiety 'to know' makes it easier for patients to reveal. All in all, the therapeutic process is faster now than it used to be when I had a crusading spirit and employed weapons of the kind I mentioned earlier.

A corollary of this attitude is that I have lost interest in symptom removal, for example, in patients suffering from hysteria. In fact, I find the

process of using 'tricks' to remove symptoms quite demeaning both to the patient as well as to myself. That these strategies can be demeaning came home to me with force when I used a classical technique to make a young person with hysterical aphonia utter some words. I succeeded and he talked but said to me in a choking voice, "I shall never forgive you for this". I discovered that he was living in family circumstances where he was privy to such secrets of his mother and father, any revelation of which would have destroyed the family. His only recourse was to keep quiet and quiet he had become. Now, I prefer to ignore the symptoms and deal directly with the conflicts and conflicts in hysterical patients lie quite at the surface. So what, if the housewife who is pressurised by her mother-in-law takes to bed for a few days because of hysterical fits? So what, if a student who is ill prepared for the examination develops a paralysis of the right hand? Heavens won't fall if the mother-in-law cooks for a few days or the student appears for the examination six months later. And if my benign negligence raises the anxieties of the family - so much the better - let them be a little anxious for once, and reduce their pressure on these people.

There is another issue which is particularly related to psychotherapy in the Indian setting. It has often been said that in India, since the relationships are hierarchical, similar relationship strategies should be used in psychotherapy. My co-therapists talk of a Guru Chela relationship in which the therapist teaches and the patient learns without asking questions. I am afraid I do not agree with this. I do not accept hierarchical and democratic cultures as different but equally valid realities. I think these are two stages in human evolution, the former being more primitive than the latter. It is true that our patients fall in line with hierarchical demands both in their real life as well in therapy but it does not mean they like it. Every human being wishes to express his or her individuality. Every human being would like to be equal to the other. I am thinking especially of women. They are the victims of hierarchy not only in India but all over the world. Many problems with which they come are, in fact, due to hierarchical demands on part of their spouses and in-laws. I encourage equity and mutuality in my relationship with my patients and also between the patients and other member of the family. I think I get better results than I used to.

Recently there was the case of a woman who was tied to the kitchen the whole day. The

mother-in-law, who could not work because of her chronic back pain, dominated her. Her husband, who did not want to hear her complaints because he worked so hard every day, neglected her. Her husband's younger brother, who was studying to be a doctor and hence could not be expected to do household errands, bullied her. One day she screamed and was diagnosed as suffering from psychosis. I screamed louder than her and successfully frightened these tyrants. I told them that unless they changed their ways, this woman will live in the mental hospital forever and then who would run their happy family? Things are much better now. The mother-in-law cuts the vegetables and dusts the house. Husband is willing to listen to his wife. The brother-in-law does the outside errands. The woman has attained a great deal of dignity.

Let me move to a new theme. Another essential personal quality of a therapist is the ability to walk on the razor's edge between different polarities which are not reconcilable. Life is nothing if not a bundle of contradictions and a therapist must realise that there are never going to be final answers to some questions. For example, how much involvement should there be with the patient. If you do not involve yourself you are not effective, if you over-involve yourself you get transference problems. A therapist must walk on the razor's edge between these polarities. Does one help the patient to gain autonomy or does one help her adjust to the society. Both are important. A therapist walks on the razor's edge between these polarities. A couple comes for therapy. You hear the wife's story and she excites a sympathetic cord in your heart. You hear the husband's story and he seems to be right also. They build two different stories from the same set of facts. Whose story is true? The therapist walks between the two polarities. I am reminded of the set of novels called the "Alexandria quartet" written by Lawrence Durrell; four different characters, four different stories but built from the same facts. Which one is true? To hell with the truth - what is important is relationship. Sometime I feel that the whole process of psychotherapy is, in fact, a process of conjuring up a story jointly by the therapist and the patient so that the relationship goes on. Healing occurs through relationship.

Another personal quality which a therapist should have is a philosophy of life - a set of values around which he builds his own life. One does not expect the patient to accept his values. But a patient in his confusion needs an edge to push

against. In the safety of a therapeutic relationship, he needs a strong pillar which he holds on to, to pull himself out of the mire and stand on his own ground. Patients often ask me, "what will you do in my position"? I never hesitate to tell them. If I do not know, I say that also. I am not in favour of the therapists hiding behind their professional masks saying that "my life should be of no concern to you". This, of course, does not mean that the therapists should have their hearts on their palms or try to solve patients' problems by giving examples from their own lives.

Finally, just like a surgeon needs clean hands, a therapist needs a clean mind. If it is not clean one at least expects sustained attempts to remove the dirty spots and if you cannot do it alone, do it with the help of your fellow therapists. Take for example, the qualities of one's speech in one's day to day life. We know how speech is the chief tool in the armoury of a therapist and we also know how words can whip up emotions both negative and positive. How can a therapist be careless in his speech when relating to his family and friends or in committee meetings, spreading confusion and tension and suddenly blossom out as a therapist in the clinic? One is not asking for perfection but only for 'Abhyasa' - only for the attitude of a devoted experimenter. As my teacher used to say, to be a mountain guide, you need not have climbed the Everest but you must be actively climbing mountains.

CONSCIOUSNESS AND SCIENTIFIC EXPLANATION

B. V. Sreekantan

The developments that have taken place in the field of physical sciences over the past four hundred years and especially in the current century enable us to explain practically all physical phenomena in terms of particles and forces operating within appropriate space-time frame works. The particular types of particles and forces involved depend on the particular phenomena to be explained and the level at which explanations are sought. While some kind of picturisation is possible upto certain levels, as we go to more fundamental levels the explanations become more abstract and esoteric and mathematical in nature. In the case of phenomena associated with living matter, a feature that has been well established is that there is no evidence for any difference with ordinary matter in the basic constituents. Therefore, it is believed that in the ultimate

analysis all processes associated with living matter, though distinctly different, should be explainable in terms of collective and emergent behaviour of the same constituents. Working out the details has no doubt been a tall order since the biochemistry that goes on within even a single cell under the control of the genetic code in the DNA molecule is more complicated than the chemistry that goes on in a sophisticated chemical factory producing the most exotic chemicals. In this perspective how does one find a scientific explanation for the phenomenon of consciousness which is unique to or is in the most advanced state in man and is behind all his activities - mental and physical? Instead of getting lost in the maze of efforts to find an explanation that covers all aspects of consciousness, and deals with it in totality, in recent years the neuroscientists have been concentrating on delineating the neuronal correlates in the brain processes associated with specific and limited aspects of the phenomenon - like cognition, computation etc. Analogous to the role of particles under different forces in the case of physical phenomena, it is now recognised that all mental phenomena are essentially related to the "firing" of different sets of neurons in the brain, the firing of a neuron being the generation and propagation of an action potential - an electrical pulse of amplitude about 70 millivolts and duration a few milliseconds. The generation of these potentials takes place in different locations of the body - in the sensors associated with eyes, ears, nose, skin and tongue, and in the special areas of the brain that have to give commands for specific actions and in the synapses. There are a few hundred billion neurons that connect different areas of the brain with the different regions of the body. The information that is brought into the sensors - visual, auditory, etc., are transformed into action potentials and are coded in a manner similar to frequency modulation in radio communication. While the action potentials have the same amplitude and duration, the repetitive frequency, the burst like character, the time separation between bursts etc., reflect the details of the information to be transmitted. The information is also in the number of simultaneous firings of bundles of adjacent neurons, there being also feed back from one set of neurons to another. Each neuron has associated with it a thousand synapses on the average. The synapses control the forward propagation of the signals through the release of neurotransmitter chemicals. In fact at each synapse the propagation of the signal is not electrical, but chemical. The neurotransmitter chemical released

in the synapse decides whether the signal should propagate further or should be aborted. The action of the synapses is partly determined by genetical information and partly by the memories implanted during development and previous encounters. For the same purpose occasionally new synapses are also created along the neurons. While considerable progress has been made in figuring out many of these details in neuronal firings, the one aspect that is posing the most serious problem is the 'binding problem'. The information even with regard to one aspect of a single event like say visual perception, that is carried by the neurons is distributed in widely different parts of the visual cortex with no apparent interconnections between the parts. There is no evidence for a centralised location either in the brain where all the information comes together for what many be called as a final processing and generation of any specific instructions to be carried to the relevant parts of the body by the motor neurons. There is no 'homunculus' or little man processing all information and giving instructions.

There have been in recent years, many approaches to this binding problem. Rapid 40 cycles per second oscillations on which neuronal signals ride have been recorded in the visual cortex of cats subjected to specific visual tasks. Crick and Koch have suggested that such synchronised firings riding as a 40 Hz wave (could be in the range 35-70 Hz) might be the neural correlates of visual awareness.

Herbert Frohlich of Liverpool University had envisaged quite sometime back, that in biological tissues there could be the formation of molecular electric dipoles that vibrate in unison when sufficient bio-energy is "pumped" in. Such vibrations could lead to the formation even at body temperature of coherent systems similar to the Bose Einstein Condensates that are formed at very low temperatures as in superconductivity, superfluidity etc. The central idea of the Bose Einstein Condensate (based on quantum mechanical coherence) is that a single state (a single wave function) can replace all the participating states (the wave functions of the individual atomic systems). Frohlich had calculated that in the molecular dipole mechanism in the tissues, the vibrations generated would be in the microwave range (Giga Hertz). On the basis of formation of Frohlich Systems, Marshal came out with the idea that conscious phenomena (images thoughts etc) could be the excited states in such systems. Hameroff (1) has extended this idea further. He considers the cytoskeletal microtubules

in the neurons to act as the substrate for the Bose-Einstein Condensates and consciousness may be a "macroscopic quantum state" originating from a mixture of coherent states having their origin in the microtubules. Explanation of the binding problem in terms of quantum processes, it has to be emphasised, does make it more mathematical and abstruse. It however, achieves scientific acceptability since non-locality and existence of superposed states, the very distinguishing hallmarks of quantum theory, have been tested out experimentally. Looking upon conscious states as macroscopic quantum states of the brain as a whole provides automatically for the unitary aspect of consciousness as well.

