

NIAS NEWS



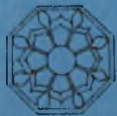
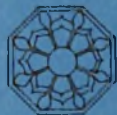
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OCTOBER 2000





Editors' Note

We are close to the end of yet another eventful year in NIAS – and this issue of NIASNEWS completes an year as well – in its new format. We hope that in the coming year the newsletter will evolve further and that there will be more improvement in its appearance and contents. What will not change, however, is its newsworthiness; we will continue to serve as a window through which the world can glimpse the various activities of the institute. But, in the meantime, please do let us know, as many of you have in the past, what you feel about NIASNEWS and whether you would like to see some other changes brought in. Help us to discover ourselves further!

In the last issue, we had inadvertently made a mistake in the reference to the book in which Prof C V Sundaram and his colleagues had contributed a chapter. We provide the correct reference in this issue and hope that such errors will be avoided in the future. Our sincere apologies to Prof Sundaram!

**Anindya Sinha, Hamsa Kalyani and
A Devaraju,**
Editors, October 2000



From the Director's Desk



The Institute's academic programme is loosely organised in a number of Units, as readers of NIASNEWS will be aware. It has always been the objective of the Institute, however, to encourage multidisciplinary work, so that we do not look at problems from what may be called a one-dimensional view point, but wherever possible, bring insights from different professional disciplines into analysis as well as into solution formulation.

I am happy that, over the last two years, a multi-dimensional programme on education has evolved at the Institute, recognising the fundamental role that education plays in national development. We have always realised the importance of education, and have for this reason very often run programmes for university and college teachers. Going beyond such courses, however, we are now involved in three different formal programmes in education – apart from several other informal ones. In the Sociology and Social Anthropology Unit, there is now a new project on elementary education. The research in this project will draw on earlier work on elementary education in six states in India, and should help us to develop programmes that take the sociological aspects of education, especially for children from deprived communities, into account. In the Gender Studies Unit where the major concern is studies on women in India, it has again been realized that access to education for the girl child is an important problem. My colleagues in this Unit have been looking at how educational programmes in rural areas in this State are faring in offering educational facilities to young girls. Finally Dr R Ramanna, Vice-

Chairman of the Council of Management, heads a Task Force on elementary education, set up in January this year by the Chief Minister of Karnataka, Sri S M Krishna. After a series of meetings held at the Institute, the Task Force submitted an interim report to the State Government in July. The Task Force has made a series of recommendations based on the discussions it held with government officials, NGOs, various educationists and with the public in several areas in the State that the Task Force visited.

These three studies give us valuable insights as to how we may go forward in making access to education far more widespread than it is now. A large number of experiments have been carried out in the country, but we hope that in the not too distant future we will be able to develop view points, philosophies and action programmes that will help to raise literacy to the higher levels that are necessary for the country to reach the next stage of development. Some reports on the NIAS programme have already appeared in NIASNEWS, and others will in coming issues. University education is of course another major concern, but this is something we shall write about at a later stage.

R Narasimha



Research Programmes



The principal areas of research that faculty members of the Institute are currently involved in include consciousness studies, conservation biology, energy policy and renewable energy, environmental toxicology, epigraphy, fluid dynamics and atmospheric sciences, gender studies, history and philosophy of science, international and strategic studies, mathematical modelling in non-traditional areas, primate behaviour and cognition, science and technology policy, sociology and social anthropology, and theory of numbers.

More specifically, the **Sociology and Social Anthropology Unit** has initiated a new research and advocacy project on **Elementary education** during the preceding period from July to September 2000. The research will draw on the previous year's research on elementary education in six states in India and will develop local education reports. These reports will enable administrators and NGO's to enhance the accessibility of elementary education to children from economically deprived communities. A final or composite report or study of all the states will also be developed during the execution of this project.

The first phase of the project on the **Setting up of digital archives for the digital preservation of manuscripts, paintings and drawings**, being run in collaboration by the **Philosophy of Science Unit** and the **Mathematical Modelling Unit**, was completed in August. Two CD-ROMs, entitled "A Digital Panorama – Parts 1 and 2", were published during this period and contain digital images of selected

manuscripts and paintings from the collections of the National Archives and the National Museum in New Delhi.

The **Gender Studies Unit** has prepared a concept note for the National Conference on Backward Districts Development, which is being organised by the Department of Rural Development and Panchayati Raj, Government of Karnataka, in collaboration with NIRD and is scheduled to be held on October 23-25 in Bangalore. The Unit is also contributing to working papers on the three themes of Improving Economic and Social Infrastructure, Human Resource Development in Backward Areas and the Institutional Aspects of Backward Areas Development .

The Department of Women and Child Development, Government of Karnataka, has entrusted the **Gender Studies Unit** to prepare a working paper on "Recasting administrative structures and redesigning policy towards the empowerment of women", which will feed into the Policy Document and Strategy for Women's Development, to be drafted by the department.



Publications

NIAS PUBLICATIONS

*Copies of the below-mentioned NIAS publication can be purchased from the Institute. Please contact the **Controller, NIAS**, for more details.*

I. NIAS SPECIAL PUBLICATIONS

2-00 Verses for the brave: Selections
from the *Yoga Vasistha*
R Narasimha



II. NIAS REPORTS

- R2-00 Blending the concerns: Gender and governance
N Shantha Mohan, A Ramesh and P Antony
Gender Studies Unit
- R2-00 Stakeholders address violence: Violence against women
N Shantha Mohan, B K Anitha and C Srinath
Gender Studies Unit

PAPERS

Ahuja, D et al. 2000. Enabling environments for technology transfer. In: *Methodological and Technological Issues in Technology Transfer*. A Special Report of IPCC Working Group III, Cambridge University Press, Cambridge, pp.105-141