Hameroff points out further that the water molecules at the surface of membranes and cytoskeletal structures could be "ordered" and such organised dynamic water clusters could become pixels of information storage. On the paradigm of cellular automata, Hameroff has even worked out a model of information processing in the microtubules.

Formation of macroscopic quantum states arising out of internal neuronal mechanisms may become experimentally detectable as technology advances. Each macroscopic quantum state may reflect a particular sensation (qualia). Hameroff points out that for example qualia of redness may correspond to a particular macrostate - a specific frequency of the boson-condensed field excitation in the brain, (ofcourse different from the frequency corresponding to the red part of EM spectrum). If with future technology the detection of such frequencies become feasible, then it would be most crucial to verify whether the same frequency boson-field excitations take place in different individuals who are viewing the same object.

While perhaps one is a very long way yet to assert that a purely physical basis for consciousness is established or the prospects of it are near, what is most exciting is that these approaches are opening up new avenues of experimental exploration of brain processes demanding more advanced technological tools with high spacial and temporal resolutions.

1. Stuart R. Hameroff, *Journal of Consciousness Studies*, 1, No.1, (1994) 91-118.

THE NGO FORUM AT THE FOURTH WORLD CONFERENCE ON WOMEN - AN OVERVIEW

Srilatha Batliwala

Imagine a true global village, where people of every race, creed, colour, region, nationality and class live.....imagine that this is a village where the majority of people are women, speaking every language under the sun, dressed in a stunning variety of garments, in every colour and shape that women's ingenuity has created.....imagine, moreover, that the inhabitants of this village discuss, debate and demonstrate about every issue of concern to the human race (not just women!) by day, while at night, they feast their senses with a dazzling array of cultural events - the dance forms, music and art of every corner of the world.....and finally, imagine that this village of over 35,000 women is squeezed into an area of approximately 20 acres - and you will then have a small idea what it was like to be at the NGO Forum of the Fourth World Conference on Women! For most of us who were fortunate enough to be in Beijing for this unparalleled event, it was the most exhilarating, exhausting, bewildering but memorable experience of our lives.

Even weeks after my return, I am still trying to unravel and understand this complex experience, and what it portends for the future of women everywhere - how much closer are we to realising the Forum's goals of Equality, Peace and Development?

Over the past two decades, the UN has increasingly recognised the role played by Non-Governmental Organisations (NGOs) in the development process worldwide. Consequently, it has become a UN tradition that whenever a major UN world conference is being held, a separate but almost simultaneous meeting of NGOs is also organised, to enable the latter to submit their views to the official delegates and influence the global policy-making process. This was the case not only in the earlier World Conferences on Women held in Copenhagen (1980) and Nairobi (1985), but also at the UN Conference on Environment and Development in Rio de Janeiro in 1992, the UN Human Rights Conference in Vienna in 1993, the UN International Conference on Population and Development in Cairo in 1994, and the UN Social Summit in Copenhagen in early 1995.

The tradition was continued at Beijing, but on an unprecedented scale. While the NGO Forum of

the Women's Conference was held at Huairou (a suburb of Beijing) from August 30th to September 8th, the UN Conference was held in Beijing from September 4th to 15th. In this article, I will try to summarise the experience of the NGO Forum, which I attended, rather than the UN conference, which had a very different atmosphere and flavour.

It is important to understand the distribution of organising responsibilities at the NGO Forum. While the China Organising Committee had the task of making all arrangements for infrastructure and logistics (housing of delegates, spaces for workshops, plenaries and cultural events, transport, and food), the NGO Coordination Committee was responsible for registering delegates and workshops, allotting spaces for workshops, and dealing with the linkage between the Official UN Conference and the NGO Forum.

Undoubtedly, the opening ceremony held at the Asiad stadium in Beijing on August 30th will be one of most memorable events of the Forum for those privileged to witness it. Here, the Chinese demonstrated their unbeatable talent for choreographing spectacular mass displays and dances, both traditional and modern. The ceremony included a selection of classical western music performed by China's all-women symphony orchestra, as well as dazzling items by jugglers, acrobats, Peking opera, ethnic dancers, and hundreds of school children - some as young as six years old - who performed colourful exercises with fans, ribbons and shields. While the opening speeches were insipid, they were mercifully short; we felt much more inspired by the visual extravaganza which took up the bulk of the evening, especially the release of thousands of balloons and white doves which soared into the setting sun and concluded the ceremony.

Although the shifting of the venue of the NGO Forum out of Beijing city to the suburban township of Huairou (nearly 50 kms away) was highly controversial, the Chinese had done their best to make the scenically beautiful suburb a worthy substitute. Huairou is a serene and pretty place dotted with lakes, woods and hills. In just about eight months, scores of apartment buildings had been constructed to accommodate the thousands of NGO delegates; and Huairou's schools, public buildings and auditoria were cleaned, spruced up and prepared for the hundreds of impending Forum events. But to the dismay of the Chinese organisers, within twenty four hours of the

opening of the Forum on August 31st, every available surface - walls, gates, arches, tents, railings and stairways were gaily plastered with multi-coloured posters and flyers inviting participants to workshops, meetings, marches, and cultural events.

The Forum offered a bewildering variety of theme areas and workshops. There were 13 themes in all - economy, governance and politics, human rights/legal rights, peace and human security, education, health, environment, spirituality and religion, science and technology, media, arts and culture, race and ethnicity, and youth. And within each theme, there were upto 30 simultaneous workshops in each time slot, and five time slots a day. This meant nearly 150 workshops a day run by hundreds of organisations and networks, small and large, from all over the world. This was apart from the various caucuses and lobbying groups whose main objective was to influence the drafting of the Platform Document at the official conference in Beijing. Choosing which workshop or meeting to attend was thus a Herculean task.

This was complicated by the fact that the UN definition of "NGO" is so vague and broad that even private corporations and companies, churches and religious organisations, and legal firms are considered NGOs, and were permitted to organise workshops at the Forum. This resulted in a bizarre mix of events to choose from at a given time. For instance, on Saturday, the 2nd of September, at 3 PM, there were simultaneous workshops by Stree Adhar Kendra of India, the International Federation of Business and Professional Women, the University of South Australia, the Lebanese Council of Women, the American Bar Association, The World Council of Churches, the Women's Circus, and the American actress Sally Field, among a hundred others. Since the NGO Forum Coordination Committee had the unenviable task of allocating spaces for workshops, inevitably problems arose: a workshop which drew a large crowd was often located in an inflatable tent which housed only 50, while a less popular theme might have been allotted a room for 200. This often caused disappointment and complaints about nepotism.

Every day, there were demonstrations, rallies and marches organised by women's groups to draw attention to a particular issue; most of these showed that the commonest concerns of the world's women were clearly the impact of Structural Adjustment Programmes on the poor in

their countries, and violence of all kinds on women. Similarly, there were protests against sex trafficking, nuclear proliferation, war and militarisation, and religious fundamentalism.

Our Indian NGO contingent joined hands with sisters from Pakistan, Bangladesh, Sri Lanka and Nepal to organise the "South Asian Peace March", which drew more hundreds of marchers, and called for the end of civil and military conflict and violence in all parts of South Asia. We were delighted when seventy-year-old Betty Friedan, the famous feminist theorist and one of the founders of the American women's movement, joined our march. But perhaps the most moving, emotionally charged and widely supported demonstration of all was the thousands-strong silent march of the "Women in Black", protesting all forms of violence against women, whose impact was immense because every single marcher was dressed in black.

Without doubt, the events which attracted the largest audiences were the nightly regional cultural programmes held in a huge school playground, with seating for nearly 10,000 - most of us called this the 'parasol' area because of the colourful umbrellas over the picnic tables dotting the entire maidan. North America, Latin America, Africa, Asia-Pacific, West Asia, and China, each had their regional nights - and most participants would agree that the Chinese put on the most magnificent performance of all, drawing upon their rich regional and ethnic diversity and tradition, as also their penchant for professionalism and excellence in the performing arts.

In case one became too confused by the multiplicity of events to get an overall picture of what was happening, one could read through the daily Forum newspapers - **Forum 95**, brought out independently, and the official forum newsletter, **World Women** - which gave one some sense of the important events of the day, and the opinions of individual delegates who wrote in on issues of concern to them. But typically, the same event would be presented very differently by the two newspapers. For instance, there was a fairly sharp confrontation on the fourth day of the Forum between the NGO Coordination Committee and the China Organising Committee about several issues: delegates complaints about excessive surveillance and searches of hotel rooms by the Chinese security, non-provision of the promised facilities for the handicapped participants, and inadequate bus services between Huairou and the

Beijing International Conference Centre where the UN Conference was being held. While **Forum 95** reported high tension and angry exchanges at the meeting, **World Women** said that the meeting took place in a 'cordial atmosphere' and that the complaints were highly exaggerated!

There were three unique features of life at the Forum that deserve special mention:

First, the entire town of Huairou was turned into one vast marketplace where one could buy, for a price, not only Chinese handicrafts of every kind, but the handicrafts of virtually every part of the world. When the task of choosing workshops became too onerous, or you could not locate the workshop you wanted to attend, or you were just mentally exhausted and over-stimulated, you could escape by browsing through the Forum's streets and haggling with pavement vendors for a curio.

Secondly, the Chinese did a brisk business in the sale of bicycles, which the delegates discovered was the best way of traversing the long distances between hotels and apartments, the workshop venues, and restaurants. On the last day, most delegates repaid the people of Huairou for their hospitality by selling the bicycles to the local residents for roughly half the purchase price!

Finally, one cannot fail to mention the babies at Beijing - and indeed, their fathers! Hundreds of infants and toddlers sat in backpacks or prams, looking either bewildered, bored or irritated by the explosion of colour, sound and movement surrounding them. It was both moving and symbolic to see scores of fathers patiently baby-sitting while their partners attended workshops. One wonders what the impact of the Forum will be on these young veterans of the Fourth World Conference on Women.

A rather unfair impression has been created by the media about the poor quality of arrangements at Huairou - this is largely the result of the biased reporting of the Western media, which came prepared to find fault even before the Forum began. They have depicted the entire meeting as beset with logistical and infrastructural problems, because of poor planning and management by the Chinese. This itself is a by-product of what one might term the 'human rights war' being waged against China by the Western countries, particularly the United States.

Things could certainly have been better, and many avoidable mistakes were made. For instance,

some delegates, particularly human rights activists, participants from Lhasa Tibet, and media persons, were subjected to excessive scrutiny and interference by the Chinese Security Police. This was unnecessary and unwise on the part of the Chinese, who had assured the UN that the Forum could be held in an atmosphere of openness and freedom. By shifting the venue at such a late stage, the Chinese placed themselves in a position where buildings could not be properly finished, and ramps and other facilities for the handicapped were miserably inadequate. The apartment blocks in which the majority of participants were housed were so hastily finished that they were full of cement dust, and anything one used was liable to break at a touch !

But on the other hand, I don't think any country in the world could have done a better job when faced with organising a meeting for a record-breaking 35,000 participants, coming with such a huge variety of languages, cultural backgrounds, demands, agendas and expectations. The Chinese had tackled the job with their characteristic efficiency and discipline. The venue was cleared of litter and garbage every day, the toilets were clean and odour-free, food and drink was always available, and an army of 50,000 young volunteers with a smattering of English (and many other languages too) worked round the clock, ready to help solve any problem you had with a smiling, courteous, "Can I help you ?" I heard hundreds of women from different countries say, "We could never have managed this conference so efficiently back home - things would have totally broken down by the second day !"

The confusions which arose were, in my view, partly a result of communication problems and partly due to the fact that the Chinese assumed that every participant would behave as the Chinese do - that is, abide by the rules and norms laid down without questioning them. This assumption, unfortunately, was completely false, and someone should have made this clear to the host country long before the Forum. If anything, the women who came to the Forum were there because they have learnt to **break rules**, not follow them; because they have learnt to question every norm, not silently accept it.

If there was anything which really destroyed the smooth functioning of the Forum, it was the rain - completely unseasonal and unexpected - which washed out countless workshops (since the majority of tents were not waterproof), and turned

many of the Forum grounds into a muddy, depressing mess. The gloomy skies and recurrent downpours, and the consequent cancellation of many events, inevitably dampened our spirits. But the Chinese can hardly be blamed for not organising better weather !

It is impossible to generalise about the impact of the Forum on those who were part of it - each participant will have their own unique experience. Some of the veterans of the women's movement felt rather sceptical - there was an uncomfortable suspicion that once again, we had been out-manoeuvred and marginalised, ending up once again talking to each other, rather than to those who really need to be convinced about the need for change. However, for the younger generation of activists, and for the hundreds of grassroots women who were attending an international women's event of this scale for the first time, the Forum was an unforgettable experience, from which they have returned energised and empowered beyond measure. If for no other reason than this, one must consider the NGO Forum of the Fourth World Conference on Women a great success.

AN ATTEMPT TO "UNDERSTAND" RS - THEORY FROM ORTHODOX PREMISES

A.N. Mitra

The Ramanna-Sreekantan formula pointing to a dual relationship between the masses and lifetime of elementary particles and nuclei, which may be expressed in the alternative form of a Γ/M ratio has a simple representation $n/2^n$ (where Γ is the total width of the particle concerned), and is intriguing enough to warrant a closer look, irrespective of its (as yet tentative) theoretical foundations. Indeed even if this formula is taken as a purely 'empirical guess' (forgetting for the moment its 'Cantor' basis), the fact that it fits such a whole range of data involving all possible types of interactions with n an integer for almost all cases is by itself an interesting result which calls for some sort of 'understanding', to start with, within the orthodox premises of quantum theory, if for no other reason than to check where the 'conventional wisdom' stands in this regard.

It was with this kind of perspective that ANM accepted a one-year visiting assignment at NIAS (on Dr. RR's invitation) to study this issue in terms of some standard quantum mechanical principles,

choosing for this purpose one of the sectors investigated by RS, viz., the strong decays of meson and baryon resonances. Now this was also the sector (characterized by small n -values) where the data showed the maximum 'scatter' w.r.t. the RS-formula. Further, it was precisely this sector where ANM (in collaboration with Anju Sharma) had recently made an investigation of Γ/M in terms of a concrete model based on the Bethe-Salpeter and Schwinger-Dyson Equations (IJMPA10 (1995)2799). Even this had required an additional ansatz to take care of the constraint of 'confinement', and had traversed back and forth several times between the authors and the Editors before the paper was accepted. The ansatz, which is best described in non-technical language as the existence of a 'short breathing mode' for temporary dissociation of a meson into a pair of quasi-free quarks before eventual hadronization (with certainly, since free quarks must not exist), seemed to provide an 'entry' into this slippery domain for checking on the possibility of a fairly wide 'contact' with experiment, and ipso - facto, the RS- formula. For a wider contact with experiment in turn, it was necessary that the theoretical premises be simplified enough so as to open up some more hadronic sectors (both meson and baryon) which, moreover, are beset with (flavour-dependent) selection rules (which it had not been possible to incorporate within the more specialized BSE-SDE description noted above). The simplification was achieved with the help of some big unifying principles (gauge principles and broken chiral symmetry, both of which are well established paradigms not to feel 'guilty' about !), which provided the necessary 'vehicle' to test the 'quasi-free ansatz' noted above on a wider scale of phenomenology. The results were expressible in the form $\Gamma/M = f(J, \alpha_s(M), M/m_q)$ where M is the hadron mass, J its spin, m_q the mass of the quasi-free quark, and $\alpha_s(M)$ is the QCD coupling constant. Now, it has long been known that M^2 versus J obeys the standard Regge trajectories with discrete points only on these lines. Moreover this last result is also known to be supported by the quark model. Therefore the alternative formula suggests a discreteness in Γ/M as much as the M^2 versus J shows the same. More importantly, this formula was found to describe quite adequately the data on several hadronic sectors without any further assumptions. On the other hand the gap between this form of discreteness and the one implied by the RS-formula remains.

Nevertheless the fact that the orthodox theory suggests a discreteness at all in the ratio should be regarded as an important qualitative victory for the RS theory.

THE LESSON FROM MURUROA

Sachidananda Mohanty

A disturbing aspect of modern times is the manner in which imperialism masquerades as culture. Imperialism involves acts of conquest, domination and subjugation of natives. It embraces economic and political exploitation of the subject people. After the disbanding of the colonial empire by the West during the fifties, one imagined that old fashioned "Gun-boat diplomacy" or "Opium War", 19th Century style, were things of the past. Today, it is culture that serves as the main weapon in the hands of the neo-imperialists. Colonialism of the Anglo-American or Teutonic blocks are fairly well known. What is however not so well known is the manner in which others have used "culture" to mask their imperialistic designs. The obduracy of the French to ignore world opinion and the opinion of the people of the Pacific Region, in particular the French Polynesia, and to conduct nuclear tests in the Mururoa Atoll reveals the extent to which the so called "cultured" nations can stoop for their game of one up manship.

One way by which imperialism attempts to soften its ugly impact is through the sedulous cultivation of cultural stereotypes and facades. And so, we learn in school that the British are a nation of shopkeepers, the Germans extoll military glory and prowess, the Americans are "babes in the wood". "innocents abroad", and the French Cherish liberty, and value culture.

We seem to be wiser now, in our discerning moods, we realize that, as in the case of individuals, sweeping description of a whole nation under such labels is only far-fetched, and that what ever else it may be, imperialism is no respecter of values, least of all, the value of self-determination and democratic accountability.

Of all the nations, it is perhaps the French that have promoted a series of successful myths in the overseas territories, Central to this myth making is the belief, religiously propagated, backed by the French culture industry that France does not cherish empires, and in any case, the French presence in the colonies has always been benign.

Nothing is farther from the Truth. While the French have made their own contribution to liberty and have their own credentials to freedom, the British their own Magna Carta and the Americans their Jeffersonian Charter of Human Rights, each of these nations has been Janus faced with regard to the rest of the world, especially their colonial empire or spheres of influence.