Ahuja, D et al. 2000. Financing and partnerships for technology transfer. In: *Methodological and Technological Issues in Technology Transfer*. A Special Report of IPCC Working Group III, Cambridge University Press, Cambridge, pp.143-174

Sarukkai, S 2000. Book review of "Labyrinth of thought: A history of set theory and its role in modern mathematics" by J Ferreiros, Birkhauser Verlag AG, Basel, 1999. *Current Science* **79**: 661

Sundaram, C V, Baldev Raj and Rajagopalan, C 1999. History of metallurgy in India. In: *History of science, philosophy and culture in Indian civilisation* (series ed. D P Chattopadhyaya) – Volume IV, Part 1: Chemistry and chemical techniques in India (ed. B V Subbarayappa), pp. 23-53. Centre for Studies in Civilizations, New Delhi

Vasavi, A R 2000. The 'Community Gap' in primary education. *Seminar* 493: 34-37

Vasavi, A R 2000. Life-world of the invisibilized. Book review of "The silken swing: The cultural universe of Dalit women (eds. F Franco, J Macwan and S Ramanathan), Stree, Calcutta: 2000. *The Book Review*, August 2000

REPORTS

Vaidya, P G and **Angadi, S** 2000. Enhancement of Digital Data I: Interpolation (finding missing data) in 1D signals. A report submitted to the Department of Science and Technology and Department of Culture, New Delhi, under a grant for "Setting up of digital archives for digital preservation of manuscripts, paintings and drawings"

ARTICLES

Devaraju, A. Temple with a difference (on the Horanadu Sri Annapoorneshwari Devi Temple). *Deccan Herald*; July 14, 2000

Devaraju, A. There's a lot in his name! (on some folk tales of Ganesha on the occasion of Vinayaka Chaturthi). *The New Indian Express*; August 27, 2000

Devaraju, A. Creating job satisfaction. *Deccan Herald*; September 13, 2000

Vasavi, A R Schooling in the urban poverty zones. *CIEE Newsletter*, September 2000



THE SEARCH FOR CONSCIOUSNESS IN NONHUMAN PRIMATES

Anindya Sinha

Philosophy of Science Unit

This essay is a modified version of a paper presented at the First National Conference on Scientific and Philosophical Studies on Consciousness, held at NIAS in February 1999.

Empirical studies on the cognitive abilities of nonhuman primates and their underlying mechanisms developed primarily because we assume that their intelligence and, if one may use the term, minds are most like our own. Through our understanding of them, we would possibly one day understand what it is like to be essentially human. However, this view that they are most like us also coexists in our minds with the equally pervasive idea that nonhuman primates differ fundamentally from us because they lack sophisticated language, and may, thus, also lack some of the capacities necessary for reasoning and abstract thought. Comparative studies on primate taxa, nevertheless may yet throw light on the nature and evolution of different human cognitive abilities, including that holy grail of current cognitive research – consciousness.

The need to study consciousness

Why should we study animal consciousness? In answering this question, it will be assumed that behaviour and consciousness in both animals and human beings result entirely from events that occur in their central nervous systems, and that there are

no immaterial or supernatural processes underlying conscious, subjective thoughts and feelings. Let us also assume that consciousness has a function to play in our lives. These two important assumptions are enough to warrant an interest into how consciousness, as a functional, operational process, evolved in the animal kingdom and came to be such an important part of the human mind. One point that must be remembered, however, is that we are unaware of most of the events that occur in our brains. But that component of central nervous system activity that gives rise to our conscious thoughts is of special significance because that is what binds us to a feeling of reality and makes us acutely aware of our existence. Animals possibly carry out much, or even most of their behaviour quite unconsciously, but insofar as they are conscious, their consciousness is an important attribute – from their own perspective and also from that of our own selfish one of trying to understand how we came to be what we are today.

In order to speculate on the role of consciousness in animal thinking, it becomes essential to ask why human beings need to be conscious. The importance of consciousness for human thought has, of course, been questioned as soon as it was realised that a great variety of our thoughts remain unconscious and inaccessible to us. Studies of human decision-making have also shown that self-analysis can often be wrong, misinformed, or even self-deceptive. The function of consciousness, therefore, continues to remain elusive. An interesting view suggests that consciousness has evolved to allow individuals to see into others' minds on the basis of their own introspection. In other words, it is only through an understanding of one's own self that it becomes possible to understand others and consequently,



predict their behaviour in certain, yet unobserved, situations. Consciousness, therefore, may be an essential prerequisite to any ability to speculate about the minds of others. In contrast, if one considers the brain to be a collection of modular subsystems, each concerned with different kinds of modality-specific, largely unconscious, computational processes, consciousness may function to alert the mind and provide a forum to analyse what is being detected and what is being understood.

What is consciousness?

Possibly the most difficult aspect of studying consciousness scientifically is to define it. This definition obviously has to be functional in order that it can be dissected out analytically. And it becomes an even greater problem when studying animals – because consciousness then has to manifest itself in behaviour – behaviour that can be unambiguously ascribed to being an effect of being conscious.

Two recently proposed functional definitions of consciousness are *perceptual consciousness* – the state or faculty of being mentally conscious of anything, and *reflective consciousness* – the recognition by the thinking subject of its own actions and mental states. Thus, if an animal is perceptually conscious, it would be able to believe, think, or remember; if, in addition, it is reflectively conscious, it would be aware of its beliefs, thoughts, or memories. Current thinking holds that some of the higher primates may indeed be perceptually conscious, but are extremely unlikely to be reflectively so. The principal reason for this bias against the belief that primates can reflect on their thoughts and actions is, however, methodological: people can tell us what they are aware of, monkeys cannot.

A very important functional manifestation of perceptual consciousness is *attribution*, whereby an individual is capable of attributing thoughts, emotions and desires to another individual. It is evident that primates are knowledgeable about each other's behaviour, to the extent that they can often predict and act upon this knowledge even before a behavioural interaction has occurred. But do primates know as much about each other's beliefs, emotions and intentions? To attribute beliefs, knowledge and emotions to both oneself and to others is to have a *theory of mind*. And if indeed primates are able to attribute mental states to each other, are they capable of recognising the similarity and differences between their own and others' states of mind?

The principal advantage that an animal enjoys if it is able to recognise that other individuals have beliefs, which might be different from its own, is that it becomes capable of immensely more flexible and adaptive behaviour. It might then be able to manipulate another individual's actions and beliefs in a great variety of social situations. Furthermore, if it can recognise ignorance in others, it can selectively reveal and withhold information from them. Again, novel information can be transmitted across individuals by active teaching rather than by the relatively slow process of observational learning. However, there have almost been no such systematic studies of attribution of mental states in social animals, including non-human primates.

Attribution of mental states

Functionally, an elegant theoretical framework to investigate the problem of attribution of mental states in animals is that of the *intentional stance*, put forward by the cognitive scientist and philosopher

Daniel Dennett. If one assumes that animals are intentional systems capable of mental states like beliefs, desires and emotions, different levels of intentionality can be clearly postulated:



Zero-order: an individual has no beliefs or desires at all. All behavioural actions are thus instinctive, invariably evoked in response to specific stimuli.

First-order: an individual has beliefs or desires, but no beliefs about beliefs. Behavioural acts can thus be generated intentionally by the actor who, however, need not have any conception of the audience's mental states.

Higher-order: some conception exists about both one's own and other individuals' states of mind. In second-order intentionality, for example, an individual behaves in a particular way because it wants others to believe in something. At the third level, it wants others to believe that it wants them to respond in a particular manner. Human linguistic communication, it will be realised, requires such third-order intentionality. Higher-order intentionality is interesting because it often demands some ability to represent simultaneously two different states of mind. To do this, an individual must recognise that it has knowledge, others have knowledge, and that there may be a discrepancy between them. Unfortunately, very few animal studies have so far extensively tested for these alternative capacities of attribution of knowledge.

Several lines of observational and empirical evidence, however, suggest that some of the higher apes may indeed be able to attribute mental states to each other. In experiments where mutually dependent individuals had to assume distinct roles and

later exchange positions to solve a particular problem, for example, chimpanzees were able to cooperate and solve common problems. Chimpanzees must clearly be able, therefore, to impute beliefs and intents to each other. In similar experiments, however, rhesus macaques failed to perform successfully – a possible indication that monkeys may not be as adept in recognising complex motives in other individuals. The ability to attribute mental states to other individuals is also manifest in such behavioural paradigms as intentional communication, teaching, imitation, as well as recognition and sharing of emotions; illustrative examples of these are known and, if analysed carefully, may provide further evidence of perceptual consciousness in the higher primates.

Another excellent measure of attribution in primates is provided by acts of tactical deception. Human-like deception requires that a signaler create or support a false belief in another individual – possible evidence for a theory of mind. Monkeys and apes are able to falsify or conceal vocal signals, facial expressions, and body gestures in social contexts as diverse as courtship, aggressive interactions and feeding competition; some of these are difficult to interpret except by assuming some attribution of thoughts and beliefs to others. Such individuals, however, may not always completely recognise the discrepancy that must be maintained between their own state of knowledge and that of the audience, if deception has to be successful. An insightful example of this is that of an individual bonnet monkey, whom I observed on one occasion, repeatedly giving false predator-alarm calls to keep another aggressive male at bay but then descending from the trees during such deceptive acts, thus betraying his own lack of belief in the predator that he was

warning against! In general, behavioural constructs such as those discussed here, however, need to be analysed very carefully in order to ascertain whether intentionality and consciousness can indeed be invoked as underlying mechanisms, or whether other simpler processes, such as Pavlovian contingency-dependent learning paradigms, can suffice to explain such complex phenomena. In fact, we still seem to lack examples that cannot be explained *except* in terms of a theory of mind.

Self-awareness

More complex manifestations of an ability to attribute mental states and perspectives to others would also seem to require that individuals be reflectively conscious, and possess some degree of self-awareness. For individuals to clearly distinguish between their own thoughts and beliefs and those of others, for example, would obviously require some accessibility to their own minds. Current evidence for self-awareness in animals, however, seems to be patchy and inconsistent. But, before proceeding further, some definitions again need to be clearly spelt out.

Self-recognition is a conservative definition referring to the ability of an animal to distinguish oneself from others without implying any awareness in doing so. *Self-consciousness*, in contrast, is a kind of meta-self-awareness, which implies that an individual is aware of its own state of mind, and can use this awareness to predict and explain the behaviour of both itself and of others. This distinction becomes important because, as noted earlier, few mental processes ever become accessible to consciousness. Hence, it is possible to conceive that an animal could recognise its own position in a social group,



distinguish between its own motives and those of others, and even attribute some beliefs to others without having reflective access to its own mind. Higher-order intentionality can be effective, however, only in the presence of some degree of truly reflective consciousness. To successfully deceive an audience, for example, an individual must be able to attribute false beliefs to others, and this can be achieved only if an animal is capable of comparing its own knowledge with that of other individuals. Such a task clearly demands at least some level of self-consciousness, including an ability to be introspective.

Experiments with mirrors have thrown some light on the extent of self-awareness in some animal species, particularly primates. In some typical controlled tests, mirror-habituated chimpanzees, whose foreheads have been marked with odourless paints, explore those parts of their faces with the help of a mirror. This has been interpreted to suggest that chimpanzees are able to recognise their images in a mirror, and thus, clearly have a well-defined sense of self.