So today, as the elite in poor third world nations sing the praise of the paintings in Louvre or wax eloquent about the "haute-couture" of Yves St. Laurent, the same French can merrily explode bombs in far away polynesia and make the arrogant claim that such explosions are necessary for their security. (Read French Pride). Never mind, the harm to ecology, the opinion of poor Tahitians, the New Caledonians, the Australians, the New Zealanders, the Japanese and the rest of us.

Again, imperialism is revealed more in its language and rhetoric. And we need to examine the language of the violators alongwith their counter charges : "who is financing the 'Green Peace' Movement ? Isn't the per capita income in New Caledonia higher than that of Australia and New Zealand ? We want to know if the Japanese Minister stood along with the protesters in Tokyo before we can allow him in to the Elyse Palace". The sense of contempt and arrogance are unmistakable. It is an antiquated parochial mindset, a throw back to the 19th Century that you thought was passe. There is always the ultimate threat : "We are going to boycott your goods unless you stop the protests !"

The moral of the story is that we and our children need to undertake a re-reading of history. We need to recall Hiroshima, Nagasaki and Jallianawallabagh. Similarly, we must remember the record of the French in Francophone countries : in Lebanon, Morocco, Tunisia and Algeria. It is perhaps Algeria that represents the worst example of French imperialism, the ugliest chapter of Gaullist France : the arrogance and obduracy of the "Pied Noirs" that might explain the anger of a Franz Fanon in his Wretched of the Earth.

Likewise, we need to recall the French legacy in Indo - China, its history or torture and exploitation until the French were ignominously vanquished in the Battle of Dien Bien Phu and made way for a worse regime to follow, or think of the Suez Crisis in 1950 when the French alongwith the English paratoopers made an aborted bid to capture of the Suez Canal. Or earlier still, recall the

collusion that Vichy France made - in contrast to the heroic partisans - with Hitler's fascists, paving way of Rommel's army in the continent and the fatal immobilization of the French navy in the North African harbour during the critical phase of World War II.

It is time therefore that we called off this bluff, this facade of culture. To the British we say, "Thank you for your civilizing mission, we were surely better off without it" To the American: "Many thanks for dropping bombs on Hiroshima and showing us your military might. We now know your commitment to the universal Charter better! And to the French : "Thank you for your claim to culture. We understand your need to maintain a nuclear edge. Only, next time you feel the impulse drop your bombs in your backyard in Alsace or at Orly."

There are no doubt others in this game. But they, like the Chinese, are unfazed about democratic claptrap. Such nations are a separate category and need a different handling.

Next time you allow yourselves to be taken in by the "Nescafe" advertisement in the exotic locales of Paris, London, New York or Bonn, pause and think of the Pacific protester in far way Polynesia! For, his image serves us as a reminder of the lesson from Mururoa.

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REMEMBERING HIROSHIMA FIFTY YEARS AFTER

C.V. Sundaram

On the morning of August 6, 1945 in the closing stages of the second World War on the Pacific front, a United States airforce bomber dropped an atomic bomb over the city of Hiroshima in the Japanese island of Honshu. It was a lethal weapon (with an explosive power equal to some 15000 tons of TNT) that was being used for the first time and as it exploded it destroyed most of Hiroshima city, converting four square miles of area into an instant crematorium. (Out of the city's population of about three and a half lakh people, 78,000 perished immediately and a comparable number died from horrible burns and radiation effects in the following months. The total death toll

by the end of the year was estimated at 1,20,000). Of some 76,000 buildings in the city 48,000 were completely destroyed and another 22,000 severely damaged. Three days later, on August 9th, another bomb of similar potency was dropped on the city of Nagasaki in the Japanese island Kyushu. It was in fact a more powerful bomb this time but on account of the undulating features of the local terrain it resulted in relatively less structural damage. Out of the total population of 2,50,000, some 80,000 died as a result of the bomb in the course of the year. The two successive blows forced the immediate surrender of Japan, bringing the war to a dramatic end.

The numbers alone will not convey the trauma of the physical and psychological suffering to which the bomb- survivors in the two cities were subjected immediately and in the following months. On account of the general devastation, that included the destruction of hospitals and loss of a majority of doctors and nurses, the medical help that could be promptly administered to the wounded was considerably restricted. Then there was the un-precedented factor of radiation sickness - the effects that slowly surfaced from exposure to neutrons and gamma rays from the bomb-explosion. Many survivors came down with nausea, head- ache, diarrhea, malaise and fever which lasted for several days, leaving the victims considerably debilitated. The skin burns caused by the intense heat of the bomb took a long time to heal, and left deep and hideous scars (described as Keloid tumours). And in the case of those who had received excessive doses of radiation, more serious latent effects became evident with the passage of time - such as incidence of leukemia (many times above the level of incidence in normal populations), and carcinomas of the thyroid, the lungs, the breast and other parts of the body. In his famous classic "Hiroshima", John Hersey - through detailed interviews with survivors and continuous follow-up - has presented the whole story, as a 'powerful and compassionate document' of human suffering. The magnitude of the problem of the health effects of radiation has warranted an organised and large scale study of the bomb survivors in Hiroshima and Nagasaki, and their children - a study that is still continuing.

This year marked the fiftieth anniversary of that cataclysmic event and it was an occasion for thoughtful recollection and reflection. There was a spate of articles in the press. The British Broadcasting Corporation telecast many special programmes, including a memorial service at the

Hiroshima peace park on the early morning of August 6th, a documentary presenting interviews with some of the atom bomb survivors, and an international debate on the continuing issues relating to nuclear weapon testing and nuclear disarmament.

It was an occasion once again to review the propriety of having used these bombs without any warning on unsuspecting populations. At this point in time there did not appear to be any remorse on the part of the Western powers. The expressed view was that the conduct of the war had already become brutalized, and extensive bombing of urban centres in Europe, and also over Japan, had come to be accepted as unavoidable. Military strategists considered the atomic bomb as only an extension of the process. There was definitely an anxiety on the part of the United States to bring the war to a quick end, to save American lives. All the same, at least the second bomb could have been delayed and possibly avoided.

Historical records of the period reveal that in the early part of 1945 when the atomic bomb project had reached an advanced stage and the first test in the New Mexican desert was due prior to the actual use of the bombs, the possibility of sharing the secrets of the project with the Soviet Union had been mooted and even the possibility of inviting neutral observers to witness the test, who could then report to and influence the Japanese Government towards an early surrender. In the event however, the activity was pursued in an exclusive fashion by the U.S., and an opportunity for securing international control was thus irretrievably lost at a crucial stage.

The news of Hiroshima and Nagasaki reached the Soviet camp at a time, when the Red army had triumphed over the German forces in the European front and Stalin had agreed to deploy his forces towards the Pacific front. Stalin interpreted the use of the 'secret weapon' as a pre-emptive bid on the part of the U.S. and he realised that the balance of power had shifted in favour of the United States. He immediately ordered the Soviet scientific effort to develop the bomb, and restore the balance. What followed is now part of history.

It was unfortunate that in the years immediately following the second World War, international politics was dominated by deadly distrust between the United States and the Soviet Union. Military strength came to be identified with the acquisition of nuclear capability and

accumulation of nuclear weapons. It set in motion a furious arms race between the two super powers lasting for over four decades. In the process even more powerful, thermo-nuclear weapons (Hydrogen bombs) came to be developed on both sides and also a variety of tactical weapons (including the neutron bomb). Side by side there was a parallel development of delivery systems in the form of long range bomber aircraft, inter continental ballistic missiles and nuclear submarines, carrying multiple war heads. In the pursuit of the policy of nuclear deterrence the objective on either side was to develop such massive retaliatory capability that will spell total destruction in case either side chooses to launch an attack on the other.

The nuclear stock pile reached a peak of 32,000 war-heads (with a total explosive power equal to several thousand megatons of TNT) on the side of the USA by 1967 and 33,000 on the Soviet side by 1988. It was an awesome 'capability' that could destroy the whole world, many times over. Only very recently, as initial steps towards disarmament, both sides have agreed to some reduction in their arsenals, and de-targeting of the war-heads. But there is still a long, long way to go before a complete agreement is reached on total nuclear disarmament, that will also be possible to implement.

The Cold War and the policy of nuclear deterrence is supposed to have cost the United States an expenditure of some 10 trillion dollars (at 1988 dollar value) during the period 1945-88. The Soviet expenditure too should have been of the same order. The military industrial complex became too difficult to sustain and it ultimately led to the economic and political collapse of the Soviet Union. In retrospect it seems strange that the world's two leading powers set for themselves a course that was ruinous to their economy, and so disturbing to world peace. One of the explanations offered by political analysts is that "during the course of the second World War both the USA and the USSR were wrenched out of their isolationism and thrust into roles of world leadership. They nurtured contrary and universal ideologies, and they chose to mount military threats in preference to political dialogue. As both the countries had been forced into the World War by sneak attacks, they had resolved never again to be seduced into appeasement or to be taken by surprise".

On the constructive side, the Japanese nation has shown remarkable resilience in recovering

from the ravages of the war. Both Hiroshima and Nagasaki have been rebuilt as modern cities with larger populations, and flourishing peace time commercial activity. There are still a large number of bomb survivors in both the cities. As part of a Japan-US programme to study the health effects of nuclear radiation, registries have been maintained for continuous surveillance of the health of the survivors and the children born to them - particularly to study the incidence of cancer in relation to the radiation doses received at the time of the bombing. This is providing valuable data for prescribing tolerance limits for radiation exposure for workers in the civilian nuclear industry, in nuclear installations, atomic power stations and also in the industrial and medical use of radiation.