It is not really evident, however, what aspects of consciousness are reflected by tests with mirrors. Although some aspects of self-recognition are clearly addressed, they reveal little about its function except under these rather restricted and artificial conditions. It is thus not evident, for example, why chimpanzees and orangutans perform well in these tests, while gorillas generally fail them. Moreover, it becomes difficult to interpret atypical responses like those of adult Japanese macaques and bonnet macaques who gaze into mirrors without interacting with their reflections in any way. It is also difficult to rule out the possibility that particular species or individuals who fail this test may reveal



some degree of self-recognition in other, more functionally relevant contexts. Interestingly, rhesus macaques can manipulate objects and monitor the behaviour of other animals through mirrors, but do not react significantly to the mirror test, as do chimpanzees. They, thus, respond appropriately to mirrored information about their environment, but not about themselves.

Knowledge of knowledge

Finally, what do animals know about what they know? Knowledge that has been obtained in one domain can be transferred to stimuli encountered in another domain only if such knowledge is accessible to the conscious knower. Such accessibility is thus obviously facilitated if an individual is, at least, partially aware of what it knows and can reflect upon this knowledge at a different point of time. Bonnet macaques, which I have been studying for the past seven years, seem to know each other's positions in the dominance hierarchy and their respective social attractiveness as allogrooming companions. But are these monkeys aware of what they know? Did the knowledge obtained by them in the domain of dominance ranks facilitate the acquisition of knowledge in another domain – that of social relationships? This is a difficult question to answer methodologically because it again becomes difficult to ontogenetically distinguish between learned behavioural contingencies and true transfer of knowledge from one domain to another.

Moreover, we know that under certain specific conditions, humans can also perform fairly complex tasks without being aware of doing so. Amnesiacs who are unaware of learning simple conditioned tasks, sleepwalkers who don't fall down

stairs, or blindsight victims who can see, but think they cannot, are intriguing examples of elaborate actions carried out unconsciously. Similarly, animals might also perform quite complex tasks or perceive complex distinctions between two stimuli without knowing or being aware of what they are doing. However, experiments with orangutans and rhesus macaques, in which certain oddity tests of analogical reasoning were solved either by hypothesis-formation (orangutans) or by simple associative learning (rhesus monkeys), showed that the apes were better able to form generalisations than were the monkeys when challenged subsequently with similar problems using novel stimuli. Monkeys seem to be able to solve complex problems only in the realm of social relationships, and may be poor at extending these skills outside the social domain.

Planning for the future (for example, carrying of hammers by chimpanzees to crack nuts) is another example that may also require some insight into possible solutions for potential problems posed by the environment. But these appear to be exceptions rather than the rule. Empirical and theoretical evidence now increasingly point to how the most impressive accomplishments of these almost minds have remained confined to rather domain-specific areas, within a relatively narrow range of activities.

In conclusion, although some higher animals, particularly apes, do occasionally act as if they recognise that other animals do have beliefs, most, if not all, of these examples can usually be explained in terms of learned behavioural contingencies, without recourse to higher-order intentionality. Apes do seem to have a theory of mind, however; but not one that allows them to clearly and easily

differentiate among the knowledge and mental states of their own and of others.



DOCTORAL PROGRAMME IN NIAS

NIAS is a unique institution that conducts advanced research in multidisciplinary areas that bridge the gap between the natural sciences, technology and the social sciences. Complementing its research programmes, NIAS also offers courses in different areas of research, development and policy for different groups of professionals including teachers, bureaucrats, and executives.

One constraint that NIAS has functioned under so far has been the lack of a doctoral programme whereby young students are trained in the research areas that the Institute has traditionally been interested in. There is, however, an urgent need for such a programme for two principal reasons. First, the unique multidisciplinary academic culture that NIAS has so carefully been building up over the past years has to be nurtured and not allowed to dissipate with the passage of time. This would require that young, talented, and committed students are identified and absorbed into the organisation – they would then serve as torchbearers into the future. Second, much of the research being conducted in the Institute, being of an interdisciplinary nature, requires cooperation between a number of specialists. Large groups such as these would definitely benefit from young researchers of different disciplines who can actively contribute to the progress of the group in their respective areas of expertise.

It must also be noted that there has been, in recent times, increasing awareness and interest in issues relating to the interfaces between the natural sciences, technology and the social sciences among young

Indian graduate students. Many of them, in fact, are becoming increasingly attracted to pursuing a research career in these interdisciplinary areas. Very few opportunities, however, exist for such students, who have dared to think differently, to pursue a career of their choice within the country. In collaboration with MAHE, an innovative leader among institutions imparting higher education in the basic and applied sciences in the country, NIAS has, therefore, begun a doctoral programme that would specifically award doctoral degrees to students interested to pursue independent research in the areas that NIAS specialises in. For more information, please contact Anindya Sinha (asinha@nias.iisc.ernet.in).

Anindya Sinha



New Faces in NIAS

Savita Angadi

Ms Angadi, who hold a Bachelor's degree in Electrical Engineering and Electronics from Karnataka University, Hubli, has joined the Mathematical Modelling Unit of the Institute as a Research Scholar under the NIAS-MAHE PhD Programme. She will work on a thesis, tentatively entitled *Nonlinear Time Series Analysis* under the guidance of Prof P G Vaidya.

The overall goal of Ms Angadi's research is to develop methods for finding equations from sampled data, in a form known as the Time Series. These methods are to be seen as an alternative to the methods of finding equations directly from "First Principles". Such methods are more likely to be applicable to many kinds of problems, as,

for example, those that arise in the biological sciences, where the first principles approach often does not work in practice.



Ms Angadi and Prof Vaidya are especially interested in time series which result from nonlinear (including chaotic) systems. They intend to study, as model systems, time series from the heart (ECG), brain (EEG) and monsoon (rainfall) data, as well as computer-generated series from the Duffing's equation. All these problems are nonlinear and, most of the time, chaotic. The method which they are planning to focus on first is the method to find the Unstable Periodic Orbits (UPO) from these time series. The main task would be to further develop existing methods to find such orbits and to invent new ones in the process. The next task would be to use the UPO's in removing noise from the data, in making predictions and in constructing equations.