It should also be mentioned that Japan is among the few developed countries who place a large emphasis on the development of nuclear power to meet growing energy needs, and as a commercial alternative to coal power. Thirty percent of all electricity generated into Japan comes from its nuclear power stations. Japan is also pursuing vigorously its fast reactor programme, to achieve energy independence.

Fifty years after the event it can still be appreciated that the development of an extreme weapon like the atom bomb had to be undertaken in a context when the western world had mortal fear of the brutal policies pursued by Hitler and the Nazis in Germany, and there was an atmosphere of urgency to gain a lead in weaponry. No doubt the science and technology achievement, in the war time Manhattan project in the USA was a spectacular achievement with many beneficial fall outs in the following decades. However, after the two World Wars and many more regional conflicts during the century, the time has come for the world to move towards better political stability and lasting peace for the whole of humanity to derive the full, constructive benefits of science and technology. In such a context the international S&T community should take a firm stand to voluntarily abstain from the application of science to the development of weapons of mass destruction.

Perhaps it will be appropriate to conclude this essay with the firm advice from Prof. Joseph Weizenbaum at MIT to one of his colleagues:

"You, colleague of many years, you are working on a machine consisting of two to the fifteenth and more microprocessors running simultaneously. With the help of such a machine one can first simulate, then construct much more

efficient, small, and lighter hydrogen bombs. Imagine, for a moment, you were an eyewitness at Hiroshima in 1945; you saw people stripped of their skin die. Would you want to make this happen a thousand times more? Would you so torture a single human being with your own hands? If you would not, regardless to what end would be served, then you must stop your work".

In the same manner that international agreement has been reached on the banning of chemical weapons, efforts have to be pursued by the nuclear weapon states (USA, Russia, France, China and UK) towards progressive nuclear disarmament and a complete ban on the use of nuclear weapons. It calls for special will on the part of the nuclear powers to let go the illusory sense of security that has been sought to be achieved with amassment of nuclear weapons.

THE CENTRAL PARADOX OF QUANTUM THEORY

Dipankar Home

How should we judge the value of a scientific theory? The standard criteria are that a 'good' theory should be logically consistent and must fit all known facts. In view of the striking empirical success of quantum mechanics it would seem to stand out as a 'highly successful' theory of the microphysical world. However, there are prominent dissenters - critics of standard quantum mechanics believe that the conceptual puzzles of quantum mechanics do not merely indicate the 'incompleteness' of the theory but also call its logical consistency into question, primarily because of what is known as the quantum measurement paradox. In what follows, we shall try to explain what really lies at the heart of this problem.

The **quantum** measurement paradox is an ineluctable fundamental problem if quantum mechanics is regarded as a universal theory applicable in the macrodomain as well. It is an inevitable consequence of the standard (linear and unitary) formalism of quantum mechanics that the treatment of any measurement of physical attributes of quantum entities by macroapparatus had to culminate in a pure state (superposition of macroscopically distinct outcomes) corresponding to a homogeneous ensemble (of systems coupled with apparatus) comprising **indistinguishable** members. This is clearly at variance with a ubiquitous fact of experience - the **definiteness** of

an **individual** measurement outcome entailing that different outcomes are macroscopically distinguishable (heterogeneous ensemble of systems coupled with apparatus). Thus the standard formalism of quantum mechanics seems to actually forbid a measurement to take place. Then it becomes logically inconsistent to speak of probabilities of outcomes in quantum theory when the very occurrence of an outcome is not ensured in the first place. Not surprisingly, Steven Weinberg has called this 'the most important puzzle in the interpretation of quantum mechanics' (**Dreams of a Final Theory**, p.64, Vintage, London, 1993).

An orthodox response is that since interference between different macrostates of an apparatus is difficult (if not impossible) to observe in practice, the 'pure' state at the end of a measurement process behaves as if it were a mixed state corresponding to heterogeneous ensemble. However, critics point out that this does not 'solve' the problem in principle because the absence of any observable interference between macroscopically distinct alternatives does not by itself imply that **actually** an individual alternative has **occurred** - in other words, the way a 'pure' state is interpreted cannot be abruptly changed merely because the relevant evidence is difficult to obtain in practice. Since there is no fundamental reason why the physics involved in 'measurements' should be different from any other kind of physics, it is the very legitimacy of such a conceptual discontinuity or a 'cut', not so much whether its precise position can be specified or not, that is the crux of the issue.

The dissatisfaction with the measurement paradox has spurred a number of nonorthodox approaches. Apart from the schemes developed independent of the postulate of wave function collapse (à la Bohm's ontological interpretation, environment-induced decoherence models), the other important line of approach embodies the notion of wave function collapse in the form of dynamical models, formulated by incorporating appropriate stochastic terms in the Schrodinger equation. A key element in all such schemes is the condition for deciding at what point a measurement is **completed**.

It is reasonable to regard a measurement to be completed at a stage where a measurement outcome is recorded or stored in a **stable** form (so that it can be retrieved or inspected at any later instant) through a **macroscopically discernible** change of state of a measuring device which is

made up of a large number of microconstituents. This notion characterizes all the approaches to the quantum measurement problem which rest on the premise that the physical process resulting in the registration of a measurement outcome is determined **entirely** by the relevant dynamics. The instant at which a measurement information is actually retrieved or inspected (which is dependent on the free will of an experimenter) is **arbitrary** and hence considered to be dynamically irrelevant.

It is next important to be clear about the precise meaning of the expression "macroscopically discernible change of state". In the context of various nonorthodox approaches mentioned earlier, a necessary condition for quantum measurement is that a dynamical evolution caused by measurement interaction should lead to an occurrence of a superposition of states of a measuring apparatus, differing in the **spatial configuration** of a macroscopic number of particles. In the collapse models, such a coherent superposition would dynamically reduce to an **actual** mixed state of the component states - a physical process simulated by stochastic terms in the Schroedinger equation, whose strength increases with the number of particles or total mass of the measuring apparatus. On the other hand, in the environment- induced decoherence models, it is the form of the interaction between a system and environment which causes an **effective** decoherence (meaning that the coherence effects become unobservable for all practical purposes) between the superposed states of the measuring system, within a time scale which is dependent on the mass of the system and spatial separation between the superposed states. Bohm's scheme is entirely different in that it requires neither wave function collapse nor the concept of environment - a definite outcome is ensured in a measurement by interpreting that it is the ontological **position** (independent of any observer) of the apparatus that enables singling out of a particular outcome. In Bohm's interpretation of the standard quantum formalism, the 'complete' state of an individual particle is specified by the wave function along with its putative ontological **position**.

A common ingredient in all the above schemes is the condition that when a system acts as a measuring device, its macroscopically distinct states are localized in position space, mutually separated by distances large enough (compared to the relevant microscopic length scales) so that the spatial overlap integrals between these states can be neglected. This criterion works well for all usual

measurements using macrodetectors made up of = 10^{23} particles. In particular, the triggered state of any typical counter has a spatial configuration of its constituent particles displaced appreciably compared to the corresponding configuration in the untriggered state.

To what extent is the foregoing criterion really universal ? Will it be possible to discriminate between various nonorthodox models of quantum mechanics by devising suitable experiments ? Can further light be thrown on issues related to the quantum measurement paradox by exploring new domains such as the cosmological scenario or measurements involving biomolecules. These are some of the crucial questions which now lie at the heart of the investigations on this topic.

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THE ULTIMATE STEP IN THE COPERNICAN REVOLUTION

R. Cowsik

Five hundred years ago Nicolaus Copernicus, the Polish Astronomer wrote the 'Commentariolus', propounding the view that planetary motions including that of earth were best understood with the sun as the center of their revolution. This idea contradicted the orthodox views that the earth, on which walked man created in his image, was the center of all motions. The works of Tycho Brahe, Kepler, Galilio and Newton led to the idea that heavenly motions followed the same laws of dynamics as that followed by mundane objects. Just as man at large was getting accustomed to these ideas, Charles Darwin came up with his 'Origin of Species' and 'The Descent of Man' moving us away from the anthropocentric superiority. Then again through the works of Einstein followed up by Hubble and astronomers of this century on the one hand and through the advent of the Space Age on the other, which put man into space, our views evolved to an almost complete abnegation of the anthropocentric myopism. But it is only about two decades ago that for the first time the ideas were formulated which propounded that the world was dominated by neutrinos or by other such weakly interacting particles which are quite different from the molecules, atoms, nuclei and electrons which are

the building blocks of everything that we see. This path towards universality is the main thrust of the research of physicists and astronomers today.

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THE SCIENTIST AND THE PHILOSOPHER

Sundar Sarukkai

Quite a few scientists have asked me why philosophy cannot be put into a mathematical form. In fact, they have even suggested that once expressed in this form, there will be more truth in philosophy and philosophy will neither be so boring nor so verbose. They also believe that with such an approach philosophers can define everything clearly and unambiguously rather than 'hide behind words and play with words' and also rid them of their unpleasant habit of answering one question with another question. The only response I could come up with is this story of a philosopher and a scientist.

A MODERN FOLK-TALE

There was once a philosopher who shared a room with a scientist. The problem with him was that, like many of his professional colleagues, he was perpetually dissatisfied. He and his ilk could never easily accept the claim of the scientists regarding the nature of this world and the universe. If you had shown this philosopher a tree and called it a tree, he would have asked, 'How do you know it is a tree?' or 'What is a tree in itself?' The scientist could never figure out why he could not accept a tree for what it is. He tells the philosopher all that he knows about the tree - height, width, colour, chemical composition, density and so on. The philosopher (poor chap, he still cannot figure out what density is), shakes his head in perplexity. He seems more intent on knowing what is not rather than being satisfied with what is. In moments of deep angst, he starts quoting difficult sentences from Heidegger and Kant. He still wants to know what a tree is other than the qualities ascribed to it. The scientist's patience reaches its limits and in sheer frustration, he writes a mathematical equation for a tree and thrusts it at the philosopher.