Distinctions for NIAS Faculty

K Ramachandra

Elected Vice President of the Calcutta Mathematical Society for the period from 2000 to 2003



Courses taught by NIAS Faculty

A R Vasavi developed and taught a course on *Social transformation in India* for first-year MBA students at the Indian Institute of Management, Kozhikode, Kerala, during the periods from July 4 to 15 and from August 28 to September 15, 2000.



Important Events

Complementing its research programmes, NIAS organises a variety of seminars, workshops, and academic courses each year. Some of the important events that were organised during the period from July to September 2000 included:

WORKSHOP ON NEW METHODS IN DIGITAL ARCHIVING

July 11 – 14

This workshop was organised as the first part of the training course offered to the representatives of the National Archives, New Delhi; National Museum, New Delhi; Salarjung Museum, Hyderabad; and the Sri Chandrasekharendra Saraswati Visva-vidyalaya, Kancheepuram, to set up digital archives in these respective institutions. Prof R Narasimha, Director of NIAS, gave the welcome address while the introductory remarks were made by Prof B V Sreekantan, Chief Advisor to the the project entitled "Setting up of digital archives for digital preservation of manuscripts, paintings and drawings", under the aegis of which this workshp was run. Dr Sangeetha Menon overviewed the workshop with a talk entitled "From the shelf to the digital media: Simple and effective methods to preserve our ancient heritage". The other lectures given were "Modelling and simulation of digital data" by Ms Savita Angadi and "Process of digitisation" and "Enhancement of digital photographs", both by Prof Prabhakar Vaidya. The key feature of this workshop was the hands-on tutorials given to the participants. The tutorials, which covered topics like digital copying, image editing, database management and electronic publishing, were taught by

Ms Shilpa Prakash, Ms K R Suchitra, Ms V B Mariammal and Mr H L Vasu. Prof K Yajnik, former director of CSIR-Centre for Mathematical Modelling and Computer Simulation gave the valedictory address on "Some reflections on the future of digital archiving". The participants were presented with certificates and with CDs written during the workshop.

Sangeetha Menon

FOURTH NIAS COURSE FOR THE INDIAN FOREIGN SERVICE

July 31 – August 5

The fourth NIAS course for the probationers of Indian Foreign Service, 1999 batch, was organised with Sangeetha Menon as its Coordinator. The course, with the theme "India and the Oceans", focussed on a variety of topics like ocean technologies, national security, fishing and sea-faring traditions. The inaugural address was given by Admiral V S Shekhawat on "National security and the Indian Ocean". While the introductory remarks were made by Prof R Narsimha, Director of NIAS, the course was overviewed by Dr Sangeetha Menon.

The speakers, drawn from diverse fields of expertise relating to the main theme of the course, included Prof M Ravindran, Dr Satish R Shetye, Prof Sulochana Gadgil, Prof V K Gaur, Dr Lotika Varadarajan, Prof John Kurien, Sri A P Venkatesvaran, Admiral Sridharan, Dr A E Muthunayakam and Dr D P Rao. The two other programs for the course were the visits made to Infosys Ltd and the Indian Space Research Organisation, and a concert of Carnatic classical vocal music by Shri N R Prashanth. The course concluded with project



presentations by the participants. In connection with the course a compendium of related topics was brought out and circulated as course reading material.

Sangeetha Menon

SEMINARS ON INFRASTRUCTURE

NIAS has as one of its major aims the conduct of multi-disciplinary research on the complex issues that face Indian and global society. In carrying out such research we appreciate the fact that these complex issues require experts in the natural sciences and technology to work closely with those in the social sciences and the arts, as well as with managers and administrators. Only then would it be possible to formulate solutions that are acceptable, and hopefully even attractive, to large sections of the population. The Institute is keenly aware that while considering issues that are critical for society at large, it is essential that solutions of problems on a smaller scale must also be closely examined.

It is with such thoughts in mind that over the last few years the Institute has organised several meetings to examine the critical issues that the city of Bangalore faces with regard to its civic infrastructure. It is well known that Bangalore has grown very rapidly – more rapidly than its citizens imagined was possible, or were able to manage. So, from the time that Bangalore was a lovely garden city, we have moved to a rapidly globalising, cosmopolitan metropolis, without ever having had the time to plan for that change, or even to consider exactly which way such a change should proceed. While Bangalore can legitimately take pride in the attention that it now receives from all over the world, it is important to realise that if in that process

it loses its soul very little of true human value will have been gained.



Flowing from this realisation, NIAS organised the first seminar in this series on "Infrastructure – key to growth: Is Karnataka geared up?" on June 13, 1997. A second seminar was held on November 27-28, 1998, this time with the theme "Status of infrastructure in Karnataka – a year later". In both these seminars the deliberations were on the infrastructure available in Karnataka, in general, and that in Bangalore, in particular.

In the year 1999, we organised a round-table meeting on a scheme for decongesting Bangalore by encouraging radial development along the Bangalore-Mysore corridor. It was argued that a high-speed twin-track electric rail link would be a cost-effective solution for spreading people, prosperity and development in directions radiating away from Bangalore. This meeting was jointly organised with the Karnataka State Planning Board, with the active support of Dr. D M Nanjundappa, who was then Vice-Chairman of the Board. This proposal also appeared to have the wide support of the general public. NIAS is happy to note that since then the proposal has been accepted by both the State Government as well as the Union Ministry of Railways.

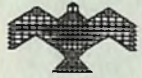
We continued this series of seminars this year as well with a meeting on "Infrastructure – transport, watershed management and water harvesting, and IT in construction management" on July 1, 2000. Transport and water continue to remain major problems in the city even today. We also added a brief session on the impact of information technology in construction management – a subject which seems most appropriate in a city that is the

centre of information technology in the country, and one in which construction is now proceeding at a frantic pace all across and even beyond the core metropolitan area.