The philosopher, instead of being grateful for this act, shakes his head (and his beard, untrimmed for the last thirty years), scratches his head (same as above), and dismisses the equation. He claims that the scientist is telling a story about the world

which is just one story among many. In fact, he goes further and dares to question the meaning of mathematical symbols themselves. He wants to know what mathematics is and has the effrontery to claim that all these symbols are just products of the imagination and are like ordinary words. God forbid! At this insult the scientist splutters and his veins pop out till his B.P. reaches its maxima. (In other words, the scientist thinks that the derivative of his B.P. is now zero.) He is rushed to the hospital and the philosopher, feeling sorry for him, decides to try and make philosophy mathematical.

He thinks of a fundamental problem in philosophy, that of essence. He thinks about this problem, on a long walk up and down the corridor, consumes three cups of tea and scratches his head excessively. The scientist, in the meanwhile, has come back after fighting with the doctor who insisted on being unscientific and irrational and who also did not use mathematical equations before prescribing medicines. The doctor was also ignorant of the topology of the stethoscope and had no knowledge at all of the dynamical equations of that instrument. He used it in blind belief and nothing upsets our scientist more than blind belief. So he walked out of the hospital in his dressing gown. He met the philosopher, who was still shaking his head and had wasted all his time thinking and not writing papers.

Their collaboration roughly went as follows. Let S stand for the scientist and P for the philosopher. Then:

S: OK. Now let's define essence. That is the basic problem with you - no definitions at all. You just want to keep talking all the time.

P: All right. What does definition mean?

S (splutters): Let E be the essence.

P: Then?

S: Then? Put it into an equation.

P: I don't know what E is.

S: Doesn't matter. Let us assume that it is a continuous function and infinitely differentiable.

P: Function of what?

S: Let us say, essence of life. Then $E = E(L)$ where L is life.

P: What is continuous about it? Some philosophers say that essence is unchanging.

S: No problem. That means the derivative of $E(L)$ with respect to time and space is zero.

P: That is very smart. Now what?

S: Ha! I see it now. Use the continuity equation. Perhaps even Bernoulli's equation. I think I can even bring in Legendre functions. This is really exciting, right?

P: Yes, yes. So what is the answer?

S: Answer? How ignorant you are! You have to solve the equation and give boundary values and then...

P: I am waiting.

S: I need more information. This is too simple. Everyone can understand it. Even you. It has to be more complicated. We can make essence non-linear, add friction terms...

P: You are right. I don't understand it at all now.

S: Good. But wait. This is still too Classical. You have to make this equation relativistic. (The philosopher accepts defeat under this blinding truth.) No, No. That is also not enough. General theory of relativity is OK, but not enough. What

decides to stop thinking and start writing papers.)

P: Duh. Did you say spin? You want me to spin?

S: No, you idiot. What is the spin of this essence? How will I know what equation I should put it into?

P: Essence spins?

S: Oh God! No, make that, Oh Dirac! Spin does not mean spin. It can be isospin, hyperspin, hypospin...

P: Disprin?

S: (Face becomes experimentally red): No seriousness at all. That is the problem with you fellows. For the last two thousand years all of you have been talking the same nonsense and you still don't know if essence has half-integral or integral spin; you haven't calculated its mass; nor have you bothered about the strength of interaction with strong, weak and electromagnetic forces. OK, gravity I can excuse, because we have not solved it ourselves and I can't expect it out of you chaps. But you have been eating the resources of all our institutes these thousands of years and you still don't know its spin and mass and continue to write in English!



NOW HE IS IN A MATHEMATICAL SOUP!

about its quantum nature? The zero-point energy and quantum fluctuations? What wave equation does it obey? The Dirac or the Klein-Gordon? Does essence have spin? What is its mass? Its lifetime? I say, you philosopher, wake up. Can't you answer these simple questions? (The philosopher is dazed. His whole life is negated. He could murder Plato and Aristotle if he could. While at it, also Kant and Heidegger. Since they were all safely dead, he wants to commit suicide but can't figure out whether he can know for sure if he would be really dead or not. But on further thought, he

(The philosopher withers under this attack. He has been found out! Voices inside his head shout - Charlatan, Liar. He is now definitely worried. His worst nightmare is coming true - that of going to a psychiatrist or worse, a psychoanalyst, who will prove to him that his whole life had been full of lies, right from the third month in his mother's womb. His hair, non-empirically, begins to turn magnesium white.)

S: (His veins begin popping out again. They are quite used to this as it happens seven times a day. But the thought of the scene with the unscientific doctors make them recede back. Not those doctors again!): I give up. I have said this all my life and nobody listens to me. I have even shown you the way to do it. You now know that essence of life is $E(L)$. Ask yourself - What is the square of E , what is $\text{Log}E$ and whether it can be expressed as a special function and so on. Differentiate, integrate and equate. If that is too easy, put it in the equations or quantum gravity. Once you solve that, all the problems in philosophy will be solved. There is definitely no need for philosophers like you who don't know mathematics. (In his

excitement, he starts speaking in the mathematical language.)

The philosopher hurries out in sheer fear. He runs to the closest barber, gets a clean haircut and a shave, puts on a shirt and tie and enrolls himself for a computer course in NIIT. (He was denied admission on the basis of his past profession, but the scientist put in a word for him.)

And then they lived mathematically ever after.

GUEST SPEAKERS

1. September 8, 1995 - a lecture on **"CONTROVERSY AS AN EXPLANATORY CATEGORY IN SCIENTIFIC METATHEORY".** An argument and illustration" by Dr M G Narasimhan of Centre for Ecological Sciences, IISc.

In his presentation, Dr Narasimhan discussed the emergence and evolution of controversy as an analytical and explanatory category in Scientific Metatheory. Scientific Metatheory is comprised of history, philosophy and sociology of science and the main object of study is the nature and growth of scientific knowledge. The category of controversy emerged in the wake of a foundational crisis in philosophy of science and the collapse of Positivism. The development of postpositivist metatheories of science had led to the emergence of new analytical categories and disciplinary perspectives like discovery, controversy and Sociology of Science respectively.

Describing controversy as a conflict laden event in terms of different epistemic claims located in a specific spatio-temporal framework, Dr Narasimhan dealt with a particular case study in polynucleotide conformation. In this case, the primary conflict was concerned with the question, "Is DNA Really a Double Helix ?" After nearly a decade of pro and contra argumentation, the debate has been resolved in favour of the understanding that DNA is a polymorphic and conformationally flexible molecule, which was capable of assuming more than one conformation at any given point of time.

Drawing the theoretical and metatheoretical threads together the speaker concluded by pointing out that there was a pluralistic understanding of phenomena at both the levels.

2. October 4, 1995 - a lecture on **"ANCIENT YOGA AND MODERN SCIENCE"** by Prof. T.R. Anantharaman.

3. November 14, 1995 - a lecture on **"US - INDIA COLLABORATIVE OPPORTUNITIES"** by Dr. Anand Patwardhan.

Dr. Patwardhan summarized the collaboration between India and the US, particularly in the Energy Sector. This was part of an ongoing collaboration in the fields of nuclear energy and security considerations. Four areas have been identified as part of this effort. They are: Energy/Environment, Science and Technology, On weapons of mass destruction and Advanced Information Systems and Decisions Support. The approach, as far as the Indian side is concerned, lies in first identifying people, institutions and issues and then forming working groups whose reports and discussions will be the foundation on which this effort can progress. There was active discussion about the status of power projects in our country and especially in Karnataka.

4. November 30, 1995 - a lecture on **"INDIA'S ENERGY - ENVIRONMENT CHALLENGE: IMPERATIVES AND IMPEDIMENTS"**.

Dr. Pachauri, Director, Tata Energy Research Institute, New Delhi gave a lecture on November 28, 1995 on **"India's Energy and Environmental Scenario - Challenges and Imperatives"**.

Dr. Pachauri observed that with increasing urbanisation and industrialisation and the growing aspirations of the middle class, commercial energy requirements can be expected to increase by 50%, between 2001 and 2011, (Coal production from 396 million tonnes to 628 million tonnes, total electricity generation from 605 upto 988 twh) He pointed out many deficiencies in government planning and policy making in regard to augmenting power generation.

Coal mining and burning will continue to pose severe problems in transport and environmental degradation. Research on coal gasification has not been pursued with a sense of urgency it deserves.

Mini-hydel projects appear to be attractive, in a context where there has been public resistance to large hydel-schemes. One can also expect a good growth potential for wind energy (in states like Tamil Nadu and Gujarat) and for solar-thermal (eg. in Rajasthan).

Dr. Pachauri dwelt at length on the excessive atmospheric pollution caused by emissions from vehicles (including two-wheelers and three-wheelers) which has reached alarming

proportions in cities like Bangalore, and which is bound to affect public health.

Growth and development will become un-sustainable without much better discipline all around and improvements in technology and strategy - by way of minimising consumption, improving industrial efficiency and emphasis on better process and product design that will avoid environmental damage.