This seminar was inaugurated by Mr T R Satish Chandran, Former Governor of Goa and Former Principal Secretary to the Prime Minister. In his keynote address, Mr Satish Chandran highlighted the important aspects of transport which always serves as a key component of the economic infrastructure of a country. Lack of investment on the modernisation of railways, the population of vehicles on roads, vehicular pollution and enforcement of road discipline were other deficiencies stressed by him. He felt that urban transport systems posed problems all over the world although in some places, it has been subsidised. But in India, subsidies are unthinkable in these areas of enterprise. As regards watershed management, good results can be obtained only if substantial contributions are regularly made in the five-year plans.

The first technical session on Transport, chaired by Dr Arcot Ramachandran, Honorary Professor of NIAS, covered topics of utmost interest to Bangaloreans. A project update on "The elevated light railway transit system" was presented by Mr N Viswanathan, Managing Director, BMRTL, who assured the participants that the ground work on the project would definitely commence on December 16, 2000. Details about the status of "The metro bus system for Bangalore city" was provided by Mr B Gopalkrishna, Director, BMTC. Dr V K Sibal, Group General Manager, RITES Limited, New Delhi, spoke on the need for "An integrated mass transit system for Bangalore". He was of the opinion that the only solution at this stage for an efficient

urban transport system in this city was to have an integrated system based on the elevated light railway transit system, the metro bus system as well as the railways, with facilities for switching over from one mode to the other with ease.



Maj Gen M K Paul (Retd) of NIAS presented a proposal entitled "Rediscover railways – a high-speed twin-track rail system between Bangalore and Mysore" and also reviewed the current status of the thinking on this proposal. Prof D Ahuja, ISRO Chair, NIAS, also reviewed certain aspects of the transport system in his presentation on "Some lessons from the history of transport systems".

The second session on Watershed Management and Water Harvesting, chaired by Mr C S Kedar, Secretary, Department of Finance, Government of Karnataka, included presentations on "Watershed management – the scenario in rural Karnataka" by Mr K Mukherjee, Executive Director, Karnataka Watershed Development Society; "remote sensing for watershed development" by Dr V S Hedge, Deputy Director, Earth Observation System, ISRO; "Water harvesting in and around Bangalore – the present situation, problems and solutions" by Dr S T Somashekara Reddy, IIMB, and "A strategy for drought mitigation in urban areas" by Col C S Vijaykant, Executive Director, Environment and Health Foundation. There was also a video screening of a documentary on watershed management. The critical importance of addressing various problems in watershed management and water harvesting in the present scenario was made extremely evident by all the speakers.

The third session on IT in Construction Management was chaired by Wing Commander S Venkatesam, Director, Asia Pacific Region, Motorola India Electronics

Limited, while Dr K N Satyanarayana, IIT Chennai, presented a paper on "IT in construction management".

This seminar was well-attended and much deliberated upon. The participants were from various government departments responsible for infrastructure development, scientists, engineers, academicians and citizens of Bangalore, generally interested in the proper development of infrastructure in and around Bangalore.

NIAS has brought out a video documentary on the year-wise status of important aspects of infrastructure in Bangalore during the last four years. A brochure covering the various lectures and essays presented during the seminar has also been published.

Maj Gen M K Paul (Retd)

MEETINGS OF THE GENDER STUDIES UNIT

The Unit organised a consultative meeting with Department of Women and Child Development of the Government of Karnataka, various NGOs and several academics to discuss the draft paper on "Recasting of administrative reforms and redesigning policy for women's empowerment" on August 30.

The Literacy Project Team of the Unit discussed the final report of the Literacy Programme Evaluation with the District officials of Mysore and Koppal, who are in charge of these programmes. They visited the unit on September 6 and 13, respectively. The purpose of this meeting was to apprise them of the study findings, and include their comments and suggestions into the report.

N Shantha Mohan



Associates' Programme



The Institute maintains a strong outreach with its Associates Programme, organised by P K Shetty. The Associates of the Institute include prominent personalities from widely different backgrounds in the media, arts, policy-making and academia. Associates are invited to a monthly evening lecture series and other important events, and constitute a strong base of ongoing outside support and interactions for the Institute.

The Associates' Programmes during the period from July to September 2000 included the following events:

20 July The biosafety protocol
John Ashe

Ambassador John Ashe, from Antigua and Bermuda, represents several countries of the West Indies at the United Nations. He is the Chairman of the Scientific Body for Implementation of the United Nations Framework Convention on Climate Change and a member of the Council of the Global Environmental Facility. He has been closely involved in international environmental negotiations and is particularly interested in scientific issues underlying global conventions.

27 September Conserving heritage
T P Issar
Former Chief Secretary
Government of Karnataka



Wednesday Discussion Meetings

The members of the Institute meet every Wednesday morning (and rarely on other mornings too!) for informal academic discussions after a talk delivered by a member of the faculty. These Wednesday meetings, organised by *Sangeetha Menon*, also serve as a forum for invited guest speakers to deliver a lecture on a subject of their choice. The discussions then continue over the high tea that follow these talks!