5. December 6, 1995 - a lecture on "**MODEL OF MIND**" by Dr. Navjyoti Singh.

6. On December 22, 1995 Prof. M. Moshinsky, a Senior Professor of Physics from University of Mexico gave a lecture on the "**DIRAC OSCILLATORS**" with arbitrary spin. The talk was based on the consequences of adding a linear (spatial) term to the momentum structure of the standard (relativistic) Dirac Equation in Physics.

FACULTY LECTURE PROGRAMME

Lectures delivered by various faculty members during the second half of 1995 are as under:-

Jul 13, 1995	"Convergence & Divergence in Science & Religion"	Dr. Raja Ramanna
Aug 16-22, 1995	"Introduction to Fractals"	Prof. A.N. Mitra
Sept 22, 1995	"Fifty years after Hiroshima"	Prof. C.V. Sundaram
Oct 18, 1995	"The Fourth UN World Conference on Women at Beijing - An overview"	Ms. Srilatha Battliwala
Nov 8, 1995	"Duality of Mass & Time"	Dr. Raja Ramanna
Dec 6, 1995	"A project proposal for computational infrastructure at the IAS"	Dr. H.K. Anasuya Devi
Dec 20, 1995	"Symmetry"	Dr. Sundar Sarukkai

IMPORTANT LECTURES/ ADDRESSES/SEMINARS/RESEARCH PUBLICATIONS ETC

DR. RAJA RAMANNA DIRECTOR

1. July 5, 1995 - Presented a paper on "Divergence and Convergence of Sciences and Spirituality" at the World Colloquium on "Sciences, Spirituality and Future" at Delhi in

commemoration of the 60th birthday of the Dalai Lama

2. July 20, 1995 - Delivered Prof. S. Bhagavantam Memorial Lecture on "Duality of Masses and Lifetimes in Quantum Systems" on the occasion of National Science Day celebration at the Andhra Pradesh Akademi of Sciences, Hyderabad

3. July 29, 1995 - Participated in the "CII-Dialogue with partners in the Administration" organised by the Confederation of Indian Industry-Southern Region, Bangalore

4. August 27, 1995 - Chaired a session on "Regional Economic Development and Cultural Interaction" at the Asian Pacific League for Freedom and Democracy Conference held at Bangalore

5. September 4, 1995 - Inauguration of the Workshop on "Internet for Information Professionals" at the Supercomputer Education and Research Centre, Indian Institute of Science, Bangalore

6. September 29-30, 1995 - Participated as the Chief Guest in the International Conference on R&D Using Electron Accelerators organised by the Mangalore University, Mangalore

7. October 28, 1995 - Participated in the seminar on "Gandhiji - Crusader of the Century against violence" organised by the Gandhi Centre of Science and Human Values at the Bharatiya Vidya Bhavan, Bangalore

8. October 30, 1995 - Delivered the Sree Chithira Thirunal Balarama Varma Memorial Lecture on "Science, Scientists and the State" organised by the Sree Chithira Thirunal Smaraka Samithy, Thiruvananthapuram

9. November 19, 1995 - Participated in the Informal Session on "Nuclear Energy in India" organised by the Bengal Initiative, Calcutta

10. November 22, 1995 - Inaugurated the Annual Conference of the Association of Schools at the Bishop Cotton's Girls High School, Bangalore

UNDER-PUBLICATION:

A paper submitted on "Duality of Masses and Lifetimes in Quantum Systems" to International Journal of Modern Physics

PROF. R.L. KAPUR
DEPUTY DIRECTOR

LECTURES:

1. August 9, 1995 - Delivered a talk on "A Healthier Way of Living" to the participants in the Management Development Programme of the Ingersoll-Rand, Bangalore.

2. October 5, 1995 - Delivered a talk on "What is Psychotherapy?" at the Department of Sociology, Jawaharlal Nehru University, Delhi.

3. October 8, 1995 - Delivered the inaugural lecture on "Reflections on Psychotherapy in India" during the symposium on "Alternative Methods in Psychological Therapies" organised by NIMHANS, Bangalore.

4. October 28, 1995 - Participated in a seminar on "Gandhiji - Crusader of the Century Against Violence" organised by Gandhi Centre of Science and Human Values, Bharatiya Vidya Bhavan, Bangalore, and delivered a lecture on "Violence Amongst the Indian Youth".

5. October 30 to November 1, 1995 - Participated in a 3-day international workshop on "Principles of Mental Health Services Evaluation" organised by the Schizophrenia Research Foundation (India) and World Association for Psychosocial Rehabilitation and spoke on "The Indian Mental Health Care System: The Need for a Quality Assurance System".

6. November 24, 1995 - Spoke on 'Changing role of family in mental health care in India' at the International Symposium on "Innovations in Psychiatric Rehabilitations" organised by the Richmond Fellowship Asia-Pacific Forum from 23rd to 25th November, 1995 at Bangalore.

PUBLICATIONS:

1. "Understanding Human Behaviour: Some Psychological Considerations for Promoting Sensitivity to Human Rights" by Prof. R.L. Kapur and Ms. Susmita Subramanyam, in a manual on Human Rights Training for Police Personnel, National Law School of India University, Bangalore, published in April, 1995.

UNDER-PUBLICATION:

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

2. "Exploring the Personal Dimensions of a Therapist". NIMHANS publication.

PROF. C.V. SUNDARAM
HOMI BHABHA VISITING PROFESSOR

LECTURES:

1. October 9, 1995 -Lecture to students at Aditi School, Bangalore on "Fifty Years after Hiroshima".

2. October 14, 1995 - Lecture on "Metallurgy - Past and Present", in the GOLDMET-95 Conference, IIM Bombay Chapter, Powai, Bombay.

3. October 16 1995 -Lecture on "In quest of Lightness in Structures", Metallurgy Colloquium, Bhabha Atomic Research Centre, Bombay.

4. October 17 1995 - Lecture on "Fifty Years After Hiroshima" Metallurgy Colloquium, Bhabha Atomic Research Centre, Bombay.

5. October 28 1995 - Participated in the Symposium on "Gandhiji - A Crusader of the Century against Violence", Gandhi Centre of Science and Human Values, Bharatiya Vidya Bhavan, Bangalore.

6. October 31 1995 - Sri B P Wadia Memorial Lecture, Indian Institute of World Culture, Bangalore

7. December 11, 1995 - Colloquium on "Nuclear Armaments", at Indira Gandhi Centre for Atomic Research, Kalpakkam.

8. December 13, 1995 - Inaugural Address at Seminar on "X-rays and Nuclear Radiation : 100 years of Achievements", at Meenakshi College for Women, Madras.

PROF. M.N. SRINIVAS
JRD TATA VISITING PROFESSOR

SEMINAR:

Presided over a national one - day seminar on "Women in sericulture" at the Institute for Social and Economic Change, Bangalore on September 5, 1995.

PUBLICATIONS:

1. "Gandhi's Religion", Economic and Political Weekly, Bombay, June 24, 1995.

2. Yaadon Se Racha Gaon (Hindi Translation of The Remembered Village), Rajkamal Prakashan, New Delhi, July 1995.

UNDER PUBLICATION:

1. "Participant Observation", paper contributed to the Workshop on Qualitative

Method for Mental Health Workers, NIAS, March 1995.

2. Contribution on "Secularism" to be published by The Rajiv Gandhi Foundation, New Delhi (Proceedings of a seminar on Secularism held in Baroda, November 1994).

PROF. B.V. SREEKANTAN
SENIOR HOMI BHABHA FELLOW

LECTURES:

1. July 6, 1995 - on "Modern Astronomy" at National Institute of Advanced Studies, Bangalore

2. September 27, 1995 - On "Physics and Consciousness" at Chemical Engineering Dept, Indian Institute of Science, Bangalore.

3. October 30, 1995 - On "Particles and Radiations from Depths of Space" at Bhabha Atomic Research Centre, Bombay.

PROF. A.N. MITRA
VISITING PROFESSOR

LECTURES:

1. August 16 & 22, 1995 - delivered series of lectures on "Introduction to Fractals",

PUBLICATIONS:

1. "The basic vs the Evolved" (book review). Current Science 69, 461(1995).

2. "In the pursuit of Science: The Subjective Element", Current Science 69, 783 (1995).

3. "India's Scientific Community: A Cultural Crisis?", Current Science, 69, Nov 25 (1995).

4. "Fathoming the unfathomable", A.N. Mitra, Current Science 69 (1995) - in press.

5. "A Dynamical Understanding of Hadronic /M Ratios", A.N. Mitra and Anju Sharma, Proc. Intl. Symp. in Honour of J. Vigier, Toronto (1995). Kluwer, Academic Publishers (Amsterdam) 1996 - in press.

6. "A New Quantum Number in a Complex Harmonic Oscillator Basis", A.N. Mitra and Anju Sharma, H. Banerjee Festschrift, Indian J. Physics, 1995 in press.

7. INSA - Einstein Professorship Lecture - "From Hadron Spectra to Quark-Loop Dynamics: An Integrated View," Proc. Ind. Nat. Sci. Acad (A), 1995-96 (in press).

8. "An Inclusive Determination of Hadronic /M Ratios", A.N. Mitra and Anju Sharma, - Submitted to IJMPA.

9. "On Khalfin's Theorem" PK Kabir and A.N. Mitra, Phys. Rev. D52, P 217 (1995).

10. "A Minimal Dynamical Framework for Hadronic Width/Mass Ratios", A.N. Mitra and Anju Sharma - NIAS preprint June 1995.

11. "Strong $su(2)$ Breaking in Pseudoscalar Mesons", submitted to Phys. Rev. C (1995).