The Wednesday Discussion Meetings during the period from July to September 2000 have included:

- | | |
|-----------|---|
| 5 July | Sanyasis and other seekers
<i>R L Kapur</i> |
| 26 July | Modelling of digitized data
<i>Savita Angadi</i> |
| 9 August | Controversy and growth of scientific knowledge, Part I
<i>M G Narasimhan</i> |
| 10 August | A digital panorama, Part 1
Presentation of a CD-ROM published in connection with the project on the "Setting up of digital archives for digital preservation of manuscripts, paintings and drawings"
<i>Sangeetha Menon</i>
<i>Shilpa Prakash</i>
<i>K R Suchitra</i>
<i>V B Mariyammal</i>
<i>H L Vasu</i> |

16 August Controversy and growth of scientific knowledge, Part II
M G Narasimhan



23 August Devadasis: 'Even the gods do not spare'
Asha Ramesh

13 September *Ekameva adwitiyam!* The socioecology of unimale troops of wild bonnet macaques
Anindya Sinha

27 September Questionable practices in agro-ecosystems
P K Shetty

The **guest lectures** at the Wednesday Discussion Meetings during this period included:

12 July Changing family relations in the urban setting
Siru Maunuksela Aura
University of Helsinki
Espoo, Finland

19 July Knowledge structures from the *Vedas* and *Shastras*
P Ramanujan
C-DAC, Bangalore

28 July A note on the 'tension' between models and data
Pierre Mazzega
Laboratory of Geophysical and Oceanographic Space Studies
LEGOS, CNRS
Toulouse, France

6 September Zoochosis and the underprivileged: Significance of behavioural pathologies in designing captive breeding programmes

Avanti Mallapur
University of Edinburgh
Scotland, UK

20 September Ecology of culture

Prasanna
Bangalore

THE NIAS LITERARY FORUM

A new forum, "The NIAS Literary Forum" has been established in the Institute to pursue and conduct literary activities such as play reading, reading of poetry (one's own or others') reading of short stories and so on. These activities are aimed at providing complementary support to the Institute's more regular work. The activities are open to all members of NIAS fraternity. Currently, this forum aims to meet on one Wednesday every month. For more details about its activities, please contact **M G Narasimhan**.

On August 30, the forum had organised a session in which Savita Angadi read out a selection from her own poems entitled "Daffodils".

SPECIAL PROGRAMMES

There were two special lectures organised at the Institute during the period from July to September 2000:

11 July Preserving the maritime heritage of India – success and shortcomings

E V Gangadharam
Director, Centre for
Marine Archaeology
Andhra University, Waltair

15 September Programming the traditional *Pancānga*

Michio Yano

Director

International Institute for
Linguistic Sciences,
Faculty of Cultural Studies,
Kyoto Sangyo University
Kyoto, Japan



A recital of Carnatic classical vocal music by N R Prashanth was organised at the Institute on August 3, 2000. He was accompanied on the violin by T S Krishnamurthy, on the mridangam by T S Chandrashekar and on the ghatam by K N Krishnamurthy



Meetings attended by NIAS Faculty

B K Anitha

Invited as a resource person to make a presentation on the "Findings of the status of rural women in Karnataka" to various NGOs of the state working with the World Vision Organisation on August 25

Participated and contributed to the draft paper on "Training initiatives" to be included in the Government of Karnataka Policy on women's empowerment at a meeting on August 29

Presented a paper on "Globalisation – its implications for women" at a seminar on Empowerment of Women – Challenges and Prospects in the context of Globalisation, organised by the Centre for Social Research, Christ College, Bangalore, September 29

Asha Ramesh

Presented a paper on "Women's employment scenario in the new

millenium" at the two-day Consultation Meeting on Challenges of Working Women in the New Millenium', organised by the National Institute of Public Cooperation and Child Development on August 3-4

Participated in a consultative meeting on Gender Budgetting, organised by the Singamma Srinivasan Foundation on August 28

Invited to participate and contribute to the formulation of a draft policy paper on "Gender and governance" at the two-day Regional Consultation organised by the Department of Women and Child Development, Government of Karnataka, September 13-14

Represented the views of the Gender Studies Unit to develop a policy framework for a document on women's empowerment at a meeting coordinated by the Department of Women and Child Development, Government of Karnataka on September 18

Invited as a resource person to conduct a PRI training session for the functionaries of GRAM VIKAS, a rural-based NGO, and a WOPRA study partner, Mulbagal, Kolar district, September 23

Dilip Ahuja

Attended the Brainstorming Session on Power Sector Reform, organized by the Scientific and Technical Advisory Panel of the Global Environment Facility, Bangalore, June 26-28

Presented a paper entitled "Some lessons from the history of transport systems" at the Seminar on Infrastructure Development in Karnataka, organised by the Jadavpur Alumni Association, Bangalore, July 1

Presented a paper on "Renewable energy and subsidies" at the International Symposium on Developmental Economics, Indira Gandhi Institute for Development Research, Mumbai, July 12-14



Attended the Workshop on the Assessment of the ECOFRIG Project, New Delhi, August 9

Participated in the Lead Authors Meeting, InterGovernmental Panel on Climate Change, Working Group III, Cape Town, South Africa, August 21-25

N Shantha Mohan

Presented a status paper on "Female education and literacy in Raichur and Gulbarga districts" at a workshop organised by the Karnataka State Literacy Mission Authority and the Directorate of Mass Education on July 7

Attended an one-day National Consultation organised by the National Alliance of Women on the sharing of the Concluding Comments of the UN CEDAW Committee to the Government of India and for evolving plans to ensure the implementation and follow-up activities, New Delhi, July 22

Attended the Advisory Committee Meeting of the project on 'Situational analysis of Indian women', New Delhi, August 22

Attended the Training Workshop on Gender Citizenship and Good Governance, conducted by the Women, Gender and Development Programme, Royal Tropical Institute, Amsterdam, the Netherlands, September 10-27

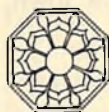
C Srinath

Participated in the DPEP State Resource Group meeting to evolve strategies for alternate schooling, Bangalore, August 22

Participated and contributed to the draft paper on "Access to credit for women" to be included in the Government of Karnataka Policy on women's empowerment at a meeting on August 29

A R Vasavi

Participated as a panel discussant at the National Seminar on Caste Enumeration in the Census at Mysore, July 29



Upcoming Events

Prof Evandro Agazzi, Professor of Philosophy at the University of Genoa, Italy, will be visiting the Institute and delivering two lectures on October 27 on "The reality of the unobservables" and "Science and values". These lectures are being jointly organised by the Centre for Studies in Civilisations, New Delhi, and NIAS. Several sessions of in-house discussions with Prof Agazzi on themes like bioethics, philosophy of mind, and scientific objectivity are also being planned during this visit. Interested scholars, researchers and students may apply to attend his lectures and join the discussions at NIAS. A limited number of travel grants may be available for the invited participants. Those interested may contact Sangeetha Menon (smenon@nias.iisc.ernet.in) at the Institute.

The ISRO Training Programme will be held from November 6-11, 2000. The programme is being organised by Dilip Ahuja (dahuja@nias.iisc.ernet.in)

The First Regional Global Environment Facility Awareness Workshop will be held on October 18-19, 2000, at NIAS. For more details on this programme, please contact Dilip Ahuja (dahuja@nias.iisc.ernet.in)



An Appeal for Funds



Building and sustaining the intellectual and social foundations of a transforming civilisation

About NIAS

India has several fine institutions, in the natural sciences, in engineering and technology, and in the social sciences. But these institutions harbour different cultures, and, indeed, are often worlds unto themselves. And there are too few bridges between and among them. The most interesting and challenging problems of the coming century probably lie in the interfaces between these cultures and disciplines – interfaces that are studied far too little in our country. It is in these no-man's lands that I believe the future of NIAS lies – in subjects that do not belong to the tidy little pigeon-holes that the current knowledge system of the world has created – artificially, and for technical or bureaucratic convenience, not because that is the way the world operates. How to build these bridges, how to bring different intellectual and social communities together, and how to look at the future of our nation and the world with the greatest possible intellectual integrity as well as public and social confidence – it is the pursuit of these aims that NIAS is taking up as its mission.

If we have to achieve these goals it is necessary for us to bring together the best in the natural and social sciences. The late JRD Tata, who conceived of this institution, saw the great need in India to form a new kind of leader – he envisioned an institution that could harness creativity and commitment, mathematics and management. With my distinguished

colleagues on the faculty of NIAS, and the eminent persons we count among our Associates, I am hopeful that we can carve a unique niche for ourselves in the public and intellectual life of this country and the world, moving in the direction that our founders so clearly saw as essential for the future health of our nation.

The appeal

The pursuit of our goals demands a measure of autonomy. We need financial support from diverse sources to ensure and sustain that autonomy. The early generosity of the House of Tatas and the Government of Karnataka has given us some splendid facilities. We now need to build on this foundation, diversify our sources of income and carry out programmes that are sensitive, at one and the same time, to public and national needs as well as to the demands of uncompromising intellectual rigour.

We solicit your contributions to help us to realise our goals. Bequests can be made to the NIAS Endowment Fund in the manner described below.

R Narasimha
Director, NIAS, and
Chairman, NIAS Endowment Committee

How to make Contributions to the NIAS Endowment Fund

All contributions made to NIAS or its Endowment Fund are tax deductible under Section 35, Subsections (i) and (ii) of the Indian Income Tax Act of 1961.

NIAS is registered under the Foreign Contributions (Regulation) Act, 1976, and is entitled to receive contributions from

abroad directly (Register number 094420614, Account No. 0100005000200, State Bank of India, Indian Institute of Science, Bangalore 560 012). Contributions must be made by cheques drawn in favour of the National Institute of Advanced Studies; the cheques may be sent directly to NIAS, or credited to the State Bank of India account mentioned above with independent intimation to NIAS.



The Institute welcomes contributions of any amount. Typical sums and the purposes for which they can be used and the forms in which acknowledgements can be made are shown below.

1. *Books*
Can be donated as books or as funds to be utilised for purchase of books
Every book donated or purchased out of donation funds will carry a label indicating the name of the donor
2. *Objects of art* (paintings, sculpture etc.)
Rs 10,000/ and above
Will carry a small plaque indicating the name of the donor
3. *Annual Endowed Lecture* (speaker residing in India)
Rs 2.5 lakhs or US \$ 6,000
May be named with concurrence of donor
4. *New Office Space*
Rs 5 lakhs per room
Room will carry a plaque indicating the name of the donor
5. *Visiting Professor* (from India or abroad)
Rs 10 lakhs or US \$ 25,000
May be named with concurrence of donor

6. *Lecture Hall*
Rs 20 lakhs or US \$ 50,000
May be named with concurrence of donor
7. *East Wing, Main Building*
Rs 40 lakhs or US \$ 100,000
May be named with concurrence of donor
8. *West Wing, Main Building*
Rs 50 lakhs or US \$ 125,000
May be named with concurrence of donor
9. *Endowed Doctoral Scholarship*
Rs 10 lakhs or US \$ 25,000
May be named with concurrence of donor
10. *Endowed Fellowship*
Rs 30 lakhs or US \$ 70,000
May be named with concurrence of donor
11. *Endowed Professorship*
Rs 40 lakhs or US \$ 90,000
May be named with concurrence of donor
12. *Endowed Research Unit*
Rs 80 lakhs or US \$ 187,500
May be named with concurrence of donor



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The National Institute of Advanced Studies (NIAS) was conceived and initiated by the late Mr. J R D Tata, who sought to create an institution which would conduct advanced research in multidisciplinary areas, and also serve as a forum to bring together administrators and managers from industry and government, leaders in public affairs, eminent individuals in different walks of life, and the academic community in the natural and social sciences. The intention has thus been to nurture a broad base of scholars, managers and leaders who may contribute to tackling the complex problems facing contemporary India in a more informed and effective manner.

The philosophy underlying NIAS is given shape by its research teams, which are drawn from a variety of disciplines in the natural and social sciences. The Institute is unique in its integrated approach to the study of intersections between science and technology and social issues.



Sangeetha Menon



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