12. "Baryon-qqq Dynamics and n-p Mass Difference", Anju Sharma and A.N. Mitra; submitted to Few-Body Systems 1995.

DR. BISWAJIT SEN
FELLOW

LECTURES:

1. Lecture on "Youth Psychology" given to engineering college teachers under their programme IMPACT at the CEDT, Indian Institute of Science.

2. July, 1995. Three lectures on "**Mental Illness and Emotional Problems of Youth**", given during the Third NIAS Teachers' Course.

SRILATHA BATLIWALA
FELLOW

LECTURES:

1. June 15, 1995 - lecture on "Autonomy, Empowerment, and Reproductive Rights - a Conceptual Exploration", at the Workshop on "Women's Health and Rights - Rethinking Population, organised by Coordination Unit, Bangalore, and HIVOS, Bangalore.

2. September 4, 1995 - lecture on "Women's Empowerment and Popular Education - A Conceptual Framework", at the ASPBAE Workshop on Popular Education and Women's Transformation, NGO Forum of the Fourth World Conference on Women, Beijing, China.

3. November 14, 1995 lecture on "Education for Women's Empowerment - The South Asian Experience", at the UNESCO Orientation Seminar on "Women's Education and Empowerment", Hamburg, Germany.

Workshops/Seminars/Training Programmes
Attended:

1. June 15-16, 1995 - Workshop on "Women's Health and Rights - Rethinking Population",

organised by Coordination Unit, Bangalore and HIVOS, Bangalore.

2. August 2, 1995 - National Resource Group Meeting, Mahila Samakhya, Department of Education, Ministry of Human Resource Development, Govt. of India, New Delhi.

3. August 4, 1995 - Orientation Workshop on Population Policy and Reproductive Health, MacArthur Foundation, New Delhi.

4. Aug 30-Sep 8, 1995 - NGO Forum of the Fourth World Conference on Women, Beijing, China

5. Oct 13, 1995 - "Participants of the Fourth World Conference Meet the Public", organised by Coordination Unit (South), Bangalore.

6. Nov 13-18, 1995 - Orientation Seminar on "Women's Education and Empowerment", organised by the UNESCO Institute of Education, in Hamburg, Germany.

PUBLICATIONS:

1 "Energy as an Obstacle to Improved Living Standards", in UNDP, 1995 : Energy as an Instrument for Social Change, UNDP, New York

2 "Women and Energy - Bearing the Brunt of Labour", in HINDU Survey of the Environment", 1995, The Hindu, Madras.

DR. P.K. SHETTY RESEARCH FELLOW

LECTURES:

1. June 27, 1995 - Lecture on "Pesticides, Human Health and the Environment" at the seminar on "United Nations for Better World" - June 26-28, 1995 Bangalore.

PUBLICATIONS:

1. "Agriculture and the Environment" in Encology Vol.9, No.9., February 1995.

2. "Pesticides - the dangers of their indiscriminate use" in the proceedings of seminar on "United Nations for Better World", brought out by Kengal Hanumanthiah Foundation on the occasion of Fiftieth Anniversary of United Nations - June 1995.

UNDER PUBLICATION:

"Influence of Metalaxyl and Pendimethalin on soil phosphatase activity in the rhizosphere of wheat". Journal of Teaching and Research in Chemistry.

INVITED SEMINAR:

1. November 13, 1995 - seminar on "Recent Trends in Chromatography" organised by Spinco Biotech Pvt. Ltd., Bangalore.

DR. V. SUCHITRA MOULY RESEARCH FELLOW

1. July 8, 1995 - Participated in the symposium on "My experience with research" held at the NIAS Course for University Teachers.

2. September 5, 1995 - Invited lecture on "Representation of Women in Science in India" at the Indian Institute of World Culture.

3. September 29, 1995 - Invited lecture on "Representation of Women in Science in India" at the Indian Institute of Science, Bangalore.

DR SUNDAR SARUKKAI RESEARCH FELLOW

LECTURES

1. "Technology - Sublime and the Real", Invited talk at the National Seminar on India and the New Technology Order, MG University, Kottayam, August 16, 1995.

PUBLICATIONS

1. "Humanism and Technology", In Facets of Humanism, Ed. B.V. Subbarayappa, Affiliated East-West Press, Aug. 1995.

UNDER PUBLICATION:

1. "Technology - Sublime and the Real", To appear in the proceedings of the National Seminar on India and the New Technology Order, MG University, Kottayam.

2. "Mathematization of the Human Sciences - Epistemological Sanskritization?", To appear in Economic and Political Weekly.

DR. H.K. ANASUYA DEVI RESEARCH FELLOW

LECTURES:

1. August 19-25, 1995 - Series of lectures delivered on "Introduction to Natural Language Processing and AI Programming Languages" and also conducted Laboratory Sessions during the same period as a part of Natural Language Processing - Teachers Training Programme, organized by Supercomputer Education and Research Centre, IISc, Bangalore.

2. December 6, 1995 - Lecture on a Project Proposal for Computational Infrastructure at the National Institute of Advanced Studies, Bangalore.

**MS SUSMITA SUBRAMANYAM
RESEARCH ASSOCIATE**

PUBLICATIONS:

"Understanding Human Behaviour: Some Psychological Considerations for Promoting Sensitivity to Human Rights" by Prof. R.L. Kapur and Ms. Susmita Subramanyam, in a manual on Human Rights Training for Police Personnel, National Law School of India University, Bangalore, published in April, 1995.

**MS. ANITA GURUMURTHY
RESEARCH ASSOCIATE**

SPECIAL ACTIVITIES

1. August 1995 - Member of the evaluation team that was invited by the Canadian Cooperative Association (CCA) to evaluate the savings and credit programme supported by CCA and coordinated by SPARC.

2. Co-edited the MADHYAM Journal - Volume X, No.1, issue titled "Communicating Grassroot Women's Concerns - Towards Beijing and Beyond".

3. November 17, 1995. - Facilitator at the workshop organised by Bridge Foundation and SPARC on Women and Credit.

**MS. ANITHA B.K.
RESEARCH ASSOCIATE**

LECTURE:

1. November 20, 1995 - a lecture titled "Literacy for Empowerment" at the workshop organised by NIPCCD for NGOs

SEMINAR/WORKSHOP:

1. October 19-20, 1995 - a Resource Person in the workshop organised by ISEC to design a manual for Head Masters of schools covered by the District Primary Education Programme of the Government of Karnataka.

HONOURS AND AWARDS

1. The Government of Karnataka has honoured Prof. M.N. Srinivas of NIAS by giving him the "RAJYOTSAVA" award for 1995 in appreciation of the incomparable services in promotion of the service of society (Sociology).

2. Prof. R.L. Kapur has been invited to be on the Board of Editor's for the Journal "TRANSCULTURAL PSYCHIATRY", McGill University, Canada. He has also been invited to be a member of the New York Academy of Services in July 1995.

VISITS ABROAD

1. Dr. V. Suchitra Mouly has joined the Department of Management at the University of Canterbury at Christ Church, New Zealand, as a lecturer from November 01, 1995. She will be co-ordinating and teaching a course on "Qualitative Research Methods". Organisational Behaviour, and Principles of Management are the other courses, she will be teaching. She will also be guiding Ph.D students.

2. Prof. Sreekantan participated as an expert in the design review of the International Giant Air Shower Project held at Fermilab, Chicago, from August 28th to September 1st, 1995.

He attended the 24th International Conference on Cosmic Rays held at Rome from August 28th to September 8th 1995.

**COUNCIL OF MANAGEMENT
MEETING**

The Fourteenth Meeting of the Council of Management of NIAS was held on November 8, 1995 at NIAS.

INFRASTRUCTURAL BUILD-UP

The works on all facets of construction of the Auditorium forming part of the "JRD Tata Memorial Centre" at NIAS is in fairly advanced stage of completion. At present, work on Acoustic, Interior, Air-conditioning, Fire-fighting, Electrification and Sound System are in progress.

There is a proposal to install computational infrastructure in NIAS consisting of components such as Central Computer Facility (CCF), Local Area Network (LAN) and the extension of the LAN to the IISc. Campus Network (WAN). The CCF will be housed in the Auditorium.

AN EXTRACT FROM A LETTER TO THE EDITOR

Dear Sir,

As a visitor to this part of the world, I would like to give you a few of my thoughts on the brief time I have spent here working with the WOPRA Unit at NIAS. When I left my home in Scotland, almost a year ago now, I had little idea of what to expect, both from India and from NIAS, but on my arrival I found both welcoming and enjoyable. I am impressed by the high academic standards at NIAS and the diverse range of disciplines working here. Under the guidance of Ms. Srilatha Batliwala, I have learned a great deal about the circumstances of women in India and I have enjoyed working with her and her colleagues very much indeed. I found the guest lectures and conference on qualitative methods in research, that I attended, of very high

quality and I liked having the opportunity to learn about subjects of my own field.

My time here has been enriched by the kindness and graciousness of you all. In particular I would like to thank the house staff for their attentiveness to me. I will remember my experience here at NIAS with great affection and would like to wish everyone success with their current enterprises and future plans.

Yours sincerely,

Pauline McConville

(Dr. Pauline is a Psychiatrist from Scotland who spent sometime at NIAS analysing data on admissions to the "State Home for Mentally Retarded Women". She also reviewed studies on women's mental health in Karnataka).

**The NIASNEWS Wishes Its Readers
A Very Happy and Prosperous
Ninety Six**

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